

[54] **STRIP-HANDLING APPLIANCE FOR PROCESSING INFORMATION**

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[58] Field of Search**242/192, 197-200, 242/205; 26/91; 352/72, 78, 157, 158**

[56] **References Cited**

UNITED STATES PATENTS

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[57]

ABSTRACT

Strip-handling means are provided for handling a record strip forming a coil on a spool and having a leading end on the outside periphery of said coil. A threading device is movable between an inoperative position and an operative position and is adapted in said operative position to engage the outside periphery of said coil and to remove said leading end from said coil. A final control member has an engaging surface and is operatively connected to said threading device and slidable to an inoperative position and an operative position to move said threading device to its inoperative and operative positions, respectively. A drive member is disposed adjacent to said engaging surface and rotatable on an axis and movable in a direction which is generally radial to said axis into and out of engagement with said engaging surface. Said drive member in engagement with said engaging surface is rotatable to move said final control member to its operative position. A mode control switch is movable to a predetermined position. The strip-handling means are adapted to initiate the unwinding of said strip from said coil when said switch is in said predetermined position. An intermediate control member is operatively connected to said switch and said drive member and arranged to move the latter into engagement with said engaging surface in response to a movement of said switch to said predetermined position.

24 Claims, 5 Drawing Figures

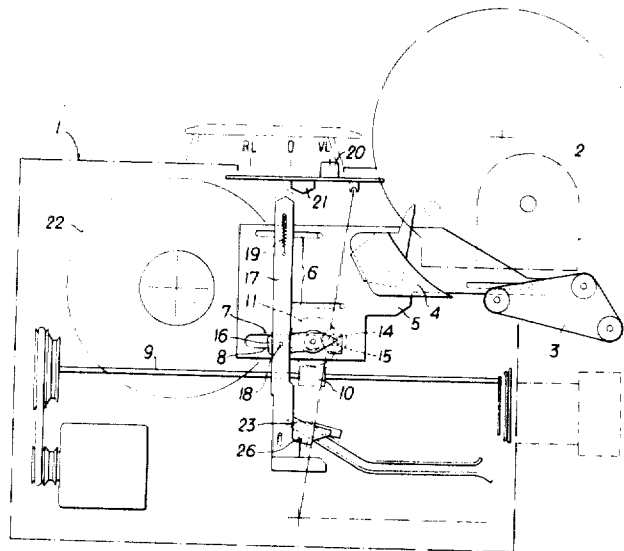


FIG. 1

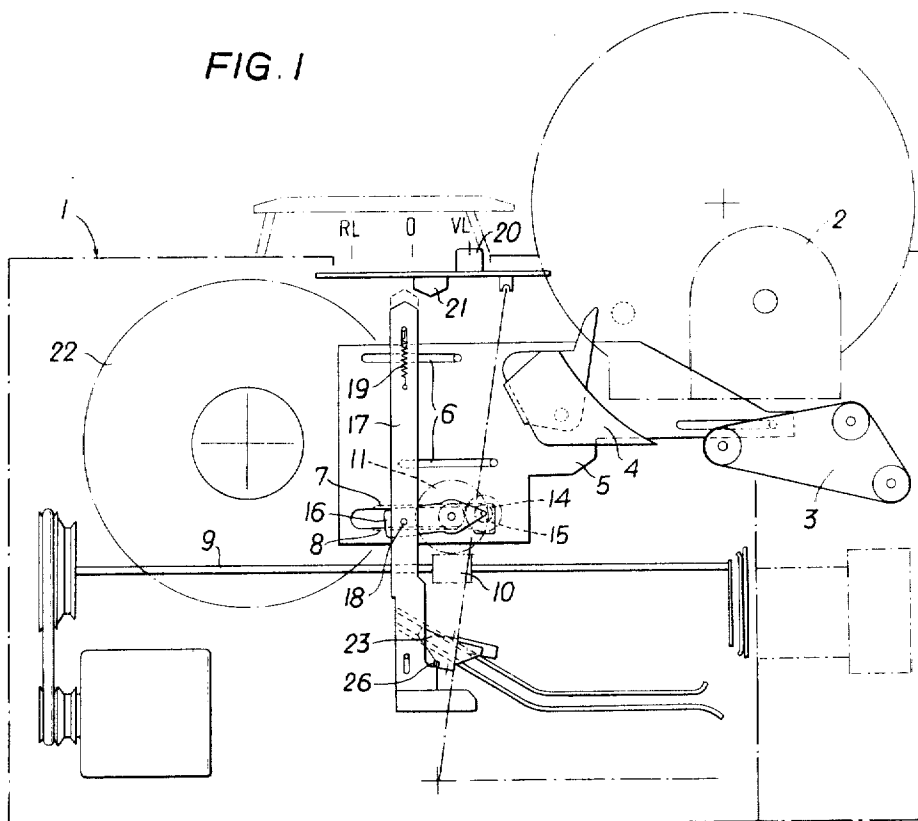
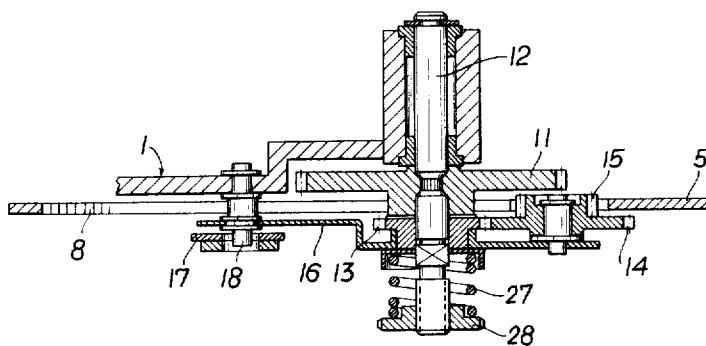
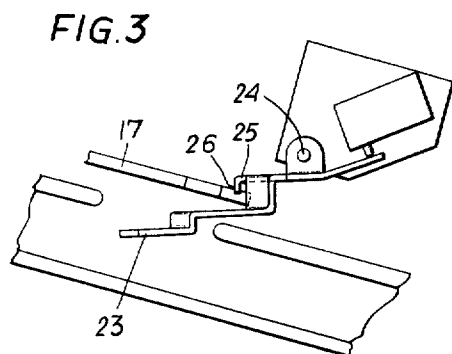
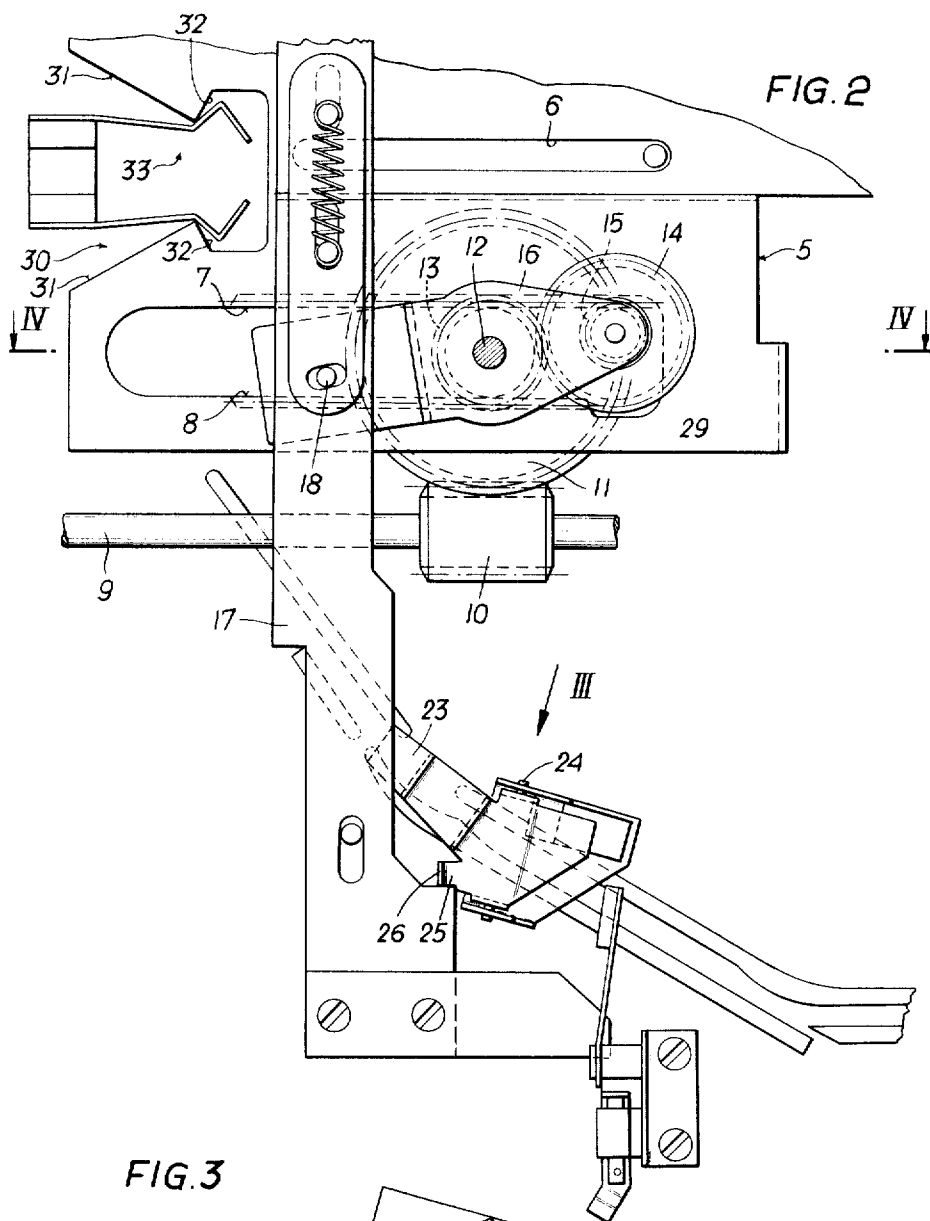


