United States Patent [19]

Anderson

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[45] **June 18, 1974**

[54] **MAGAZINE LOADED PROJECTOR-PLAYER**

[76] Inventor: **Ray C. Anderson,** 3700 15th St., Rock Island, Ill. 61201

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[21] Appl. No.: **235,553**

[52] **U.S. Cl.** ..... **352/74,** 352/8, 352/72, 352/123, 221/88, 274/4 F

[51] **Int. Cl.** **G03b 23/02**

[58] **Field of Search** ..... 352/72, 74, 78, 123, 6, 352/7, 8; 274/4 F; 221/67, 87, 88, 240

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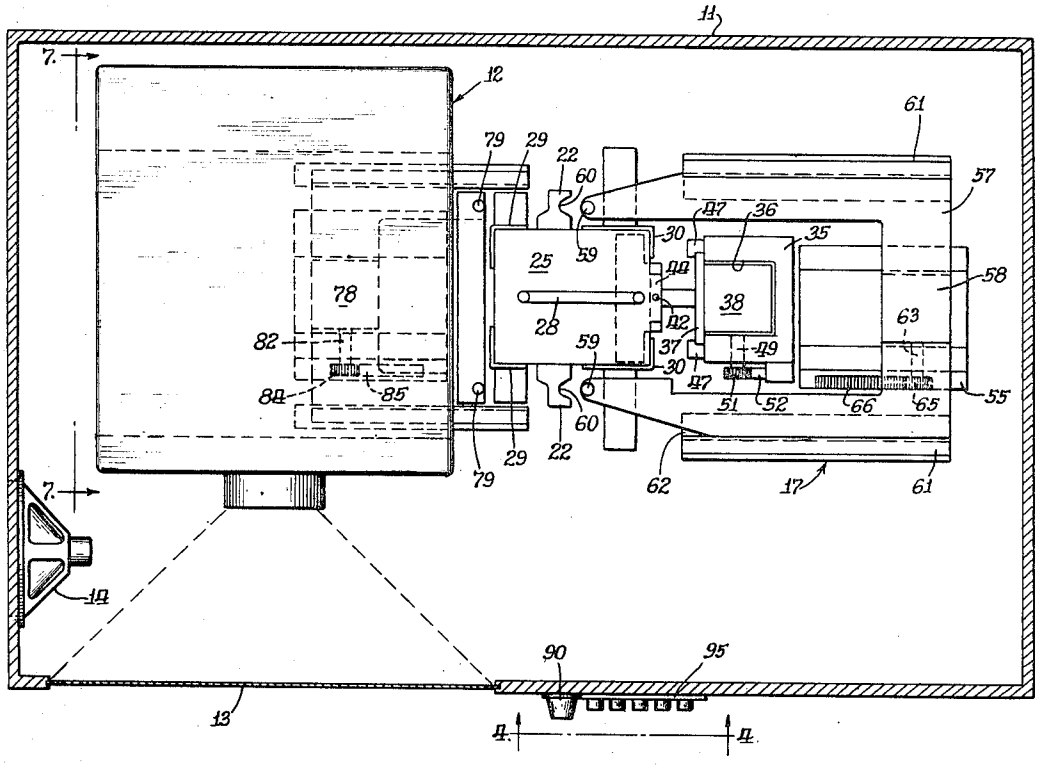
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Primary Examiner—Samuel S. Matthews
Assistant Examiner—Alan Mathews

[57] **ABSTRACT**

A unitary projector-player combination intended for use as a complete home entertainment unit and utilizing a cartridge sound film projector and novel injection-ejection mechanism for inserting cartridges into and retracting from the projector. The mechanism employs a rectangular magazine formed with a plurality of cartridge retention slots, a reciprocal slide mechanism for moving the magazine along a vertical axis, a reciprocal slide mechanism for injecting a cartridge into the projector, and a reciprocal slide mechanism for ejecting a cartridge from the projector and returning it to its slot in the magazine.

