

No. 867,185.

PATENTED SEPT. 24, 1907.

J. BIANCHI.
APPARATUS FOR ANIMATED PICTURES.

APPLICATION FILED AUG. 15, 1906.

3 SHEETS—SHEET 1.

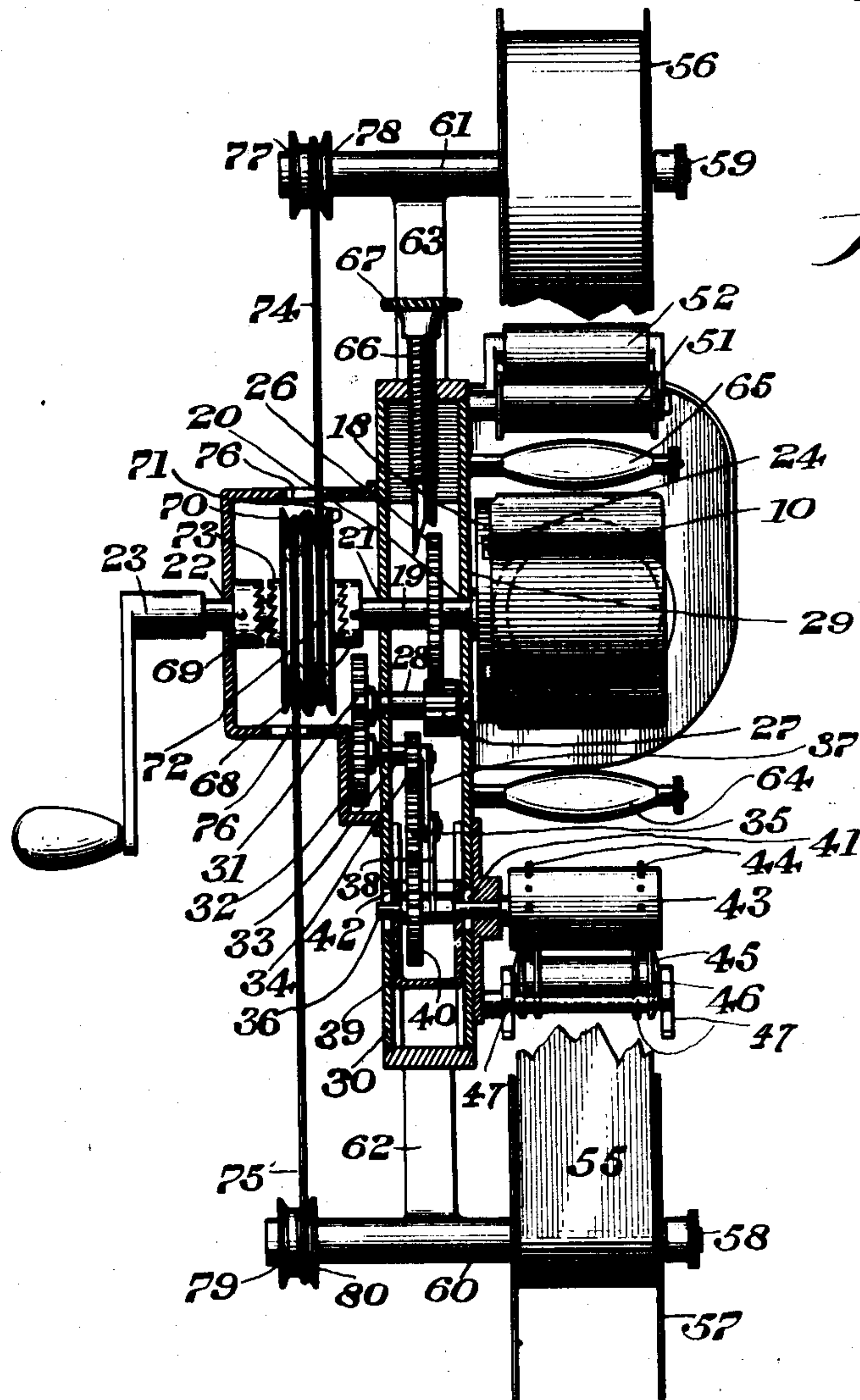


fig. 1.