FIG. 4

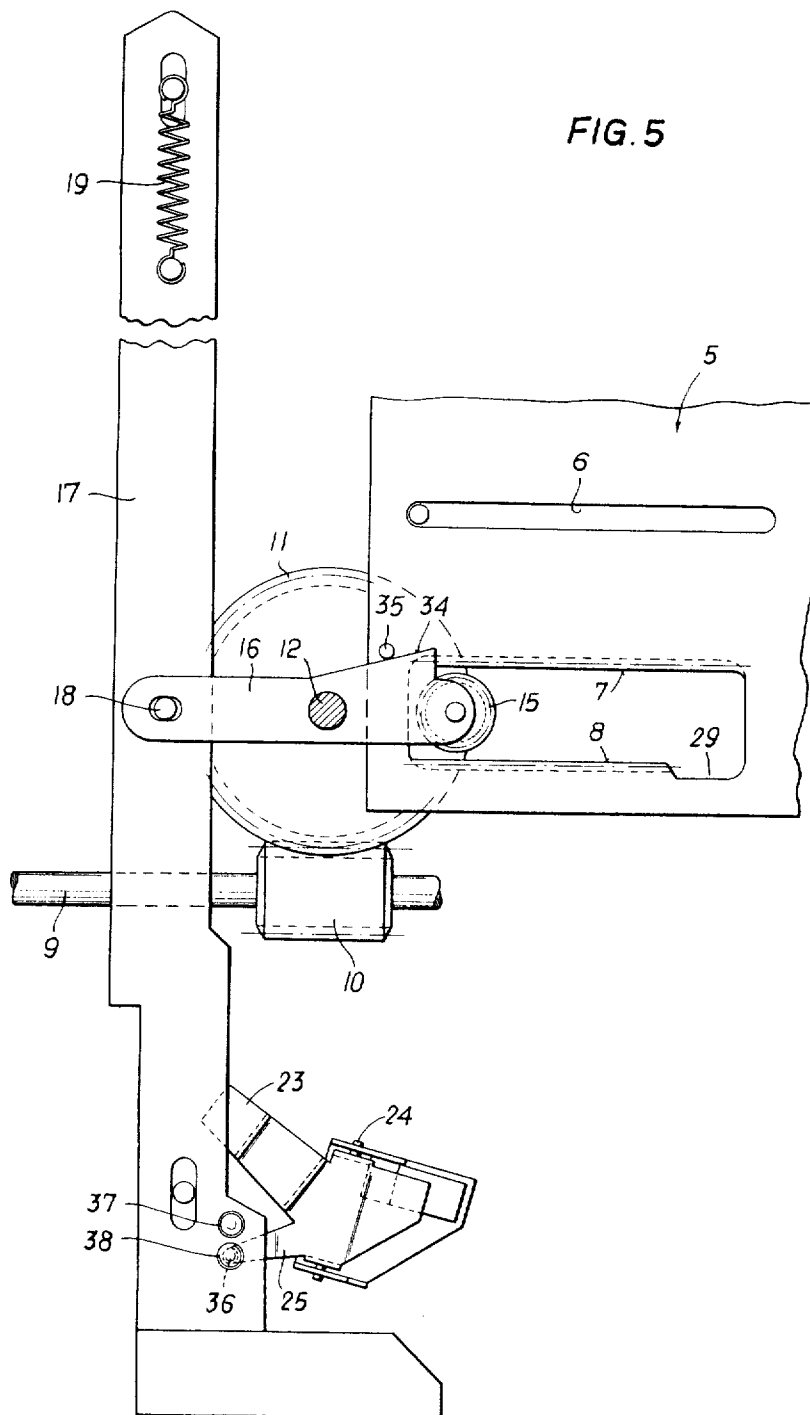


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FIG. 5



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STRIP-HANDLING APPLIANCE FOR PROCESSING INFORMATION

This invention relates to a recording and/or reproducing appliance, particularly a substandard film projector, for handling a striplike information carrier which is carried by spools and particularly kept in cartridges. Said appliance comprises a threading device for removing the leading end of the strip from the strip coil. The threading device is controlled by a slidable control member, which is slidable from an inoperative position to an operative position by a mode control switch. In accordance with prior teachings, the slidable control member of such appliance was actuated by hand. It is already known from the Austrian Pat. specification, No. 280,051 to provide the device for removing the leading end of the strip from the strip coil with engaging surfaces in the form of racks, which are in mesh with drive pinions. This arrangement requires reversible drive means including a reversing gear train. It is also known to provide a program control mechanism for controlling all functions of a projector but the expenditure involved in the gearing required for this purpose is relatively high. All devices described hereinbefore require safety means for preventing errors in the manual control of the appliance.

It is an object of the invention to provide a particularly simple appliance of the kind defined first hereinbefore. In accordance with the invention, the slidable control member is provided in known manner with at least one engaging surface; a generally radially movable drive wheel or the like is mounted near said engaging surface, and the mode control switch controls an intermediate control member, which is connected to the drive wheel or the like and moves the same into engagement with the engaging surface in dependence on the position of the mode control switch. Whereas basically similar drive means are known for zooming mechanisms associated with lenses, the object underlying the invention is entirely different. As in known arrangements, the slidable control member in the arrangement according to the invention may