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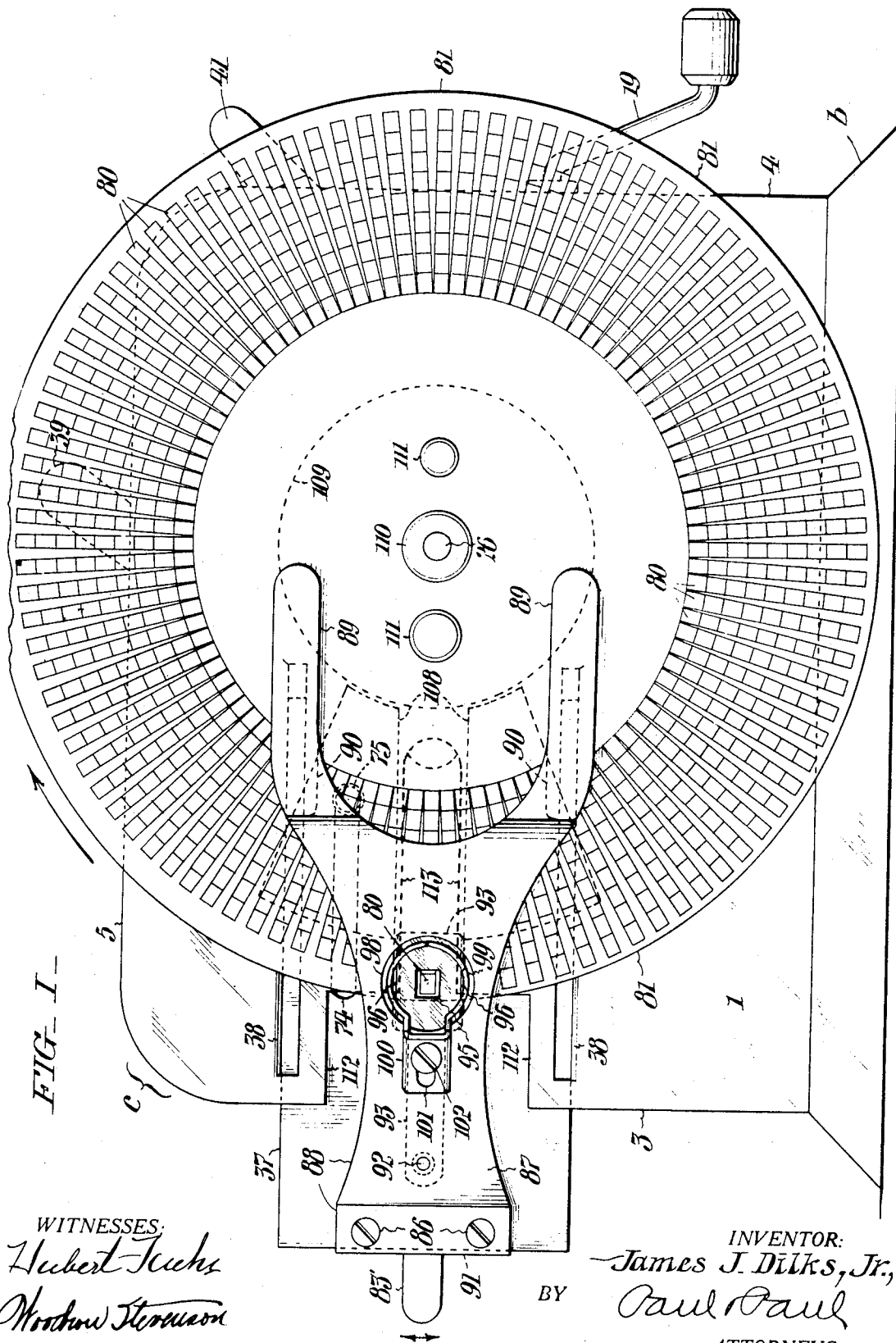
J. J. DILKS, JR

