Dec. 16, 1952 J. W. SPALDING 2,621,558

FILM GATE FOR FILM HANDLING APPARATUS

Filed Dec. 21. 1949 2 SHEETS—SHEET 1

Fig. 1

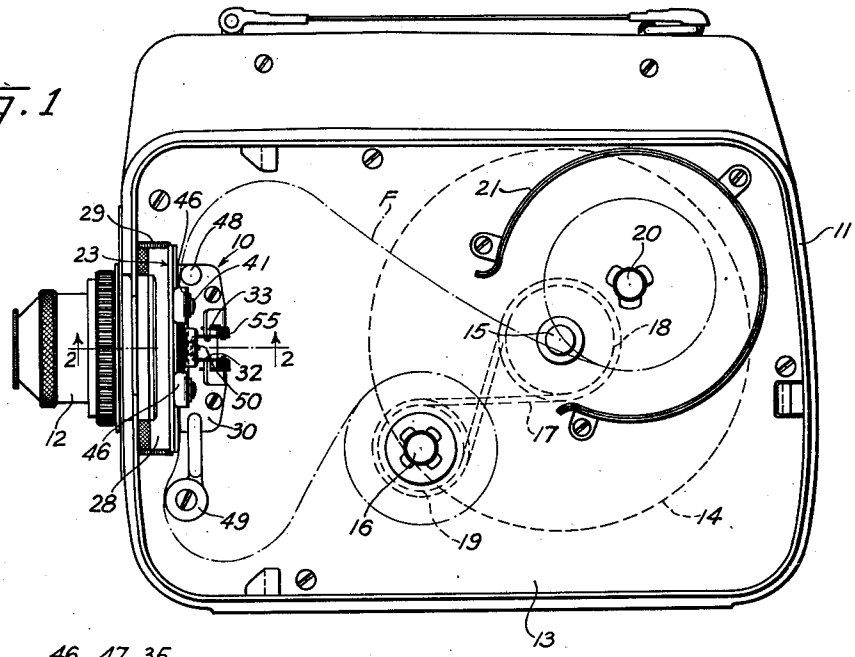


Fig. 2

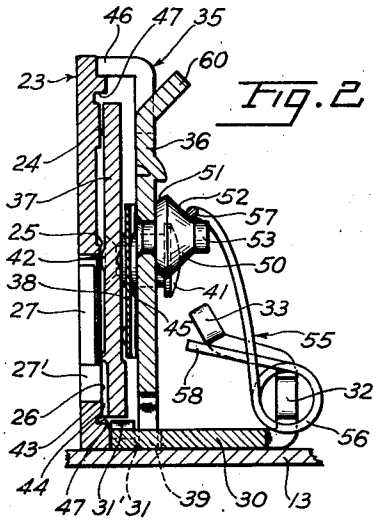
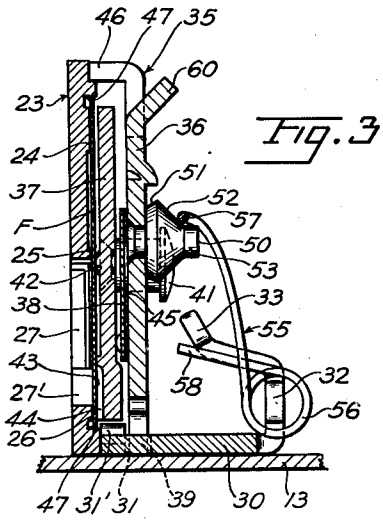


Fig. 3



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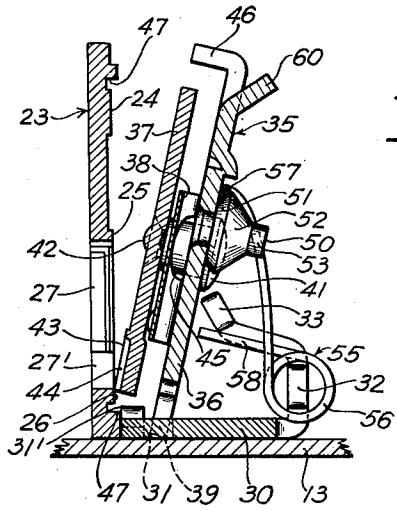