be spring-loaded toward its inoperative position and in that case is slidable to its operative position by the drive wheel or the like against the action of the loading spring. The drive wheel may be replaced by a drive sector or a pivoted lever. In any case, the engaging surface is that surface which is engaged by the drive wheel or the like.

Special advantages will be obtained if a least one cam is provided to control the drive wheel. In a preferred embodiment of the invention, the cam controls the intermediate control member for a short time during the movement of the mode control switch from one control position to the other. The intermediate control member may be, e.g., a slidable member which is operatively connected to the mode control switch, and disengageable detent means may be provided to hold the intermediate control member in the position which is controlled by the cam. Because the cam controls the intermediate control member only for a short time during the movement of the mode control switch from one control position to the other and the intermediate control member is then held in position by the detent means, the latter may be controlled by a control device, which causes the intermediate control member to return to its initial position when this is required for the selected function. If this were not the case and if the cam would remain engaged with the intermediate control member, the detent means could be omitted but the mode control switch would have to be shifted by hand or by a program control mechanism. The means for controlling the disengageable detent means comprise preferably a strip-sensing member, which is usually provided in substandard film projectors and which in response to the passage of the strip disengages the detent means locking the intermediate control member that serves to operate the slidable control member. In this way, the program is controlled by the film itself. Whereas it is known to initiate the return of the slidable control member to its inoperative position in that the film itself renders a detent means inoperative, the use of this concept within the scope of the invention affords the advantage that the need for a separate actuating member and a separate actuation for threading the