2,186,753

MOTION PICTURE PROJECTOR

Filed Feb. 1, 1938

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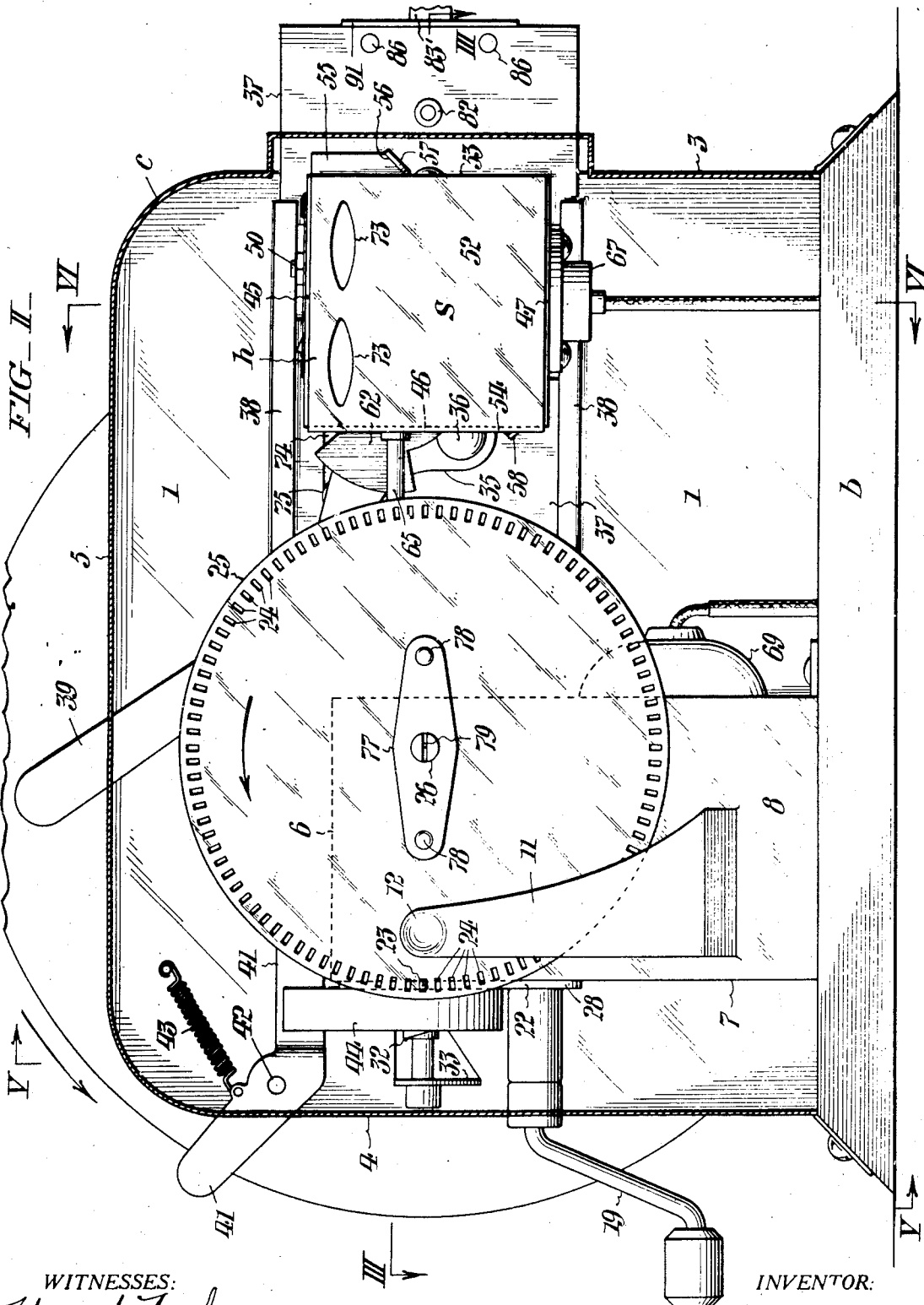
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WITNESSES:

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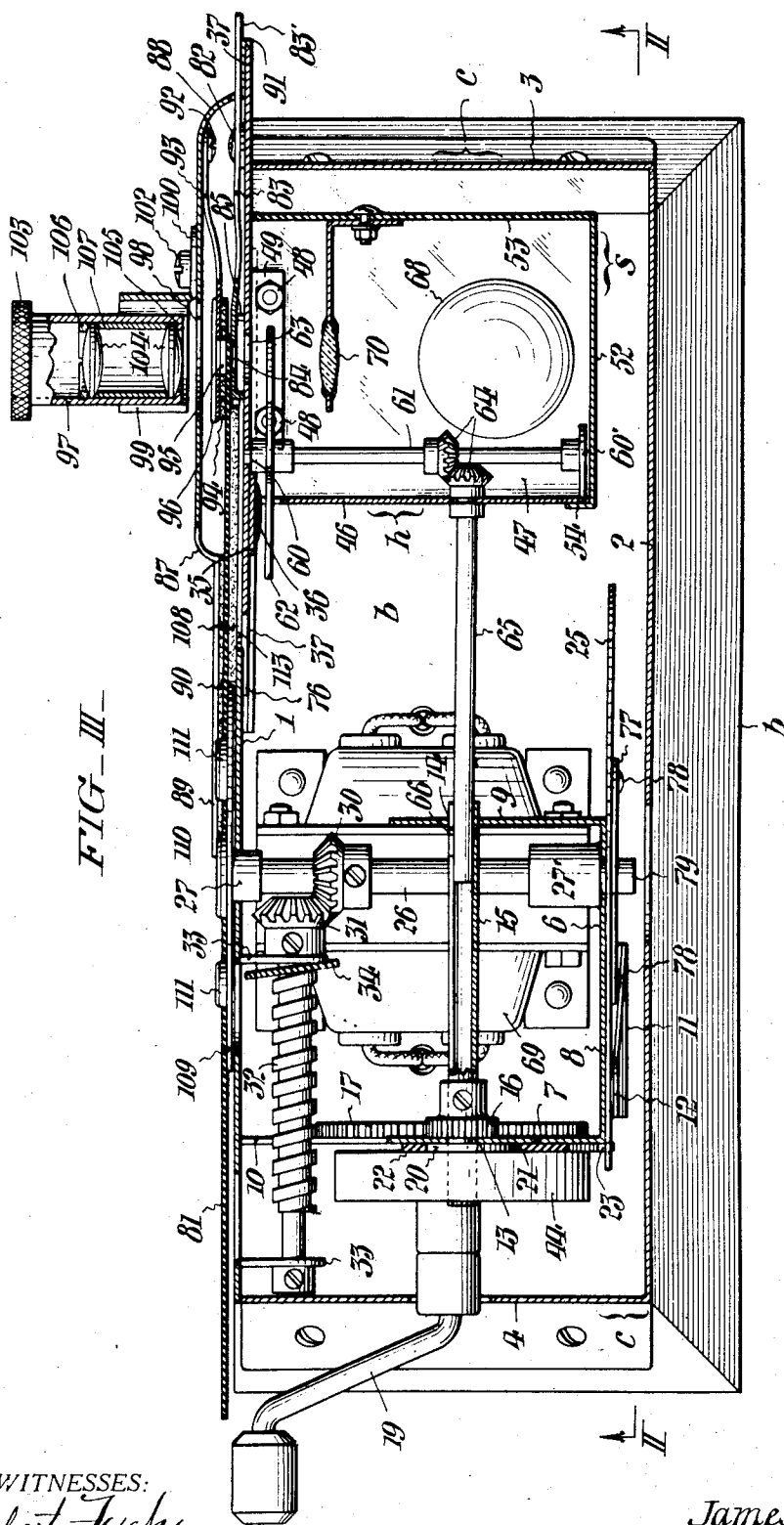
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MOTION PICTURE PROJECTOR

Filed Feb. 1, 1938

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WITNESSES:

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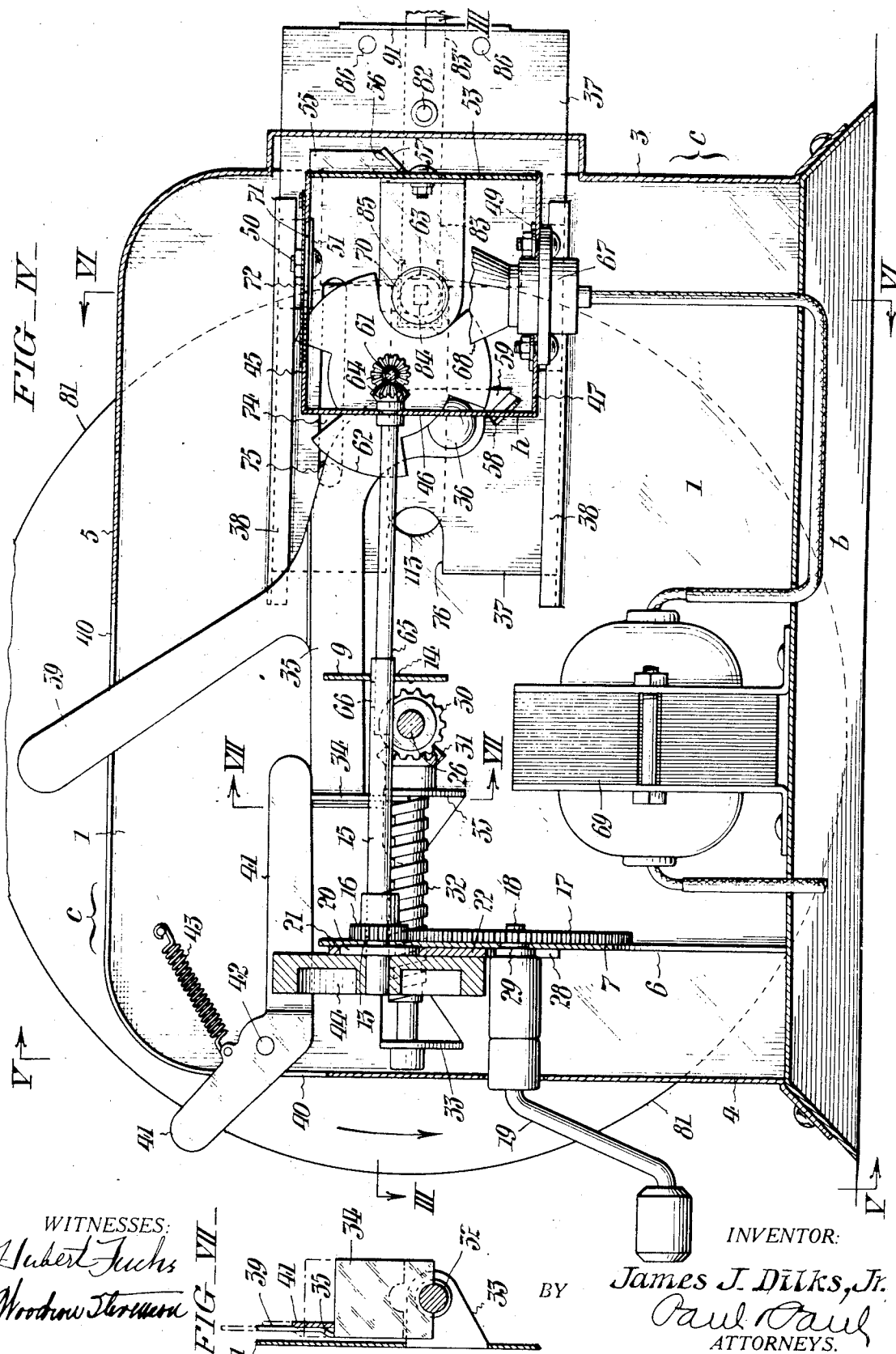
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MOTION PICTURE PROJECTOR