Fig. 4

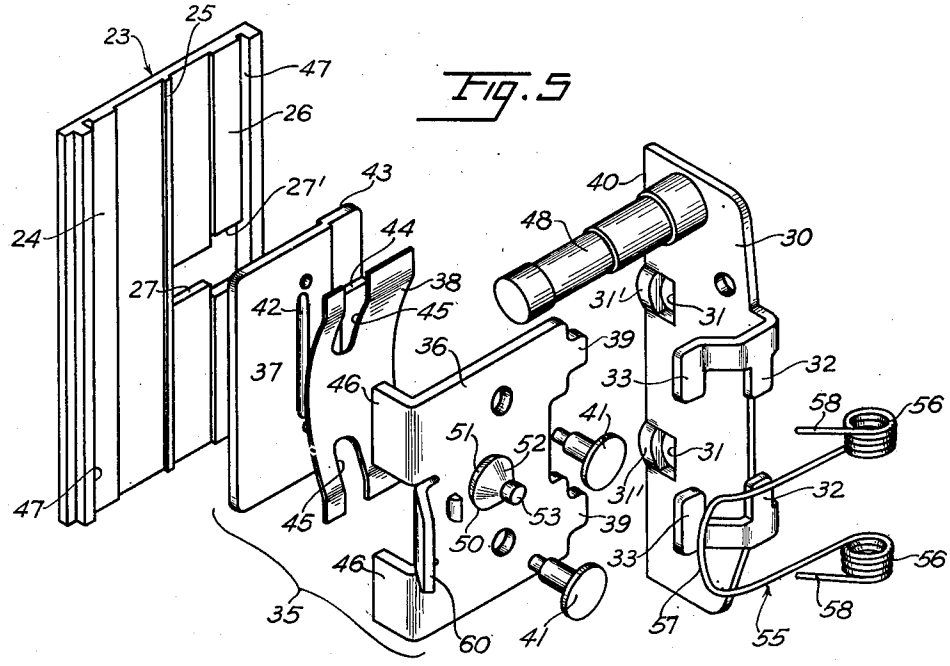


Fig. 5

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FILM GATE FOR FILM HANDLING APPARATUS

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6 Claims. (Cl. 88—17)

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The present invention relates to a film gate for film handling apparatus and more particularly to features of film gate construction which facilitate the positioning, mounting and locating of the movable gate assembly and which permit the movable gate assembly to be readily removed from its operative position for purposes of cleaning and replacement.

The primary object of the invention, therefore, is to provide a movable gate assembly which is detachably hinged to the stationary gate assembly, the hinge permitting said movable gate member to be moved to an open position for threading a film strip between said gate assemblies, and to provide a resilient member which maintains the movable gate member in its normal operating position and holds it in the open position.

Another object of the invention is to provide a single resilient member which is mounted on the stationary gate assembly and which maintains the movable gate assembly in its normal position, maintains the detachable hinge connection between said assemblies in both the normal and open positions of the movable gate member, holds the movable gate assembly in its open position, and permits withdrawal of the movable gate assembly from the apparatus.

A further object of the invention is to provide a retaining member on the movable gate assembly which has opposed conical surfaces, and a spring member having spaced coils adapted to be received by the stationary gate assembly and an intermediate portion which is adapted to engage one of said conical surfaces to maintain the movable gate assembly in position and to maintain the detachable hinge connection and which is adapted to engage the other of said conical surfaces to hold the movable gate assembly in its open position.

Other and further objects of the invention will be suggested to those skilled in the art by the following disclosure.

The aforementioned and other objects of the invention are embodied in a film gate assembly including a stationary gate member, a base member having spaced apertures therein and arranged substantially perpendicular to said gate member, a movable gate assembly including a support member having hinge lugs and positioning lugs, a movable gate member adapted to engage the stationary gate member, and a resilient member between said support member and said second gate member for urging said movable gate member toward said stationary gate member, the hinge lugs and spaced apertures providing a detachable hinge means for positioning said

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movable gate assembly and for permitting said movable gate assembly to be moved to an open position, a retaining member having opposed conical surfaces and secured to said support member, and a spring member having spaced coils anchored on said base member and an intermediate portion adapted to engage one of said conical surfaces for maintaining said detachable hinge means and for maintaining said positioning lugs against said stationary gate member and thereby positioning said gate members to form a guideway for a film strip and adapted to engage the other of said conical surfaces upon movement of said movable gate assembly to said open position for retaining it in said open position.