film is eliminated. It is sufficient to move the mode control switch to position "unwind". During the movement of the mode control switch from the zero position to the position "unwind," the intermediate control member is displaced for a short time by the cam and is held in its displaced position by the disengageable detent means. This operation will initiate the drive of the slidable control member and the threading operation. As soon as the strip has reached the sensing member, the slidable control member is returned whereas the mode control switch need not be shifted. This concept facilitates the manual control of the appliance and affords an effective protection preventing a second operation of the slidable control member because even after a repeated displacement of the intermediate control member by the cam the intermediate control member will not be locked in position but will immediately return to its initial position.

If the slidable control member is provided with two engaging surfaces, which are disposed on opposite sides of the drive wheel in known manner, it will be suitable to provide in known manner a recess at least beyond the end of that engaging surface which is engaged by the drive wheel during a movement of the slidable control member to its inoperative position. Such recess may also be provided beyond the end of that engaging surface which is engaged by the drive wheel during the displacement of the slidable control member to its operative position. Alternatively, the means for driving the slidable control member may be provided with an overload coupling. Because the threading operation takes only a relatively short time, that overload coupling will not be excessively stressed. In another alternative, means may be provided for disengaging the drive wheel from the engaging surface when the slidable control member is in its operative position. If such an arrangement comprises detent means for the intermediate control member, the latter must be yieldably locked by the detent means so that the means for disengaging the drive wheel can perform its function in spite of the detent means. Other arrangements may also be used.

Additional features and advantages of the invention will become apparent from the following description of embodiments which are shown diagrammatically and by way of example in the diagrammatic drawings, in which

FIG. 1 shows a projector embodying the invention,

FIG. 2 is an enlarged view showing the essential details of said projector,

FIG. 3 is a partly sectional elevation showing the projector viewed in the direction of the arrow III in FIG. 2,

FIG. 4 is a sectional view taken on line IV—IV in FIG. 2, and

FIG. 5 is a view which is similar to FIG. 2 and shows another embodiment which contrary to FIG. 2 is in operative position.

A substandard film projector 1 is arranged for the use of film cartridges 2. For threading the film out of a cartridge, the projector 1 comprises a threading device, which consists of a belt drive 3 and a stripper 4. The threading device 3, 4 is controlled in known manner by a slidable final control member 5, which is guided by pin-slot guides 6. To enable an operation of the final control member 5, the same is formed with two racks 7, 8, which have confronting teeth defining an aperture. Means for driving the final control member 5 are provided between the racks 7, 8.

The drive for the final control member 5 is derived from a worm 10, which is fixed to the main shaft 9 of the appliance and in mesh with a worm wheel 11. A pinion 13 is mounted on the shaft 12 of the worm wheel 11 and in mesh with a gear 14. A drive gear 15 is rigid with the gear 14 and extends through the aperture between racks 7 and 8. The gears 14, 15 are mounted on a lever 16, which is pivoted on the shaft 12. In an intermediate position of the lever 16, the gear 15 is out of mesh with the rack 7 and the rack 8. In each end position of the lever 16, the gear 15 is in mesh with a respective one of the racks 7 and 8.

The lever 16 is controlled by a slidable intermediate control member 17, which is connected to the lever 16 by a pin. A ten-

sion spring 19 tends to pull the intermediate control member 17 upwardly in FIG. 2. In its uppermost position, the top end of the intermediate control member 17 protrudes into the path of a control cam 21. The control cam 21 is so connected to a mode control switch 20 that the intermediate control member 17 will be displaced against the action of the spring 19 only for a short time during a shift of the mode control switch 20 from its zero position to position VL (unwind). The cam 21 has already disengaged the intermediate control member 17 when the mode control switch 20 has reached its position VL.