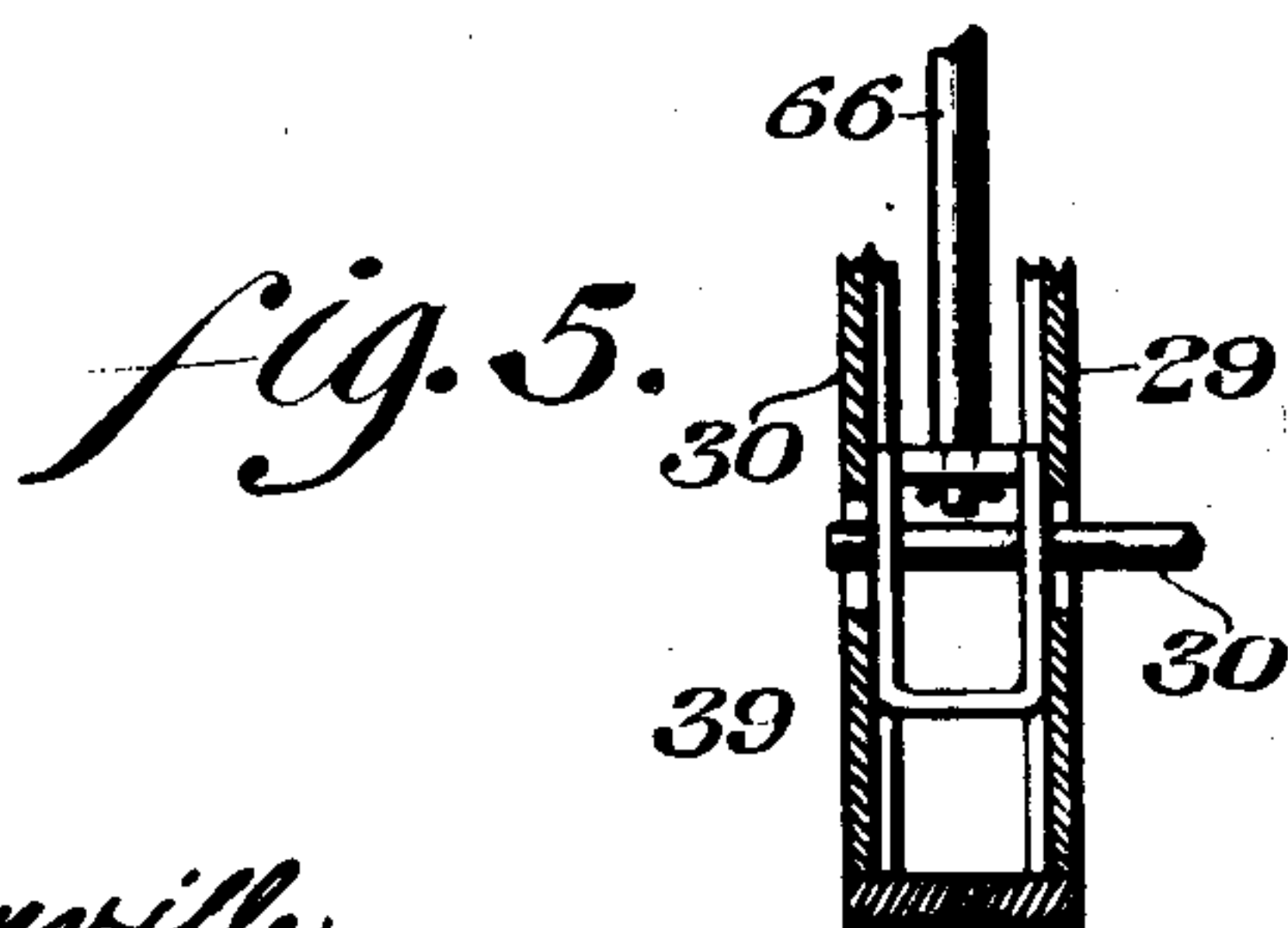


fig. 5.