Reference is now made to the accompanying drawings wherein similar reference numerals designate similar parts and wherein:

Fig. 1 is a side elevation of a motion picture camera, the side cover being removed, and showing the relation of the film gate to the objective mount and film path;

Fig. 2 is an enlarged vertical section taken substantially on line 2—2 of Fig. 1 showing the relation of the various elements when there is no film in the gate;

Fig. 3 is a vertical section similar to Fig. 2 showing the relation of the various elements when a film strip is positioned in the gate;

Fig. 4 is also a vertical section similar to Fig. 2 in which the movable gate assembly has been moved to its open or threading position; and

Fig. 5 is an exploded perspective view of the elements comprising the illustrated embodiment of the invention.

While the film gate assembly is illustrated herein with respect to a motion picture camera of the double 8 mm. type in which the invention is particularly effective, it must be understood that the invention is also applicable to any type of sprocketless film handling apparatus. For purposes of illustration, the film gate 10 is shown in Fig. 1 as being mounted within camera casing 11 directly behind objective mount 12 and on mechanism plate 13. Spring motor 14 is mounted on shaft 15, take-up spindle 16 being driven therefrom by means of belt 17 encircling pulleys 18 and 19. Supply spindle 20 is freely rotatable, and the film F is confined around said spindle by the arcuate guard member 21, the film path from the supply reel to the take-up reel being indicated by broken lines in Fig. 1.

The film gate comprises a stationary gate member 23 having film engaging tracks 24, 25 and 26 and is provided with an exposure aperture 27 and an aperture 27' for the claw which engages the

film perforations. The gate member 23 is positioned and secured to bracket 28 which extends through aperture 29 in mechanism plate 13. A base member 30 may be formed integral with gate member 23 or, preferably, may be a separate member secured to mechanism plate 13. It will be noted that base member 30 is arranged perpendicularly to gate member 23 and is provided with spaced apertures 31 and spaced projections 32 and 33, as shown in Fig. 5, for a purpose to be described hereinafter.

The movable gate assembly 35 comprises a support member 36, a floating or movable gate member 37, and a bowed resilient member 38. The support member 36 is provided with hinge lugs 39 which are spaced in accordance with apertures 31 and adapted to be inserted thereinto. Lugs 39 and apertures 31, when assembled, cooperate to form a detachable hinge means between the stationary and movable gate assemblies. It will be noted from Fig. 5 that the areas 31' between the edge 40 and the apertures 31 are formed outward to permit the lugs 39 to move thereunder when the movable gate assembly is moved to its open position for threading the film between said gate members. A snubbing action is provided at both ends of the film gate, in Fig. 1, by post 48 and roller 49 mounted on base member 30 to prevent drag from the supply film roll or excessive torque in the take-up film roll so that any undesirable film movement in the gate is eliminated. The floating or movable gate member 37 is secured to the pins 41 which are free to move relative to member 36 through which they pass and has an embossed track 42 which is adapted to engage the central track 25 or the central portion of the film strip which lies thereunder. A second track 43 is embossed along the edge of the gate member 37 and engages track 26 or the area of film in contact therewith. The central portion of said track is relieved at 44 to provide clearance at aperture 27' for the film advancing claw. The resilient member 38 is interposed between member 36 and gate member 37 and is provided with slots 45 for straddling pins 41.

From Figs. 2 and 3, it will be noted that the position of member 36 is determined by the lugs 46 which engage stationary gate member 23. Spring member 38, therefore, urges movable gate member 37 into engagement with the tracks 25 and 26, the outer end of member 37 being free from engagement with the track 24. Also from Fig. 3 it will be noted that the position of member 36 remains the same and that gate member 37 and pins 41 are moved toward member 36 when the film strip has been inserted between the stationary and floating gate members. In other words, the gate members, when positioned as shown in Figs. 2 and 3, provide a guideway for a film strip movable therebetween, the edge guides 47 on the stationary member 23 preventing any sidewise motion of the film strip.

A pin 50 which is secured to the support member 36 has an inner conical surface 51 and an outer conical surface 52 which terminates in a cylindrical portion 53. Pin 50 serves as a retaining member for the movable gate assembly 35 in a manner about to be described.