A film-sensing member 23 is provided near the film path adjacent to a take-up spool 22 of the projector and essentially consists of a spring-loaded lever, which is pivoted on a pin 24. The sensing lever 23 comprises a short arm 25, which has an angled portion 26. When there is no film in the film path, the sensing lever 23 may be moved by its loading spring into the film path. Before the cam 21 has displaced the intermediate control member, the lower portion of the intermediate control member 17 is in the path of the angled portion 26 and prevents a movement of the sensing member 23 into the film path. During the displacement of the intermediate control member 17, the latter disengages the angled portion 26 so that the sensing member 23 can enter the film path. As soon as the control cam 21 has moved past the intermediate control member 17, the same tends to return to its initial position under the action of the spring 19. This is prevented by the angled portion 26, which now protrudes into the path of the intermediate control member 17 so that the same is positively locked in position.

When the intermediate control member 17 is in this position, the lever 16 is angularly spaced in the counterclockwise sense from its neutral position so that the drive gear 15 is now in mesh with the rack 7. Because the drive gear 15 is constantly driven by the worm 10, the final control member 5 is now driven too and is displaced to the right in FIG. 2 until it has reached its operative position. During this movement, the belt drive 3 and the stripper 4 are pivotally moved in known manner into the interior of the cartridge 2.

When the final control member 5 has reached its right-hand end position, the drive gear 15 is disposed at the left-hand end of the slot which is defined by the racks 7, 8. Because the drive gear 15 is constantly driven by the worm 10, means must be provided to prevent a continued operation of the drive gear 15.

In the embodiment shown in FIGS. 2 to 4, an overload coupling (FIG. 4) is provided for this purpose. The worm wheel 11 is only frictionally connected to the pinion 13, which is freely rotatable on the shaft 12. The friction between the worm wheel 11 and the pinion 13 can be adjusted by an adjusting nut 28, which forms an abutment for one end of a compression spring 27. The other end of the compression spring 27 indirectly bears on the pinion 13. When the drive gear 15 reaches the left-hand end (in FIG. 2) of the slot which is defined by the two racks 7, 8 of the final control member 5, that gear can no longer rotate so that the operative connection between the worm wheel 11 and the pinion 13 is interrupted. Because the threading-out and threading-in operations do not take very long time, there will be no excessive wear of the worm wheel 11 and the pinion 13.

As soon as the film reaches the film sensing member 23 in the film path, a side edge of the film will laterally deflect the sensing member 23 so that the latter and the arm 25 perform a pivotal movement in the counterclockwise sense in FIG. 3. As a result, the angled portion 26 unlocks the intermediate control member 17, which is now returned to its initial position by the spring 19, so that the lever 16 is pivotally moved in a clockwise sense. At this time, the final control member 5 is in its operative position so that the pivotal movement of the lever 16 causes the drive gear 15 to mesh with the rack 8. The final control member 5 is then returned to its inoperative position, in which the drive gear 15 reaches the right-hand end of the slot which is defined by the two racks 7, 8. The rack 8 is provided with a recess 29 beyond that end so that the drive gear

15 can rotate freely when it has entered said recess. A similar recess could be provided at the left-hand end of the rack 7 and in this case the overload coupling between the worm wheel 11 and the pinion 13 could be eliminated. When the drive gear 15 is in the recess 29, a constant scraping of the rotating drive gear 15 on the last tooth of the rack 8 should be prevented. For this purpose, the final control member 5 has resilient detent means, which comprise a detent recess 30, which is defined by edges which first converge inwardly at 31 and then diverge inwardly at 32. The detent recess 30 cooperates with spring means 33, which comprise two limbs having free end portions, which initially diverge and then merge into converging portions. As the final control member 5 is moved from its operative position toward its inoperative position, the leading ends of the spring means 33 initially contact the converging edges 31 of the detent recess 30 so that the detent means oppose the displacement of the final control member 5. If the arrangement differs from the embodiment shown by way of example in that the rack 7 is provided at its left-hand end with a recess which corresponds to the recess 29, the spring means 33 and/or the edges 31 may be shaped so that the final control member 5 is constantly biased toward its operative position during the first half of its movement from the operative position to the inoperative position. In this case, the rotating drive gear 15 disposed in the recess of the rack 7 cannot scrape on the last tooth of that rack when the final control member 5 is in its operative position.

When the converging end portions of the spring means 33 have passed the throat of the detent recess 30, the spring force acts in the opposite direction because the limbs of the spring means 33 now cooperate with the diverging edges 32. The final control member 5 is thus biased toward its inoperative position so that the drive gear 15 cannot scrape on the last tooth of the rack 8 when the drive gear 15 has entered the recess 29.