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3 SHEETS—SHEET 2.

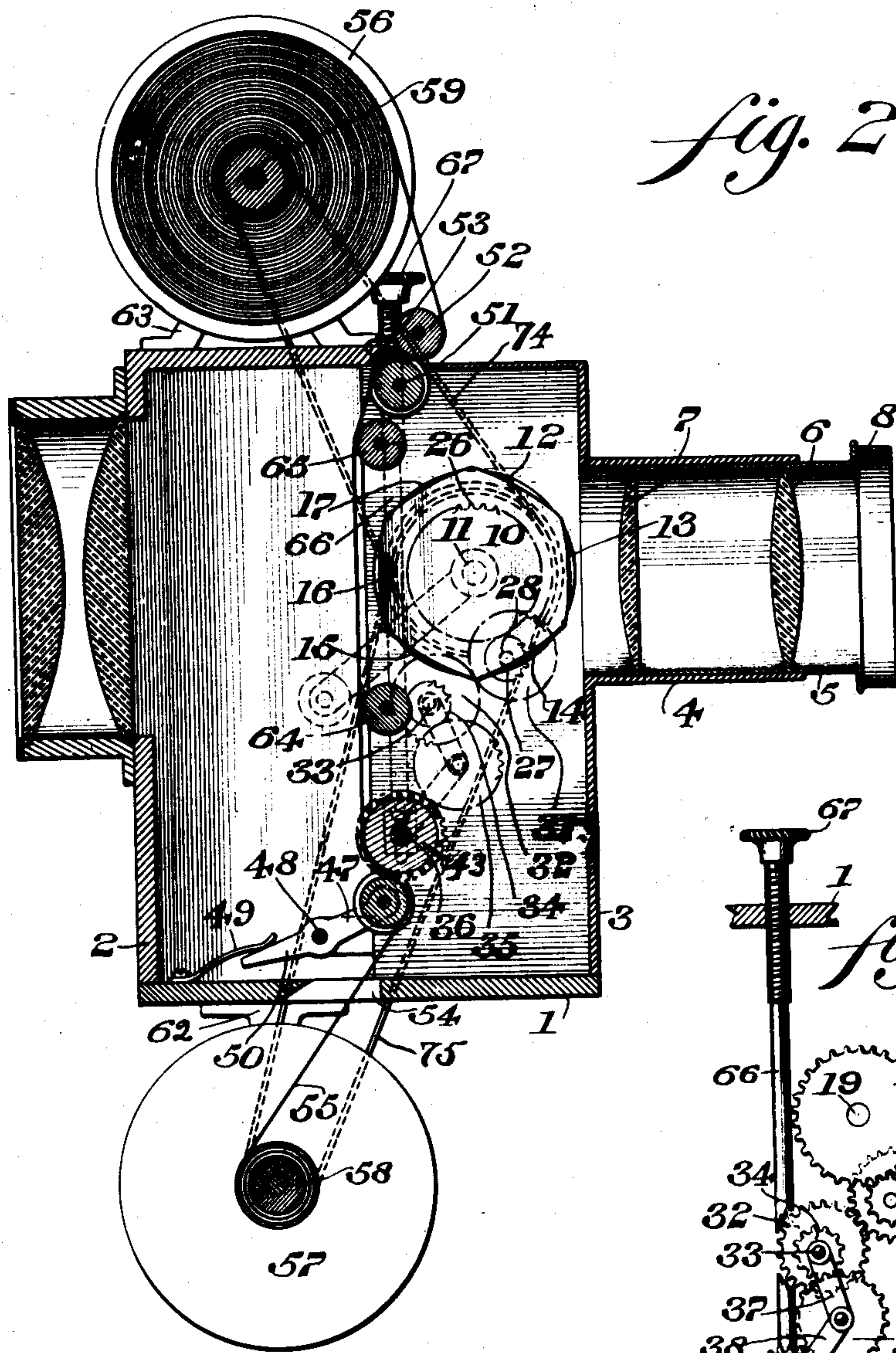


fig. 2.