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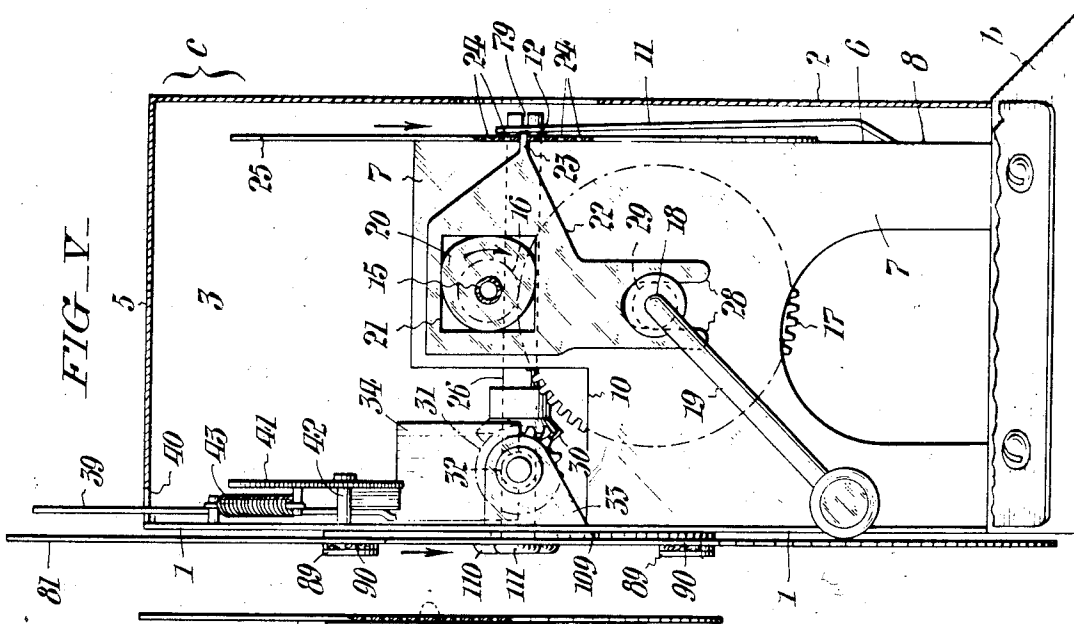
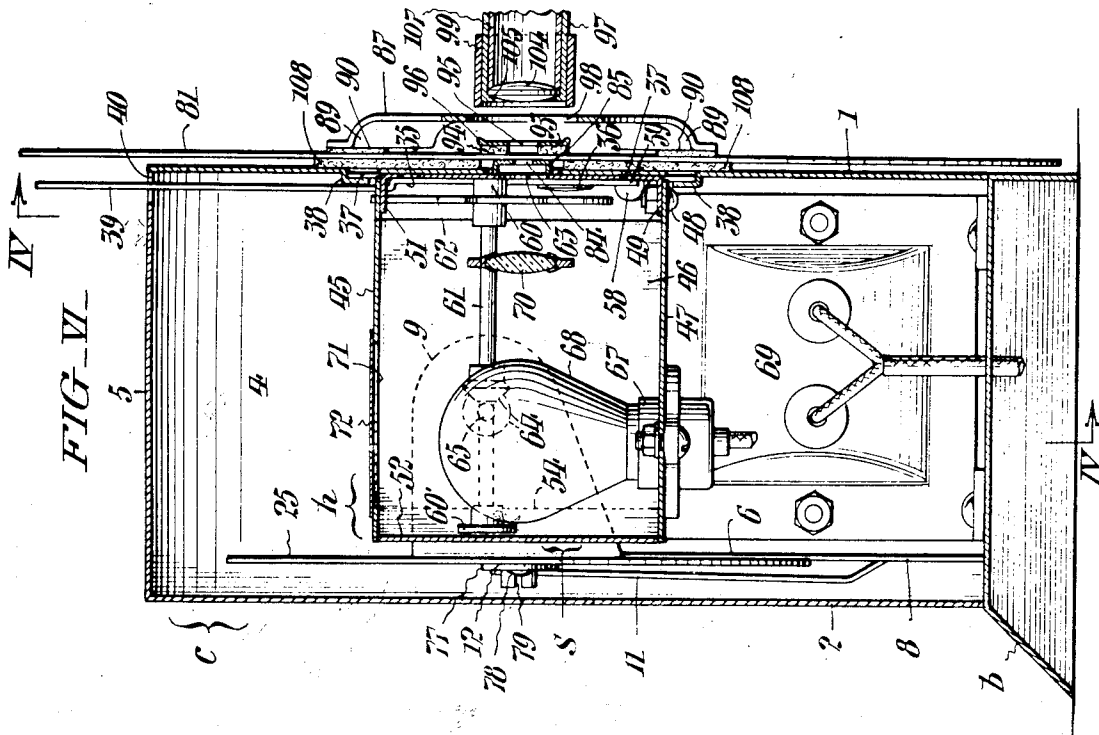
J. J. DILKS, JR