FIGS. 2 to 4 illustrate two embodiments of means for interrupting the operative connection between the worm wheel 11 and the final control member 5, namely, the recess 29 and the overload coupling. Another embodiment of such means is shown in FIG. 5, in which parts having the same function are provided with the same reference characters as in the embodiment described hereinbefore. FIG. 5 shows the final control member 5 in its operative position. Means are provided to disengage the drive gear 15 from the rack 7 and to hold the drive gear 15 in a neutral position between racks 7 and 8 when the final control member 5 is in that position. For this purpose, the lever 16 is provided with an oblique cam surface 34 and a stop 35 is secured to the final control member 5. Shortly before the end of the displacement of the final control member 5 from its inoperative position to its operative position, the stop 35 engages the oblique cam face 34 to disengage the drive gear 15 from the rack 7. Alternatively, the stop 35 could be connected to the lever 16 and the cam face 34 could be provided on the final control member 5.

The means just described cannot operate if the intermediate control member 17 is positively locked, e.g., by the angled portion 26 in the embodiment described first. For this reason, the embodiment shown in FIG. 5 comprises yieldable detent means. Instead of the angled portion 26, a pin 36 is carried by the short arm 25 and at least two depressions 37, 38 are provided at the lower end of the intermediate control member 17. The detent pin 36 rests in the depression 37 when the final control member 5 moves from its inoperative position to its operative position and the drive gear 15 is in mesh with the rack 7. As soon as the stop 35 engages the cam face 34, the intermediate control member 17 is displaced so that the pin 36 is lifted from the depression 37. When the drive gear has reached its neutral position between the racks 7, 8, the pin 36 falls into the depression 38 to hold the intermediate control member 17 in position against the force of the spring 19. Only when the film-sensing member 23 has been deflected by the film is the pin 36 lifted from the depression 38 and is the intermediate control member 17 returned to its initial position by the spring 19.

The arrangement according to the invention enables an automatic, convenient operation of the final control member 5 and of the threading device 3, 4 without need for complicated transmissions, and without added expenditure prevents a repeated operation of the threading device 3, 4 when the film has been threaded into the appliance. When the threading operation has been performed and the mode control switch is moved to its zero position and is subsequently returned to its position VL, the cam 21 will displace the intermediate control member 17 for a short time. On the other hand, the intermediate control member 17 cannot be locked in position when the sensing member 23 is deflected by the film so that the intermediate control member 17 immediately returns to its initial position. This movement of the intermediate control member 17 results in a slight displacement of the final control member 5 for a short time but the final control member 5 is returned to its inoperative position as the intermediate control member 17 returns to its initial position.

Whereas the present invention has been described here with reference to a substandard film projector, it will be apparent that the invention affords the same advantages when applied to magnetic tape recording and reproducing appliances.

What is claimed is:

1. An information-processing appliance which comprises strip-handling means for handling a record strip forming a coil on a spool and having a leading end on the outside periphery of said coil, a threading device which is movable between an inoperative position and an operative position and is adapted in said operative position to engage the outside periphery of said coil and to remove said leading end from said coil, a final control member, which has an engaging surface and is operatively connected to said threading device and slidable to an inoperative position and an operative position to move said threading device to its inoperative and operative positions, respectively, a drive member disposed adjacent to said engaging surface and rotatable on an axis and movable in a direction which is generally radial to said axis into and out of engagement with said engaging surface, said drive member in engagement with said engaging surface being rotatable to move said final control member to its operative position, a mode control switch, which is movable to a predetermined position, said strip-handling means being operable to initiate the unwinding of said strip from said coil when said switch is in said predetermined position, and an intermediate control member, which is operatively connected to said switch and said drive member and arranged to move the latter into engagement with said engaging surface in response to a movement of said switch to said predetermined position.
2. An appliance as set forth in claim 1, which constitutes a substandard film projector.
3. An appliance as set forth in claim 1, in which said strip-handling means are adapted to handle a record strip forming a coil on a spool contained in a cartridge.
4. An appliance as set forth in claim 1, in which said final control member has an additional engaging surface, said drive member is movable in said radial direction into and out of engagement with said additional engaging surface and in engagement with said additional engaging surface is rotatable to move said final control member to its inoperative position, said mode control switch is movable to a second predetermined position, said strip-handling means are operable to continue the unwinding of said strip of said coil when said switch is in said second predetermined position, and said intermediate control member is arranged to move said drive member into engagement with said additional engaging surface in response to a movement of said switch to said second predetermined position.
5. An appliance as set forth in claim 4, in which said drive member is a drive wheel,