14 Claims, 7 Drawing Figures



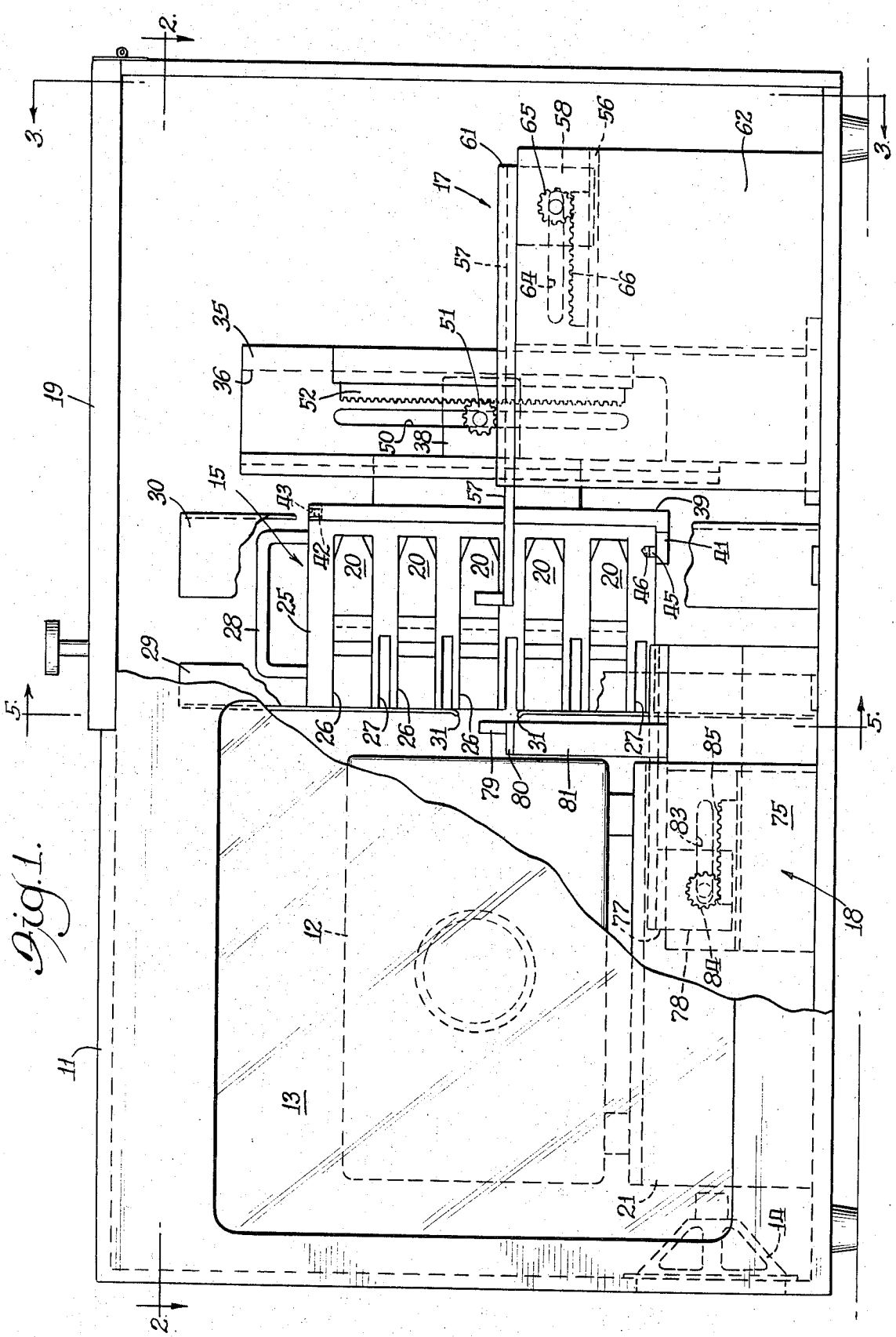


Fig. 1.