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MOTION PICTURE PROJECTOR

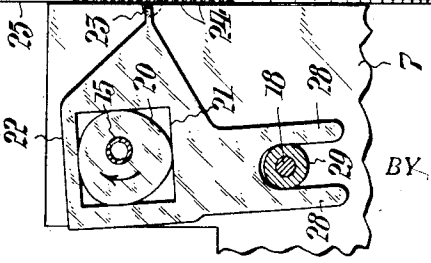
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FIG. VIII



UNITED STATES PATENT OFFICE

2,186,753

MOTION PICTURE PROJECTOR

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Application February 1, 1938, Serial No. 188,157

12 Claims

(Cl. 88-18.5)

This invention has general reference to motion picture projectors and, more particularly, to projectors employing films of disk form with the image areas arranged in spirallized sequence.

An important object of this invention is the provision of a motion picture disk projector of the type indicated in which the film disk has radially directed image areas of equal size, and which includes means for effecting quick return of the lens to starting positions on the film disk.

Another aim of this invention has reference to the provision of motion picture projectors with a master disk containing a single annular series of apertures or slots equal in number to that of the radially-directed image areas.

A further object is to provide a projector including means whereby individual selection of any desired section of the film disk image areas may be projected at any time.

Other objects and ancillary advantages of this invention will be hereinafter set forth and, for the purpose of better disclosing the nature and characteristic features of the invention, a practical embodiment thereof is illustrated in the accompanying drawings, and which will now be particularly described. However, it is to be understood this invention is not restricted to the precise form shown, but that it is susceptible of modification within the scope of the concluding claims.

In the drawings:

Fig. I is a front elevation of a small or toy motion picture machine embodying the improved projector of this invention, and with the projector device removed.

Fig. II is a vertical section, taken on the plane II—II in Fig. III.

Fig. III is a horizontal section, taken on the plane designated III—III in Figs. II and IV.

Fig. IV is a longitudinal section, taken approximately on the plane IV—IV of Fig. VI.

Fig. V is a lateral section on the plane V—V in Figs. II and IV.

Fig. VI is a similar section on the plane VI—VI of Figs. II and IV.

Fig. VII is a fragmentary sectional view on the plane VII—VII in Fig. IV, and,

Fig. VIII is a detail view of the film disk operating means hereinafter more fully explained.

Referring more specifically to the drawings, the improved toy projector of this invention comprises a casing *c* including a base *b*, upon which are mounted front and rear walls *1, 2*, respectively, with end walls *3, 4*, as well as a top *5*; and all of said parts are preferably made from thin

sheet metal, while the front wall *1* is provided with differential cut-outs *12, 13*, for a purpose hereinafter set forth.

Rigidly sustained by the base *b* within the casing *c* and similarly connected to the front wall *1* is a vertical bearing member *6* embodying rectangularly related side and back walls *7, 8*, respectively, as well as a second wall portion or bracket *9* in parallelism with the side wall *7*, while the latter is cut out at *10*, for a purpose later on referred to. The bearing member *6* is also preferably made of sheet metal, and from the back wall there is outwardly punched, or otherwise formed, a spring tongue portion *11* having its upper end dish-shaped inwardly to form a friction grip *12*, the purpose whereof will be hereinafter set forth.

This bearing member *6* affords journal support at *13, 14* for a tubular shaft *15* having a comparatively small gear *16*, in turn meshing with a substantially larger driver *17*. The driver *17* is rigid with a short rotary shaft *18*, conveniently operable by a removable hand-crank *19*.