A resilient or spring member 55 is formed with spaced coils 56 and an intermediate formed portion 57, see Figs. 2 and 5. The coils 56 are adapted to be received by the projections 32 and the ends 58 of said coils are retained by projections 33 so that the intermediate portion 57 is urged or biased toward movable gate member 35. The portion 57 is of such a length and formation that the central section engages the outer conical surface 52 so that support member 36 is urged toward the stationary gate member, being positioned with respect thereto by lugs 46. At the same time, spring 55 exerts a downward thrust to maintain hinge lugs 39 in apertures 31. When the movable gate assembly is moved by finger piece 60 to its open position for threading, as shown in Fig. 4, intermediate portion 57 of spring 55 is moved along the outer conical surface 52 and then engages conical surface 51 to hold the movable gate assembly in the open position. At the same time, spring 55 also maintains hinge lugs 39 in apertures 31. To remove or insert the movable gate assembly, intermediate portion 57 of spring 55 is moved to the right and the movable gate assembly as a unit is merely lifted out or inserted so that lugs 39 enter apertures 31. Upon releasing spring 55, after insertion of the movable gate assembly, it is immediately positioned and the lugs 39 are maintained in their respective apertures.

The retaining member 50 and spring 55, therefore, cooperate to provide a triple function, namely, positioning the movable gate assembly and maintaining it in its proper position, maintaining the detachable hinge connection between the stationary and movable gate assemblies in either the normal operative position or the open, or threading, position, and holding the movable gate assembly in its open position. In addition, spring 55 permits the movable gate member to be readily removed from or inserted into the camera or apparatus. Since many variations of this invention will readily occur to those skilled in the art, the present disclosure is to be viewed in an illustrative sense, and the scope of invention is defined by the appended claims.

Having now particularly described my invention, what I desire to secure by Letters Patent of the United States, and what I claim is:

1. A film handling apparatus comprising a stationary gate assembly including a gate member and a base member adapted to be arranged substantially perpendicular to said gate member and to one side of the film path and having a pair of projections spaced from and parallel to said gate member and provided with an aperture adjacent said gate member, a movable gate assembly including a hinge lug on one end thereof adapted to be received by said aperture and adapted to be positioned with respect to said gate member for holding the film thereagainst, said aperture and hinge lug providing a detachable hinge means for positioning said movable gate assembly and for permitting said movable gate assembly to be moved to an open position, a retaining member secured to said movable gate assembly and having opposed surfaces inclined toward and away from said movable gate assembly in the direction of movement of said movable gate assembly to form a raised edge therebetween, a resilient member having two spaced coils adapted to be received by said projections and an intermediate portion biased by said coils toward said movable gate assembly for engaging one of said inclined surfaces to urge said hinge lug into said aperture to maintain said detachable hinge means and to urge said movable gate assembly against said gate member and for engaging the other of said inclined surfaces, when said movable gate assembly is moved to said open position, to hold said movable gate assembly in said open position.

2. A film handling apparatus comprising a stationary gate assembly including a gate member

and a base member adapted to be arranged substantially perpendicular to said gate member and to one side of the film path and provided with a pair of spaced apertures adjacent said gate member, a movable gate assembly including a pair of spaced hinge lugs on one end thereof adapted to be received by said apertures and adapted to be positioned with respect to said gate member for holding the film thereagainst, said spaced apertures and hinge lugs providing a detachable hinge means for positioning said movable gate assembly and for permitting said movable gate assembly to be moved to an open position, a retaining member secured to said movable gate assembly and having opposed conical surfaces inclined toward and away from said movable gate assembly and forming a raised edge therebetween, a resilient member on said base member having a portion thereof biased toward said movable gate assembly for engaging one of said conical surfaces to urge said hinge lugs into said apertures to maintain said detachable hinge means and to urge said movable gate assembly against the film and for engaging the other of said conical surfaces, when said movable gate assembly is moved to said open position, to hold said movable gate assembly in said open position.

3. A film handling apparatus comprising a stationary gate assembly including a gate member and a base member adapted to be arranged substantially perpendicular to said gate member and to one side of the film path and provided with a pair of spaced apertures adjacent said gate member, a movable gate assembly including a support member having a pair of spaced hinge lugs at one end thereof adapted to be received by said apertures and a pair of spaced positioning lugs at the opposite end thereof and extending perpendicularly therefrom for engaging said gate member, a movable gate member secured in spaced relation to and movable with respect to said support member for holding the film against said gate member, and a resilient member between said support member and movable gate member for urging said movable gate member towards said gate member, said spaced apertures and hinge lugs providing a detachable hinge means for positioning said movable gate assembly and for permitting said movable gate assembly to be moved to an open position, a retaining member secured to said support member and having opposed surfaces inclined toward and away from said support member and forming a raised edge therebetween, and resilient means on said base member having a portion thereof biased toward said movable gate assembly for engaging one of said surfaces to maintain said detachable hinge means and, to maintain said positioning lugs against said gate member for holding said movable gate member in engagement with the film and for engaging the other of said surfaces to hold said movable gate assembly in said open position and adapted to be manually disengaged from said retaining member for detaching said hinge means to remove said movable gate assembly.