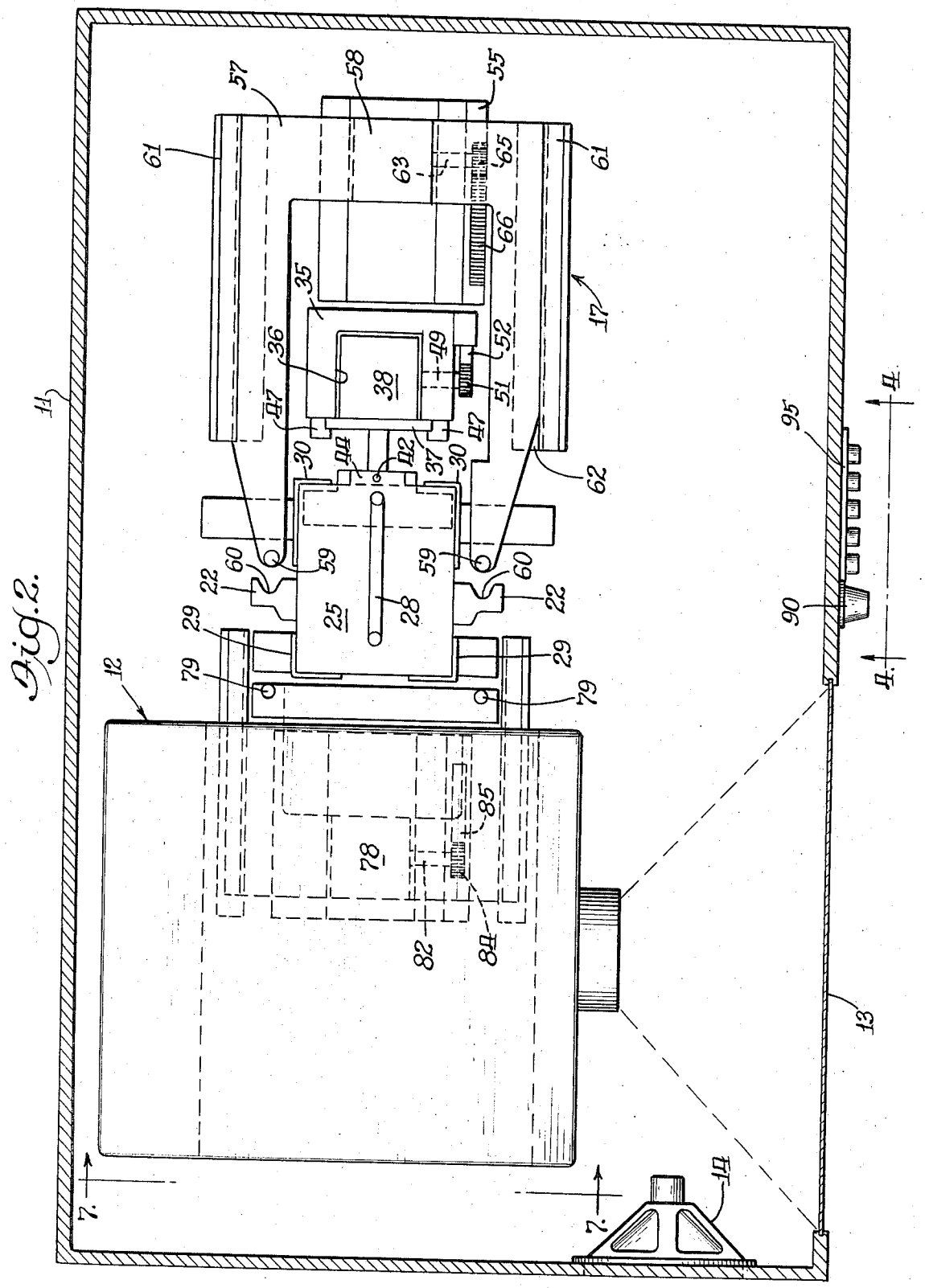

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Fig. 2.

Fig. 3.

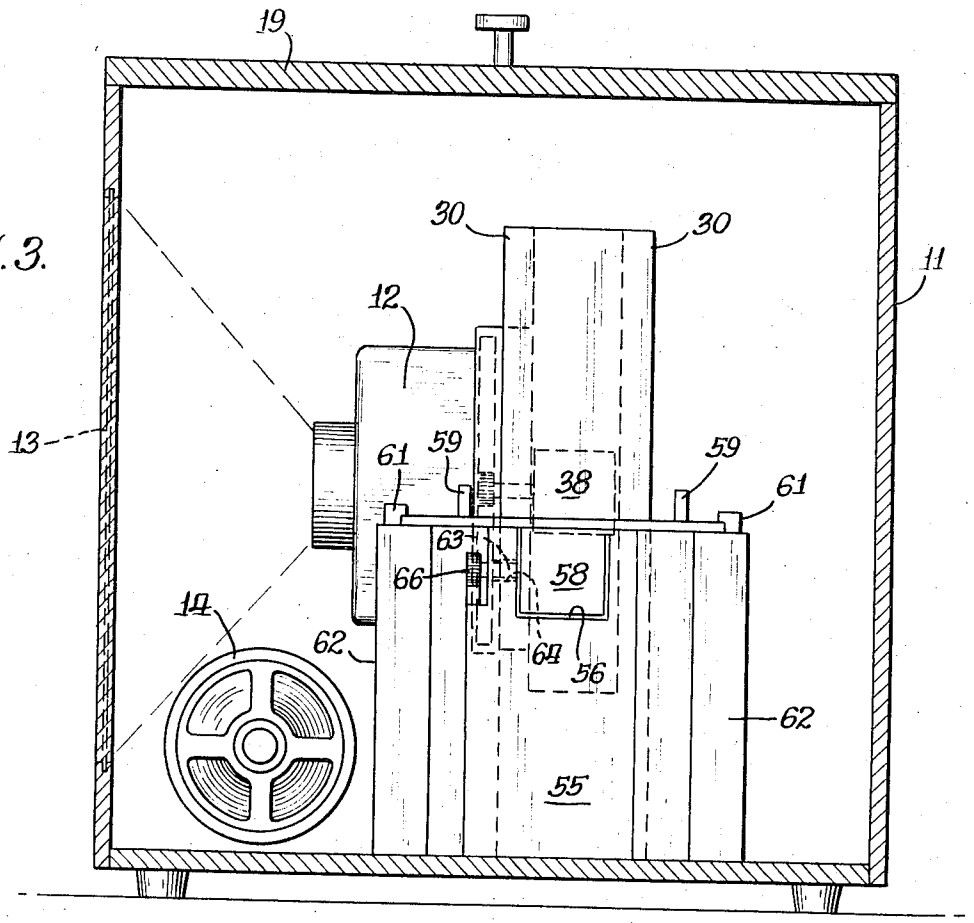

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Fig. 4.

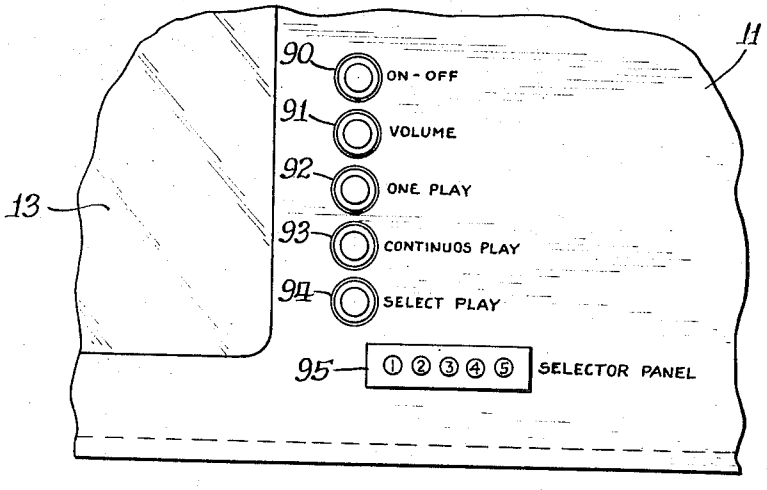

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CONTINUOS PLAY
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SELECTOR PANEL

Fig. 5.