Also secured on the tubular shaft *15* is a disk-cam *20*, cooperative with a rectangular orifice *21* in an eccentrically-oscillatable "picker" device *22*, said device having a pin *23* for intermittent engagement in the single circumferential series of apertures or slots *24* of the master disk *25* fast on a rotary shaft *26*, journaled in appropriate bearings *27, 27'*, transversely of the casing *c*. The "picker" *22* also embodies a forked extension *28* engaging an enlargement or collar *29* on the shaft *18*.

The shaft *26* has a bevel gear *30* fixed thereon which meshes a complementary gear *31* at the proximate end of a feed-screw *32*, afforded rotary bearing in apertured lugs *33*, preferably stamped inwardly from the front wall *1* of the casing *c*. Engaging the thread of the feed-screw *32* is the angular end *34* of a follower *35*, pivoted at *36* to a plate slide *37* and movable along guides *38*, preferably integral with the casing front wall *1*. The follower *35* is somewhat in the nature of a latch means having an upward and angularly directed arm *39* extending through a slot *40* in the top *5* of the casing *c*, said arm serving to release the follower end *34* from the feed-screw *32* when the slide *37* is moved to its limit in one direction, or to the left-hand in Figs. II, III and IV, for quick return in the reverse direction to normal starting position. The follower end *34* is held cooperative with the feed-screw *32* by aid of an angled presser-member or latch *41*, pivoted at *42* to the casing wall *1*, and is under the ac-

tion of a tension spring 43 anchored between the latch 41 and said wall. 44 is a fly-wheel secured to the outer end of the tubular shaft 15.

Mounted on the slide 37 is a housing *h*, preferably comprising a sheet metal section affording a top 45, side wall 46 and bottom 47, said housing being secured to said slide by spaced bolts 48 engaging through holes in the bottom and registering holes in a flange 49 formed out of the lower medial portion of such slide. A similar bolt 50 engages through registering holes in the housing top 45 and a flange 51 formed out of the top mid-portion of the slide 37. To complete the housing *h*, use is made of an angular sheet metal section *s*, providing the back wall 52, and a side wall 53 in parallelism with the side wall 46 aforesaid. This section *s* is preferably made removable and snugly engages between the upper and lower free edges of the top and bottom 45, 47, respectively, with an angular flange 54 gripping over the edge of the side wall 46, as readily understood on reference to Figs. II and VI, more particularly. In addition, the side wall 53 of the section *s* is provided with an upper lateral flange 55 having its lower edge tapered at 56 for snap engagement over a correspondingly-inclined lug 57 stamped out of the slide 37. A limiting lug or stop 58 is also stamped out of the slide 37 for engagement by the tapered end 59 of the follower 35, when rocked to the right-hand for release of its angular end 34 from the feed screw 32, as later on more fully explained.

Journalled within the housing *h* by suitable bearings 60, 60' is a shaft 61 having thereon a conventional shutter 62 for intermittent opening and closing of a light emitting aperture 63 in the slide 37; said shaft being rotatable by a miter-couple 64 from an axially slidable shaft 65 having a spline connection 66 in the axially aligned end portion of the tubular shaft 15. In addition, the housing *h* is fitted with a conventional socket 67 for an electric light bulb 68 in circuit with a suitable transformer 69 receiving current from any convenient source. 70 is a conventional condenser intermediate the bulb 68 and light aperture 63, and it is preferably attached to the removable section *s* so that when the latter is removed it can be readily cleaned, adjusted, and expeditiously replaced. In the top 45 of the housing *h* there is provided an orifice 71 over the bulb 68 which is normally closed by a laterally-movable cover 72, thereby affording ready access to said bulb for removal when blown out, or to make replacements when necessary. Apertures 73, Fig. II, are provided in the upper portion of the removable housing section back wall 52 for escape of heat developed by the bulb 68.

Movement of the slide 37 is limited by means of a slot 74 therein, coacting with a pin 75 in the casing front wall 1, while the said slide is cut out at 76 so as to clear the bearing 27 when moved towards the axis of the shaft 26. Attention is directed, at this juncture, to the provision of the master disk 25 with a diametric reinforcement 77 secured thereto as by rivets 78; and to the fact that the end of the shaft 26, on which said disk is frictionally engaged, is diametrically split or grooved at 79 for inward collapse by application of suitable means, such as a pair of pliers, whereby the disk 25 can be incrementally turned in either rotative direction for the purpose of accurately setting the apertures or slots 24 to register centrally with respect to the sight aperture 63 and the image areas 80 on the film disc 81, for a purpose later on explained.