- said two engaging surfaces are disposed on opposite sides of said drive wheel, said final control member is formed with a recess adjacent to said additional engaging surface, and said drive wheel is arranged to enter said recess out of engagement with both said engaging surfaces after a movement of said final control member to its inoperative position.
6. An appliance as set forth in claim 5, which comprises means for constantly rotating said drive wheel.
7. An appliance as set forth in claim 5, in which said final control member is formed with a second recess adjacent to said first-mentioned engaging surface, and said drive wheel is arranged to enter said second recess out of engagement with both said engaging surfaces after a movement of said final control member to its operative position.
8. An appliance as set forth in claim 7, in which resilient detent means are provided, which are adapted to hold said final control member in each of its operative and inoperative positions so that the respective recess is in register with the drive wheel, and said resilient detent means are movable through a dead center position and arranged to urge said final control member toward its inoperative and operative positions when said resilient detent means are on opposite sides of said dead center position.
9. An appliance as set forth in claim 8, in which said resilient detent means comprise a spring.
10. An appliance as set forth in claim 5, which comprises resilient detent means adapted to hold said final control member in its operative position, in which said recess is in register with the drive wheel.
11. An appliance as set forth in claim 4, in which a cam mechanism is arranged to control the movement of said intermediate control member to respective end positions temporarily in response to a movement of said mode control switch to each of said predetermined positions, and disengageable detent means are provided, which are adapted to hold said intermediate control member in each of said end positions.
12. An appliance as set forth in claim 1, in which said drive member is a drive wheel.
13. An appliance as set forth in claim 1, which comprises drive means for driving said drive member, said drive means comprising an overload coupling.
14. An appliance as set forth in claim 1, which comprises means for disengaging said drive member from said engaging surface when said final control member is in its operative position.
15. An appliance as set forth in claim 1, in which one of the two members consisting of said final control member and said drive member carries an oblique cam face and the other of said two members carries a stop, which is arranged to engage said cam face and disengage said drive member from said engaging surface when said final control member is in its operative position.
16. An appliance as set forth in claim 1, which comprises a cam mechanism for operatively connecting said mode control switch to said intermediate control member.
17. An appliance as set forth in claim 16, in which said cam mechanism is arranged to control the movement of said intermediate control member temporarily in response to a movement of said mode control switch to said predetermined position, and disengageable detent means are provided, which are adapted to hold said intermediate control member in the position to which it has been moved under control of said cam mechanism.
18. An appliance as set forth in claim 17, in which said intermediate control member consists of a slidable member.
19. An appliance as set forth in claim 17, which comprises means defining a path for the movement of said strip in said appliance, and

strip sensing means normally extending into said path and arranged to be deflected by said strip moving in said path and to disengage said detent means from said intermediate control member in response to such deflection.

20. An appliance as set forth in claim 17, in which means are provided for disengaging said drive member from said engaging surface when said final control member is in its operative position, and said detent means are adapted to yieldably hold said intermediate control member in said position to which it has been moved by said cam mechanism.

21. An appliance as set forth in claim 1, in which said drive member consists of a drive gear, a lever is provided, which carries said drive gear and which is pivotally movable about a pivotal axis, and

drive means for driving said drive gear are provided and comprise an additional drive wheel mounted for rotation on said pivotal axis.

22. An appliance as set forth in claim 1, which comprises means for recording information on said strip as it is unwound from said coil.

23. An appliance as set forth in claim 1, which comprises means for reproducing information recorded on said strip as it is unwound from said coil.

24. An appliance as set forth in claim 1, which comprises means for selectively recording information on said strip and reproducing information recorded on said strip as it is unwound from said coil.

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