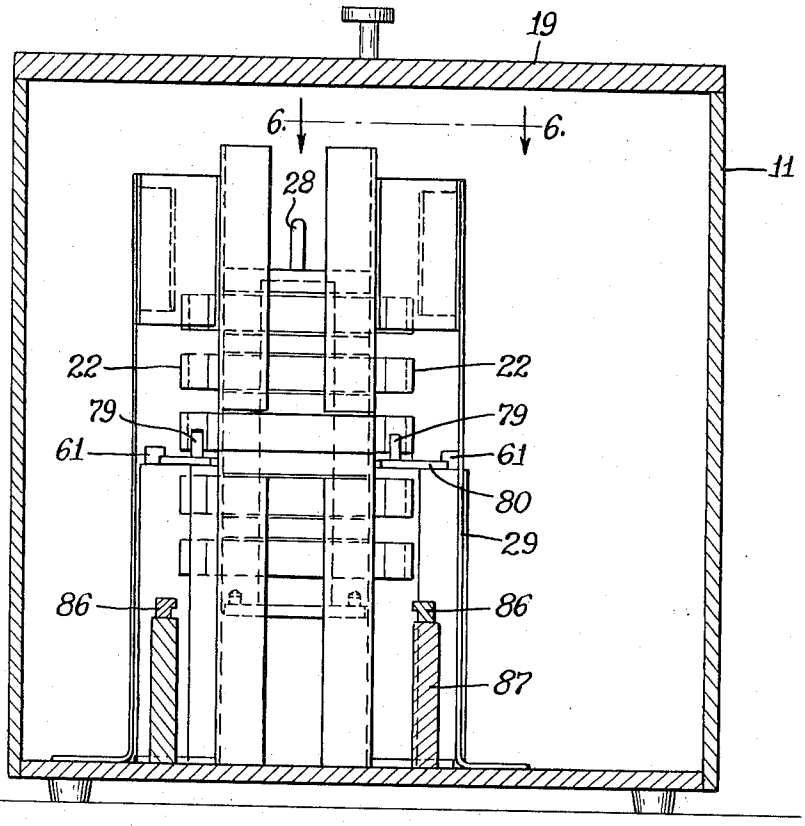


Fig. 7.

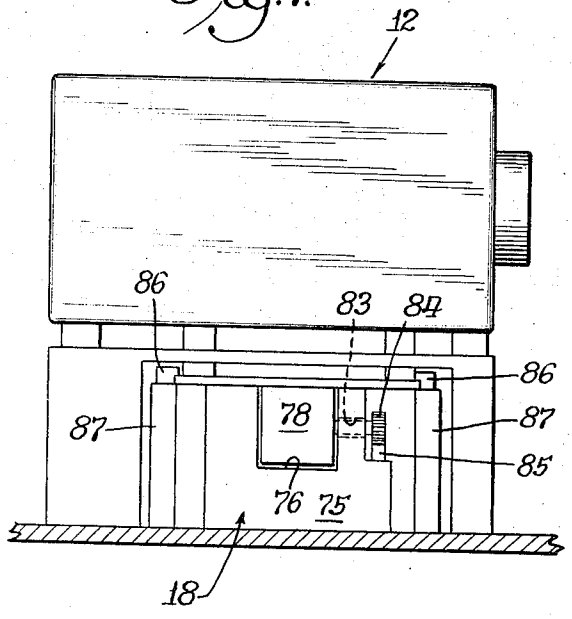
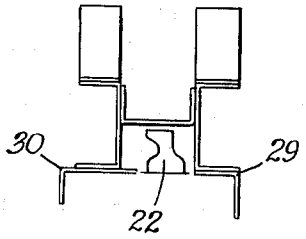


Fig. 6.



MAGAZINE LOADED PROJECTOR-PLAYER

This is a continuation-in-part of my copending application Ser. No. 213,580, filed Dec. 29, 1971 now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to the field of motion picture projector units, and more particularly, to a projector-player unit having an automatic film cartridge selection and changing mechanism.

DESCRIPTION OF THE PRIOR ART

Projector-players capable of receiving a plurality of sound film cartridges and mechanisms for successively injecting and ejecting the cartridges have been described in my co-pending applications for U.S. Patent Ser. No. 171,130, filed Aug. 12, 1971, and Ser. No. 183,957 for a Unitary Projector-Player, filed on or about Sept. 27, 1971 now U.S. Pat. No. 3,771,859. In these devices, the separate cartridges were loaded by hand into the injector mechanism, or into a drum for feeding the cartridges into the projector.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a novel cartridge loading mechanism for a projector-player comprising a cartridge magazine, generally in the form of an elongate rectangular block and formed with a plurality of cartridge retention slots, that is loaded with cartridges and inserted as a unit into the cartridge selector mechanism. The cartridge magazine provides a convenient device for programming the order of play of the cartridges as well as storage rack for the cartridges when not in use.

It is a more particular object to provide a vertically movable slide mechanism for moving the cartridge magazine as a unit into any one of a plurality of selective positions.

It is an additional object to provide a horizontally movable slide mechanism for injecting the selected cartridge into the projector from its position in the magazine.

It is still another object to provide a horizontally movable slide mechanism for ejecting the cartridge after completion of play and returning it to its slot in the magazine.