Referring again to the slide 37 and more particularly to Figs. I, III and VI, it will be seen the same is provided with a fulcrum axis 82 for a pivotal lever 83, having an exposure orifice 84 adapted for slight up-and-down oscillatory adjustment, by the lever extension 83', into accurate registration with the image areas 80; and said lever has its inner end angled at 85 for bearing engagement between the casing outer face and the back of the film disc 81. Also supported by and attached to the slide 37, as by screws 86, is a film disk clamp device 87, said device being preferably made from sheet metal to provide a shank portion 88 and spaced prongs or fork arms 89 having felt pads 90 fixed thereunder, for engagement with the exposed or outer face of the film disc 81. It is also to be observed the clamp device shank portion 88 is outwardly bent into spacial relation with respect to the slide 37, and that its end is angled at 91 to grip the edge of said slide, whereby it is prevented from relative movement. Secured to the inner side of the shank portion 88, as by a screw 92, is a springy member or tongue 93 having a felt or similar pad 94 for coaction with the film disc 81 outer face, so that the latter is effectively prevented from vibratory movement. The tongue 93 and pad 94 are jointly apertured at 95 for exposure of each consecutive or selected part of the total image area 80 as later on explained; and said tongue has its longitudinal edges outwardly beaded at 96 for stiffening purposes.

The projector device 97, in accordance with this invention, is axially and adjustably supported, in front of an aperture 98 in the clamp device 87, by means of a split sleeve 99, having an angled flange 100 provided with a slot 101 and securing screw 102, whereby it is adjustably attached to the clamp device shank portion 88. It is also to be remarked that the projector 97 has its outer end knurled at 103 so that it can be axially adjusted inwardly or outwardly of the split sleeve 99 for focussing purposes, and that its objective lenses 104 are secured therein intermediate the inwardly turned end 105 by a split spring ring 106, with an intervening spacer tube 107.

Spaced, somewhat sectoral-configured, pads 108 attached to the front wall outer face of the casing afford substantial support for the film disc 81 as it is progressed relative to the projector device 97. It is also to be noted that the exposure orifice 84 is substantially identical in shape with that of the image areas 80, while the tongue aperture 95 is somewhat larger to afford adequate clear projection. The film disc 81 is supported on a table-flange 79 on the rotary shaft 26, and is retained in place against relative movement, as well as for initial "setting" purposes, or desired selective pick-ups, by axial and radially spaced button projections 110, 111, respectively.

Having described the embodiment of this invention as illustrated, and assuming the slide 37 has been moved to its outer position, as best shown in Figs. I-IV, by releasing the latch 41, and disengagement of the follower end 34 from the feed-screw 32, and progression of said slide to the right-hand, or outwards, as will be obvious to those acquainted with the art, it will now be apparent that a film disc 81 can be placed in position by slightly drawing the clamp device 87 away from the table flange 109, and placing said film disc over the axial and radial buttons 110, 111, respectively. Upon release of the clamp device 87, and illumination of the bulb 68, the hand crank 19 is rotated until the series of image areas 80 are consecutively passed intermediate

the registering exposure orifice 84 and larger aperture 95 with concurrent projection by the device 97 onto a suitable screen or the like. As the slide 37 moves inwardly, or outwardly as desired, it will be seen that the clamp device shank portion 88 correspondingly travels into or out of the front wall cut-out 112, while the cut-out 113 similarly accommodates like progression of the lever 83 and tongue 93 having the exposure apertures 84, 95. Obviously, it will be readily understood that by releasing the latch 41 and movement of the slide 37 by means of the arm 39 that the exposure orifice 84 can be placed at any desired point of the image areas 80 for projection of any selected or desired section of the film disk 81, as well as for repeats and so forth.

While only one embodiment of the invention has been disclosed, it will be obvious to those skilled in the art that it is not so limited, but that said invention is susceptible of various changes and modifications without departing from the spirit thereof. Hence it is desired that only such limitations shall be placed upon the following claims as are imposed by the prior art or as specifically recited therein.

Having thus described my invention, I claim:

1. In projecting apparatus for disk picture films having a spiral series of image areas arranged in symmetrically spaced radial lines, a rotary mounting for the disk; means including a master control having a single annular series of slots with a cooperative picker device for intermittently rotating the mounting, each time through an angle corresponding to that of the spacing of the image area radial lines on the disk; a slide supporting the projector lens with guide means confining it to travel crosswise of the disk; and a feed-screw with a pivotal follower operatively coordinating the rotary mounting and slide for concurrent movement so that the projector lens is caused to follow the spiral of the disk pictures.

2. In projecting apparatus for disk picture films having a spiral series of image areas arranged in symmetrically spaced radial lines; a rotary mounting for the film disk; a master disk having a single annular series of slots proximate its circumferential edge with a cooperative picker for intermittently rotating the film disk mounting, each time through an angle corresponding to that of the spacing of the image area radial lines on the film disk; a projector lens support confined to travel crosswise of the film disk; a slide carrying the projector lens support with guide means confining it to travel crosswise of the disk; and a feed-screw with a pivotal follower operatively coordinating the rotary mounting and slide for concurrent movement so that the projector lens is caused to follow the spiral of the disk pictures.