4. A film handling apparatus comprising a stationary gate assembly including a gate member and a base member adapted to be arranged substantially perpendicular to said gate member and to one side of the film path and provided with a pair of spaced apertures adjacent said gate member, a movable gate assembly including a support member having a pair of spaced hinge lugs at one end thereof adapted to be received by said apertures and a pair of spaced positioning lugs at the opposite end thereof and extending perpendicularly therefrom for engaging said gate member, a movable gate member secured in spaced relation to and movable with respect to said support member for holding the film against said gate member, and a resilient member between said support member and movable gate member for urging said movable gate member toward said gate member, said spaced apertures and hinge lugs providing a detachable hinge means for positioning said movable gate assembly and for permitting said movable gate assembly to be moved to an open position, a retaining member secured to said support member and having opposed conical surfaces inclined toward and away from said support member to form a raised edge therebetween, resilient means on said base member having a portion thereof biased toward said movable gate assembly for engaging one of said conical surfaces to urge said hinge lugs into said apertures to maintain said detachable hinge means and to maintain said positioning lugs against said gate member for positioning said movable gate assembly and for engaging said other conical surface, when said movable gate assembly is moved to said open position, to hold said movable gate assembly in said open position.

5. A film handling apparatus comprising a stationary gate assembly including a gate member and a base member adapted to be arranged substantially perpendicular to said gate member and to one side of the film path and having a pair of projections spaced from and parallel to said gate member and provided with a pair of spaced apertures adjacent said gate member, a movable gate assembly including a support member having a pair of spaced hinge lugs at one end thereof adapted to be received by said apertures and a pair of spaced positioning lugs at the opposite end thereof and extending perpendicularly therefrom for engaging said gate member, a movable gate member secured in spaced relation to and movable with respect to said support member for holding the film against said gate member, and a resilient member between said support member and movable gate member for urging said movable gate member toward said gate member, said spaced apertures and hinge lugs providing a detachable hinge means for positioning said movable gate assembly and for permitting said movable gate assembly to be moved to an open position, a retaining member secured to said support member and having opposed surfaces inclined toward and away from said support member in the direction of movement of said movable gate assembly to form a raised edge therebetween, a spring member having two spaced coils adapted to be received by said projections and an intermediate portion biased by said coils toward said movable gate assembly for engaging said surface inclined away from said support member to urge said hinge lugs into said apertures to maintain said detachable hinge means and to maintain said positioning lugs against said gate member, for positioning said movable gate assembly and for engaging said surface inclined toward said support member, when said movable gate assembly is moved to said open position, to hold said movable gate assembly in said open position.

6. A film handling apparatus comprising a stationary gate assembly including a gate member and a base member adapted to be arranged substantially perpendicular to said gate member and

to one side of the film path and having a pair of projections spaced from and parallel to said gate member and provided with a pair of spaced apertures adjacent said gate member, a movable gate assembly including a support member having a pair of spaced hinge lugs at one end thereof adapted to be received by said apertures and a pair of spaced positioning lugs at the opposite end thereof and extending perpendicularly therefrom for engaging said gate member, a movable gate member secured in spaced relation to and movable with respect to said support member for holding the film against said gate member, and a resilient member between said support member and movable gate member for urging said movable gate member toward said gate member, said spaced apertures and hinge lugs providing a detachable hinge means for positioning said movable gate assembly and for permitting said movable gate assembly to be moved to an open position, a retaining member secured to said support member and having an inner conical surface inclined toward said support member and an opposed outer conical surface inclined away from said support member to form a raised edge therebetween, and a spring member having two spaced coils adapted to be received by said

projections and an intermediate portion biased by said coils toward said movable gate assembly for engaging said outer conical surface to urge said hinge lugs into said apertures to maintain said detachable hinge means and to maintain said positioning lugs against said gate member to hold said movable gate member in engagement with the film, for engaging said inner conical surface, when said movable gate assembly is moved to said open position, to hold said movable gate assembly in said open position, and adapted to be manually disengaged from said retaining member for permitting withdrawal of said movable gate assembly from said apparatus.

JOHN WESLEY SPALDING.

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