With appropriate electrical controls, the mechanism can be operated to select an individual cartridge, play all of the cartridges in succession and then stop, or play all of the cartridges in succession and then recycle to play them all again.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view, partially cut away, of the projector-player of the present invention;

FIG. 2 is a top view, taken on line 2—2 of FIG. 1, showing the cartridge magazine and cartridge injection and ejection mechanisms;

FIG. 3 is an end view taken on line 3—3 of FIG. 1;

FIG. 4 is a fragmentary front view, taken on line 4—4 of FIG. 2, showing the control switches;

FIG. 5 is a sectional side view, taken on line 5—5 of FIG. 1;

FIG. 6 is a fragmentary top view, taken on line 6—6 of FIG. 5;

FIG. 7 is an end view, taken on line 7—7 of FIG. 2, showing the film cartridge ejector mechanism;

FIG. 8 is a front view, partially cut away, of a modified form of the projector-player; and

FIG. 9 is a top view, taken on line 9—9 of FIG 8, showing the cartridge magazine and cartridge injection and ejection mechanism.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The unitary projector-player of the present invention is designated generally by the numeral **10** and comprises: a housing **11**, a projector **12**, a screen **13**, a speaker **14**, a cartridge magazine **15**, a cartridge selector mechanism **16**, a cartridge injector mechanism **17**, and a cartridge ejector mechanism **18**. A hinged lid **19** is provided on the top of the housing **11** for easy access in loading and unloading the projector-player **10** with a plurality of sound-film cartridges **20**.

The screen **13** is of the rear-projection type and is mounted in the front wall of the housing **11**. The projector **12** is mounted on a suitable stand **21** within the housing **11** and projects the pictures from the film within a film cartridge **20** onto the screen **13**. The sound from the film within a cartridge **20** is also picked up by the projector **12** and broadcast through the speaker **14**.

In an alternate means of projection in which the projected image is reversed the image is initially projected onto a mirror from which it is reflected onto the screen. In one such construction the screen may be placed in a sidewall of the housing (in the sidewall, e.g., on which speaker **14** is now shown as being located in FIG. **2**) with a mirror located between the projector lens and screen.

The cartridge magazine **15** comprises a generally rectangular body **25** formed with a plurality of transverse slots **26** which receive in a close sliding fit relationship the film cartridges **20**. The body **25** is also formed with a plurality of clearance slots **27** located between and below the slots **26**. The magazine **15** is also provided with a carrying handle **28** attached to the top of the body **25**.

Two pair of front and rear guide rails **29** and **30** are vertically mounted within the housing **11** adjacent to the projector **12** and retain the cartridge magazine **15**. The magazine **15** is adapted to be moved selectively up and down within the guide rails **29** and **30** by the selector mechanism **16**. The rails **29** are formed with slots or openings **31** on the side adjacent to the projector **12** to allow the transfer of the cartridges **20** therethrough from the magazine **15** to and from the projector **12**.

The selector mechanism **16** comprises a vertically mounted slide block **35** formed with an internal well **36**, a slide **37**, a drive motor **38** attached to the slide **37**, and a magazine support bracket **39** also attached to the slide **37**. The bracket **39** has an upright member **40** disposed between the rear guide rails **30**, and an integral transverse base member **41**. The member **40** carries an upright pin **42** which engages a hole **43** formed in a flange **44** integral with the top of the magazine body **25**. The base member **41** carries two upwardly extending pins **45** which engage holes **46** formed in the bottom of the magazine body **25**. The slide **37** is constrained to move vertically up and down by a pair of guide rails **47** attached to the slide block **35**. The motor **38** has a drive shaft **49** which extends horizontally through a vertical

slot 50 formed in the side of the block 35. The shaft 49 carries a pinion gear 51 which engages a vertically mounted rack 52 on the side of block 35.

Each of the film cartridges 20 has a molded plastic outer shell formed with a pair of opposed horizontally extending arms 22. The arms 22 facilitate injection into and ejection from the projector 12 as will be described hereinafter.

The cartridge injector mechanism 17 comprises a horizontally mounted base block 55 formed with an internal well 56, a horizontal slide 57, a drive motor 58 attached to the slide 57, and a pair of vertically mounted injector pins 59 carried by the slide 57. The slide 57 is of an enlarged U-shaped configuration which surrounds the cartridge selector mechanism 16. Each of the arms of the slide 57 carries one of the pins 59 which are adapted to engage indentations 60 formed in the arms 22 of the cartridges 20. The slide 57 is constrained to move in one dimension in a horizontal plane by a pair of guide rails 61 mounted on upright supports 62 parallel to guide block 55. The motor 58 has a drive shaft 63 which extends through a horizontal slot 64 formed in a side of the block 55. The shaft 63 carries a pinion gear 65 which engages a horizontal rack 66 mounted on the side of the block 55.

The cartridge ejector mechanism 18 comprises a horizontally mounted base block 75 formed with an internal well 76, a horizontal slide 77, a drive motor 78, and a pair of vertically mounted ejector pins 79 carried by a pair of upright posts 81 attached to the slide 77. The drive motor 78 has a shaft 82 which extends through a horizontal slot 83 formed in the side of the base block 75 and carries a pinion gear 84. The pinion gear 84 engages a horizontal rack 85 mounted on the side of the block 75. The slide 77 is constrained to slide in a horizontal reciprocal motion by a pair of guide rails 86 mounted on upright pillars 87.

Referring now to FIG. 4, the control panel for the projector-player 10 is illustrated. The control switches are seen to comprise: an on-off switch 90, a volume control 91, a sequence control switch 92 which plays all of the cartridges 21 in succession, then stops, a second sequence control switch 93 which plays all of the cartridges 20 in succession, then recycles, a select play switch 94 for allowing individual selection or continuous play, and a plurality of individual selector switches 95 for selecting a particular cartridge 20.