3. In projecting apparatus for disk picture films having a spiral series of complemental image areas arranged in symmetrically spaced lines; a casing; a rotary shaft in the casing with means for mounting the film disk; a disk clamping device; a master disk on said shaft having a single annular series of slots proximate the periphery and angularly corresponding with the radial spacing of the image areas on the film disk; a cam actuated picker cooperative with the master disk slots for intermittent rotary movement of said master and film disks concurrently; a projector lens mounted on a slide confined to travel in guides on one wall of the casing and crosswise of the film disk; a feed-screw and pivotal follower

operatively coordinating the lens slide with the rotary shaft for concurrent movement so that the projector lens follows the spiral of the disk pictures; and means for release of the pivotal follower from the feed screw whereby the slide is freed for full or partial return to its normal starting position.

4. In projecting apparatus for disk picture films having a spiral series of complemental image areas arranged in symmetrically spaced lines; a casing; a rotary shaft in the casing with means for mounting the film disk; a disk clamping device; a master disk on said shaft having a single annular series of slots proximate the periphery and angularly corresponding with the radial spacing of the image areas on the film disk; a cam actuated picker cooperative with the master disk slots to effect intermittent rotary movement of said master and film disks concurrently; a projector lens mounted on a slide confined to travel in guides on one wall of the casing and crosswise of the film disk; a feed-screw and pivotal follower operatively coordinating the lens slide with the rotary shaft for concurrent movement so that the projector lens follows the spiral of the disk pictures; adjustable apertured members between which the film disk is rotatable and exposed to the projector lens, the inner of said members having an orifice corresponding with each image area and the outer member having a larger orifice; and means for release of the pivotal follower from the feed screw whereby the slide is freed for full or partial return to its normal starting position.

5. In projecting apparatus for disk picture films having a spiral series of complemental image areas arranged in symmetrically spaced lines; a casing; a rotary shaft in the casing with means for mounting the film disk; a disk clamping device; a master disk on said shaft having an annular series of slots proximate the periphery and angularly corresponding with the radial spacing of the image areas on the film disk; picker means for intermittent rotary movement of the master and film disks concurrently; a projector lens mounted on a slide confined to travel in guides on one wall of the casing and crosswise of the film disk; feed-screw and follower means operatively coordinating the lens slide with the rotary shaft for concurrent movement so that the projector lens follows the spiral of the disk pictures; individually adjustable apertured members having concentric orifices and between which the film disk is rotatable and exposed to the projector lens, the inner orifice corresponding with each image area and the outer member having a larger orifice; a housing supported by the slide aforesaid containing a rotatable shutter, condenser and source of illumination; means for rotating the shutter including a telescopic drive shaft; and a latch normally retaining the follower in operative engagement with the feed-screw, but releasable to permit full or partial return of the slide to its initial or selective starting positions respectively.

6. A projecting apparatus for disk films as defined in claim 5, wherein the film mounting shaft is journaled intermediate the casing front wall and a rigidly sustained bearing member, said member embodying rectangularly related side and back walls with a bracket portion in parallelism to the side wall; and the side wall and bracket afford bearing for a tubular shaft having a telescopic section operatively coordinated with the shutter rotating means.

7. A projecting apparatus for disk films as defined in claim 5, wherein the film mounting shaft is journaled intermediate the casing front wall and a rigidly sustained bearing member, said member embodying rectangularly related side and back walls with a bracket portion in parallelism to the side wall and a spring tongue integral with the back wall having its free end dished for frictionally retaining the master disk in operating position.

8. A projecting apparatus for disk films as defined in claim 5, wherein the mounting shaft end bearing the master disk is diametrically grooved for expansive retention of said disk in position, and diametric collapse for removal of such disk.

9. A projecting apparatus for disk films as defined in claim 5, wherein the feed-screw follower has the form of a pivotal member carried by the projector lens slide, said member having one end angled for engagement with the feed-screw thread and its other end suitably tapered for contacting an angular movement limiting stop on the casing wall, said member also having a relatively-inclined manipulator arm, and a spring-influenced latch coacts with the member angled end

for normal maintenance of the latter in engagement with the feed-screw.

10. A projecting apparatus for disk films as defined in claim 5, wherein the slide housing consists of a stationary and a removable sections, the removable section having a grip flange along one edge for engagement with the confronting edge of the stationary section, and said removable section also has a lateral flange for snap support by an angular lug projected from the slide.

11. A projecting apparatus for disk films as defined in claim 5, wherein the projecting lens is adjustably sustained by a forked disk clamp device attached to the slide, the shank portion of said device being outwardly bellied with a sight aperture therethrough, and the fork arms are provided with suitable pads for contact with the film disk.

12. A projecting apparatus for disk films as defined in claim 5, wherein the projector lens is mounted in a split spring sleeve having an angled flange whereby it is secured to the clamp device shank for radial adjustment, and its outer end is knurled to afford grippage for its axial adjustments.

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