In operation, the projector-player 10 functions as follows: The lid 19 is raised and a full cartridge magazine 15 is inserted into the guide rails 29 and 30. The instrument is turned on by switch 90 and the select play switch 94 is set for either continuous play or individual selection. Assume that continuous play is selected and that either switch 92 or 93 is activated. The drive motor 38 of the selector mechanism 16 is energized and the cartridge support bracket 39 is moved downward until the first cartridge 20 is aligned with the openings 31. The motor 58 of the injector mechanism 17 is then energized causing the slide 57 to move to the left (as shown in FIG. 1) pushing the cartridge 20 through the openings 31 into the projector 12. The projector 12 picks up the film within the cartridge 20 and displays the pictures on the screen 13. After the cartridge 20 is injected, the motor 58 is energized in the opposite direction and the slide 57 is returned to its original position.

Upon completion of the play of the particular film, the motor 78 of the ejector mechanism 18 is energized causing the slide 77 to move to the right (as shown in FIG. 1) and ejecting the cartridge 20 from the projector 12 and returning it to its slot 26 in the magazine 15. During the ejection cycle, the pins 79 bear against the arms 22 and the support bar 80 extends into the slot 27 in the magazine body 25 immediately below the particular cartridge slot 26 to which a cartridge 20 is being returned. After the cartridge 20 has been returned to its slot 26, the motor 78 is energized in the opposite direction and the slide 77 returned to its original position.

The motor 38 of the selector mechanism 16 is again energized, lowering the magazine 15 until the next cartridge 20 is aligned with the openings 31. The motor 58 of the injector mechanism 17 is again energized and the second cartridge 20 is injected into the projector 12. After the cartridge 20 is injected, the motor 58 is energized in the opposite direction and the slide 57 is returned to its original position.

The operational cycles described are repeated until all of the cartridges 20 have been played. If the switch 93 had been activated originally, the selector mechanism 16 is activated to raise the cartridge magazine 15 to its uppermost position and the complete cycle repeated.

A modified form of the invention is illustrated in FIGS. 8 and 9. In this modification the injector and ejector mechanisms are incorporated into one unit 218. The unit 218 is similar to the ejector mechanism 18 but differs in that the support bar carries both ejector and injector pins. The cartridge magazine 15 and selector mechanism 16 are of the same type as in the unit shown in FIGS. 1 and 2.

The injector-ejector mechanism 218 just like the ejector mechanism 18 comprises a horizontally mounted base block 275 formed with an internal well 276, a horizontal slide 277, a drive motor 278, and a pair of horizontally extending support bars 280 carried by a pair of upright posts 281. The drive motor 278 has a shaft 282 which extends through a horizontal slot 283 formed in the side of the base block 275 and carries a pinion gear 284. The pinion gear 284 engages a horizontal rack 285 mounted on the side of the block 275. The slide 277 is constrained to slide in a horizontally reciprocal motion by a pair of guide rails 286 mounted on upright pillars 287.

The support bars 280 are of substantially U-shaped construction each having a pair of inwardly extending arms 291 and 292. The support bars 280 carry a pair of horizontally spaced injector pins 293 and a second pair of horizontally spaced ejector pins 294, the latter being spaced from the injector pins 293 along a line parallel to the direction of travel of the horizontal slide 277.

The injector pins 293 are positioned on the innermost ends of the arms 291 while the ejector pins 294 are positioned on the innermost ends of the arms 292 to contact opposite sides of the arms 22 formed on the cartridge shell.

In operation, after the drive motor 38 of the selector mechanism 16 has been energized and a cartridge 20 is aligned with an opening 31, the motor 278 is energized causing the slide 277 to move from its "rest position" to the left. By this movement, the outer injector pins 293 on bar 280 contact the arms 22 pushing the

cartridge 20 through openings 31 into the projector 12. The projector 12 picks up the film within the cartridge 20 and displays the pictures on the screen 13. At the end of the film run, the motor 278 is energized in the opposite direction and moves the slide to a "load position" which is slightly beyond the "rest position." During this movement the inner ejector pins 294 bear against the opposite surfaces of the film cartridge arms 22 to push the cartridge back into its slot in the cartridge magazine. After "load position" is attained the motor 278 reverses and moves back slightly to the left to its "rest position" and stops. The movement of the motor and the associated slide mechanism carrying the injector and ejector pins is controlled by limit switches and other necessary controls (not shown). It will be appreciated that the drive motor 278 of the injection and ejection mechanism may be mounted stationary with the rack attached to the slide 277 so that the rack will move with the slide. This particular construction shown in FIGS. 8 and 9 has the advantage of eliminating one slide mechanism from the unit as a whole and is effective to reduce the overall size of the unit.

There has been shown and described a unique mechanism for playing selectively or in sequence a plurality of sound film cartridges in a convenient, readily accessible manner. The film cartridges may be stored in the cartridge magazines, and a plurality of such magazines employed, or the cartridges may be replaced in a particular magazine as desired.

It is to be understood that the embodiments shown and described are by way of example only, and the invention is not to be considered as limited thereto except insofar as the claims may be so limited.

I claim:

1. A unitary projector-player combination comprising:
- a projector adapted to project a film contained within a cartridge;
- a unitary cartridge magazine adapted to contain a plurality of film cartridges, said magazine being completely independent of the projector-player unit with which it is adapted to be associated, said magazine being slideably insertable into and slideably removable from said projector-player;
- cartridge means disposed within said magazine;
- laterally extending arm means operatively associated with said cartridge means;
- magazine retaining and guide means independent of said cartridge magazine mounted adjacent to said projector and adapted to receive said magazine and constrain its motion to the vertical dimension, said magazine being slideably disposed in said magazine retaining means thereby allowing said magazine to be freely removed from or inserted into said magazine retaining means;
- a vertically movable selector mechanism operatively associated with said magazine and adapted to move the latter to a plurality of selective positions within said retaining means,
- said selector mechanism including a vertically movable slide mechanism, magazine support means carried by said slide mechanism for supporting said cartridge means, and drive means operatively associated with said slide mechanism and operable to move said support means and the magazine supported thereby to a plurality of selective positions;
- a horizontally movable injection mechanism operable to remove a selective cartridge from its position within said magazine and inject it into said projector; and
- said injection mechanism including means for contacting said arm means during injection of said cartridge into said projector.

2. The combination of claim 1 including:
- a horizontally movable ejection mechanism operable upon completion of play of a film within a selected cartridge to eject the cartridge from said projector and return it to its respective position in said magazine.

3. The combination of claim 1 wherein:
- said magazine retaining means comprises a plurality of vertically mounted guide rails formed with a horizontal aperture adjacent to the cartridge slot of said projector.

4. The combination of claim 1 wherein:
- said magazine is an elongate body generally in the form of a rectangular block and formed with a plurality of transverse slots each of which is adapted to contain a film cartridge.

5. A unitary projector-player combination comprising:
- a projector adapted to project a film contained within a cartridge;
- a unitary cartridge magazine adapted to contain a plurality of film cartridges;
- magazine retaining means mounted adjacent to said projector and adapted to receive said magazine and constrain its motion to a vertical dimension;
- a vertically movable selector mechanism operatively associated with said magazine and adapted to move the latter to a plurality of selective positions within said retaining means; and
- horizontally reciprocable injection and ejection means operable when moved in one direction to remove a selected cartridge from its position within said magazine and inject it into said projector and, upon completion of play of a film within a selected cartridge, further operable when moved in the opposite direction to eject the cartridge from said projector and return it to its respective position in said magazine;
- said horizontally reciprocable injection and ejection means including,
- a horizontal slide member;
- a pair of spaced pull pins operatively associated with said slide member and adapted to contact one side of arms operatively associated with a film cartridge and pull it into the projector when the slide mechanism is moved in one direction; and
- a pair of spaced push pins operatively associated with said slide member and adapted to contact the other side of said arms operatively associated with a film cartridge and push it out of the projector when said slide mechanism is moved in the other direction.

6. A cartridge injection and ejection mechanism for feeding selective film cartridges into a projector-player which cartridges have a unitary outer shell formed with a pair of opposed horizontally extending arms, and comprising:
- a cartridge magazine in the form of a unitary elongate rectangular body and formed with a plurality of transverse cartridge retention slots;
- cartridge means disposed within said magazine;

laterally extending arm means operatively associated with said cartridge means; and

a vertically mounted slide mechanism;

a magazine support bracket carried by said slide mechanism and adapted to receive said cartridge magazine;

drive means operatively associated with said slide mechanism and operable to move said bracket and said magazine linearly to a plurality of selectably positions; and

a horizontally movable slide injection mechanism operable to inject one of the cartridges into the projector;

said horizontally movable slide injection mechanism including means for contacting said arm means during injection of said cartridge into said projector.

7. The mechanism of claim **6** wherein:

said horizontally movable slide comprises a generally U-shaped member, the two arms of which surround said vertically mounted slide mechanism and each carry pin means adapted to contact the arms operatively associated with the selected cartridge to inject it into the projector;

and drive means operatively associated with said horizontally movable slide for moving it horizontally.

8. The mechanism of claim **6** including:

a second horizontally movable slide mechanism disposed on the opposite side of said cartridge magazine for ejecting a cartridge from the projector.

9. A cartridge injection and ejection mechanism for feeding selective film cartridges into a projector player which cartridges have a unitary outer shell formed with a pair of opposed horizontally extending arms, and comprising:

a cartridge magazine in the form of a unitary elongate rectangular body and formed with a plurality of transverse cartridge retention slots;

a vertically mounted slide mechanism;

a magazine support bracket carried by said slide mechanism and adapted to receive said cartridge magazine;

drive means operatively associated with said slide mechanism and operable to move said bracket and said magazine linearly to a plurality of selectable positions; and

a horizontally movable slide injection mechanism operable to inject one of the cartridges into the projector;

a second horizontally movable slide mechanism disposed on the opposite side of said cartridge magazine for ejecting a cartridge from the projector;

said second horizontally movable slide mechanism including:

a horizontal slide member;

a pair of vertical posts attached to said slide member;

a horizontal support bar attached to said vertical posts;

a pair of spaced push pins carried by said horizontal support bar and adapted to contact the arms of a cartridge then within the projector; and

drive means operatively associated with said slide member and operable when energized to move said slide member horizontally so as to eject the cartridge from the projector and insert the cartridge back into said magazine.

10. The mechanism of claim **9** wherein:

said cartridge magazine body is formed with a plurality of clearance slots between and immediately below the cartridge slots for receiving said support bar when the cartridge is being returned to the magazine.

11. The mechanism of claim **10** wherein:

said second horizontally movable slide mechanism is mounted beneath the projector.

12. In a cartridge injection and ejection mechanism for feeding selective film cartridges from a cartridge magazine into a projector-player the combination comprising:

a cartridge magazine in the form of a unitary elongate rectangular body and formed with a plurality of transverse cartridge retention slots;

cartridge means disposed within said magazine;

laterally extending arm means operatively associated with said cartridge means;

a vertically mounted slide mechanism;

a magazine support bracket carried by said slide mechanism and adapted to receive said cartridge magazine;

drive means operatively associated with said slide mechanism and operable to move said bracket and said magazine linearly to a plurality of selectable positions;

a horizontally reciprocable slide mechanism operable to inject and eject a selected one of the cartridges into and out of the projector;

said horizontally reciprocable slide mechanism including means for contacting said arm means during both ejection of said cartridge from and injection of said cartridge into said projector.

13. The combination of claim **12** wherein:

said horizontally reciprocable slide mechanism includes first means associated therewith for injecting a cartridge into the projector when said horizontally reciprocable slide mechanism is moved in one direction and further includes second means associated therewith for ejecting a cartridge from the projector when said horizontally reciprocable slide mechanism is moved in the other direction.

14. In a cartridge injection and ejection mechanism for feeding selective film cartridges from a cartridge magazine into a projector-player the combination comprising:

a cartridge magazine in the form of a unitary elongate rectangular body and formed with a plurality of transverse cartridge retention slots;

a vertically mounted slide mechanism;

a magazine support bracket carried by said slide mechanism and adapted to receive said cartridge magazine;

drive means operatively associated with said slide mechanism and operable to move said bracket and said magazine linearly to a plurality of selectable positions;

a horizontally reciprocable slide mechanism operable to inject and eject a selected one of the cartridges into and out of the projector;

said horizontally reciprocable slide mechanism including

a horizontal slide member;

a pair of vertical posts attached to said slide member;

a pair of spaced pull pins carried by said vertical posts and adapted to contact one side of the arms of a film cartridge and pull it into the projector when the slide mechanism is moved in one direction;

a pair of spaced push pins carried by said vertical posts and adapted to contact the other side of the arms of a film cartridge and push it out of the projector when said horizontal slide mechanism is moved in the other direction.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,817,607 Dated June 18, 1974

Inventor(s) Ray C. Anderson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Insert Figures 8 and 9, as shown on the attached sheet.

Signed and sealed this 10th day of June 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks

Fig. 8.

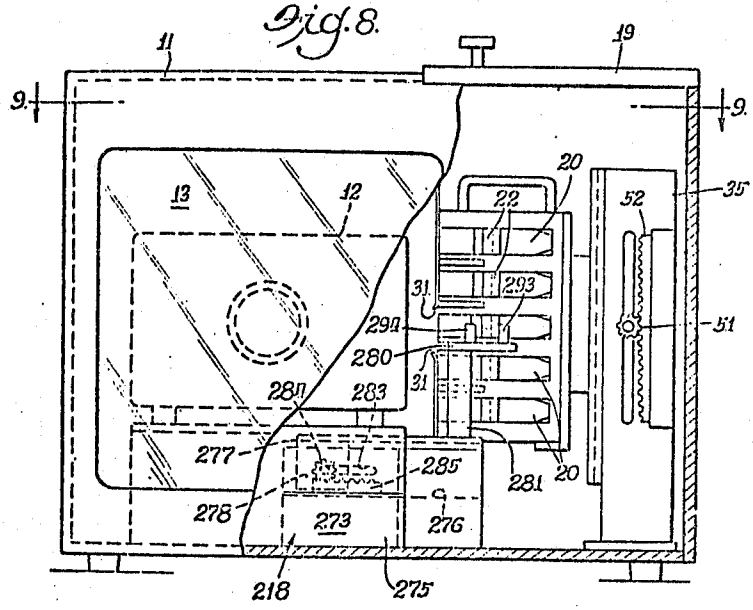
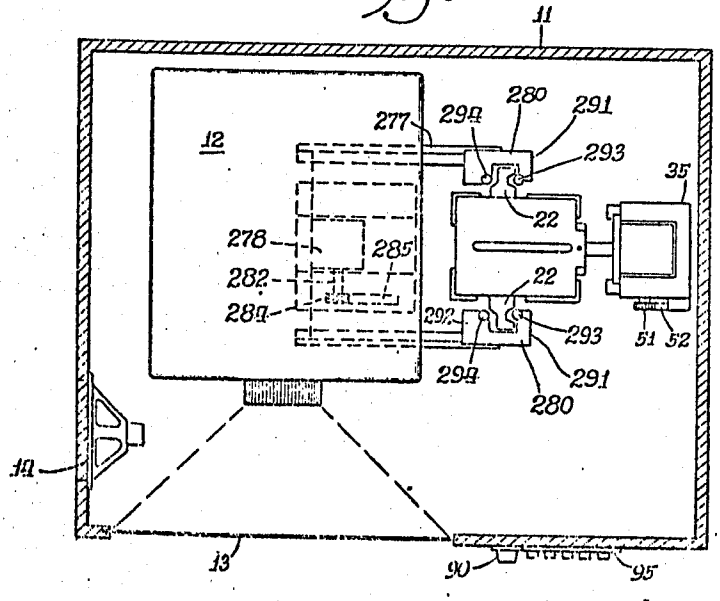

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Fig. 9.


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