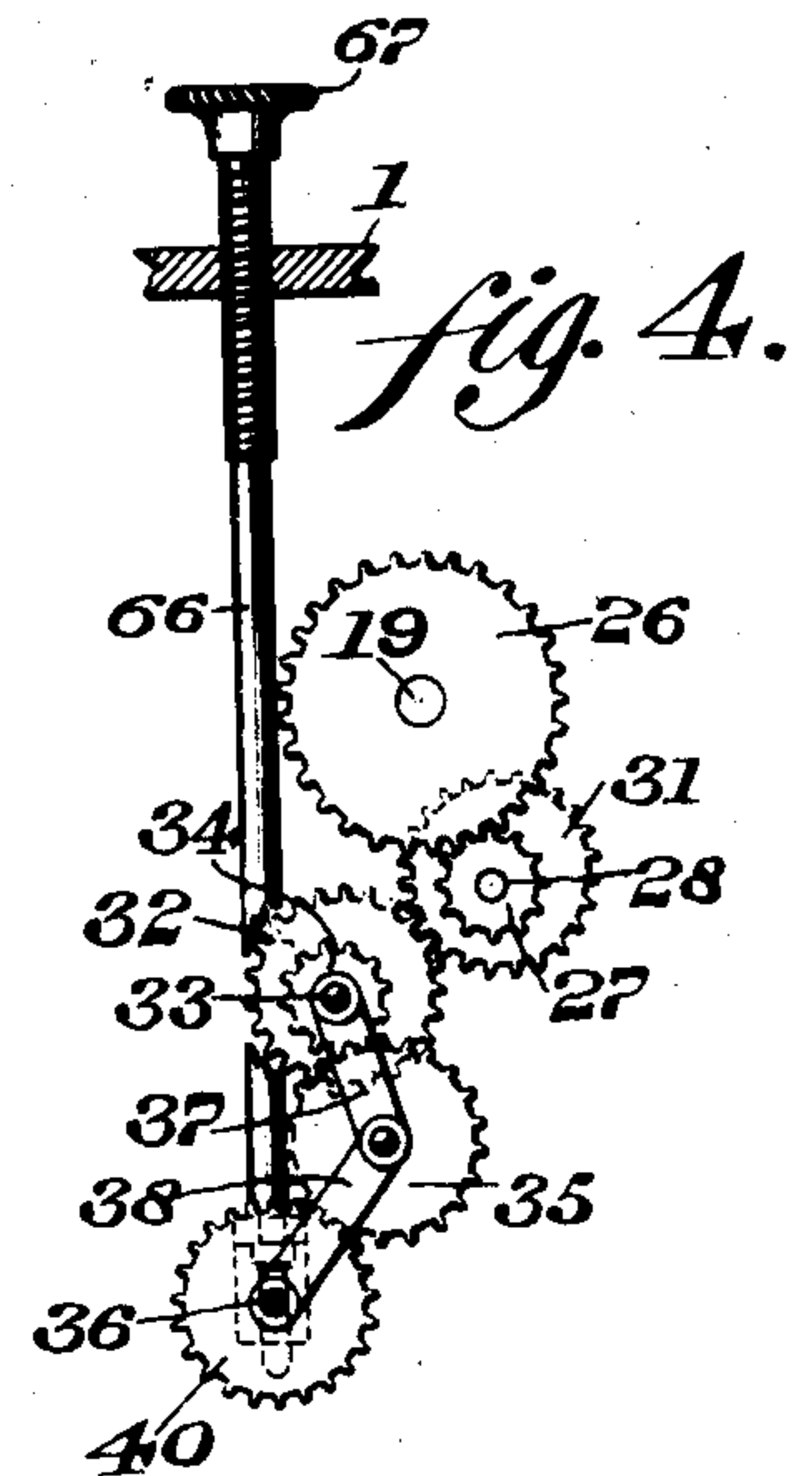


fig. 4.

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3 SHEETS—SHEET 3.

fig. 3.

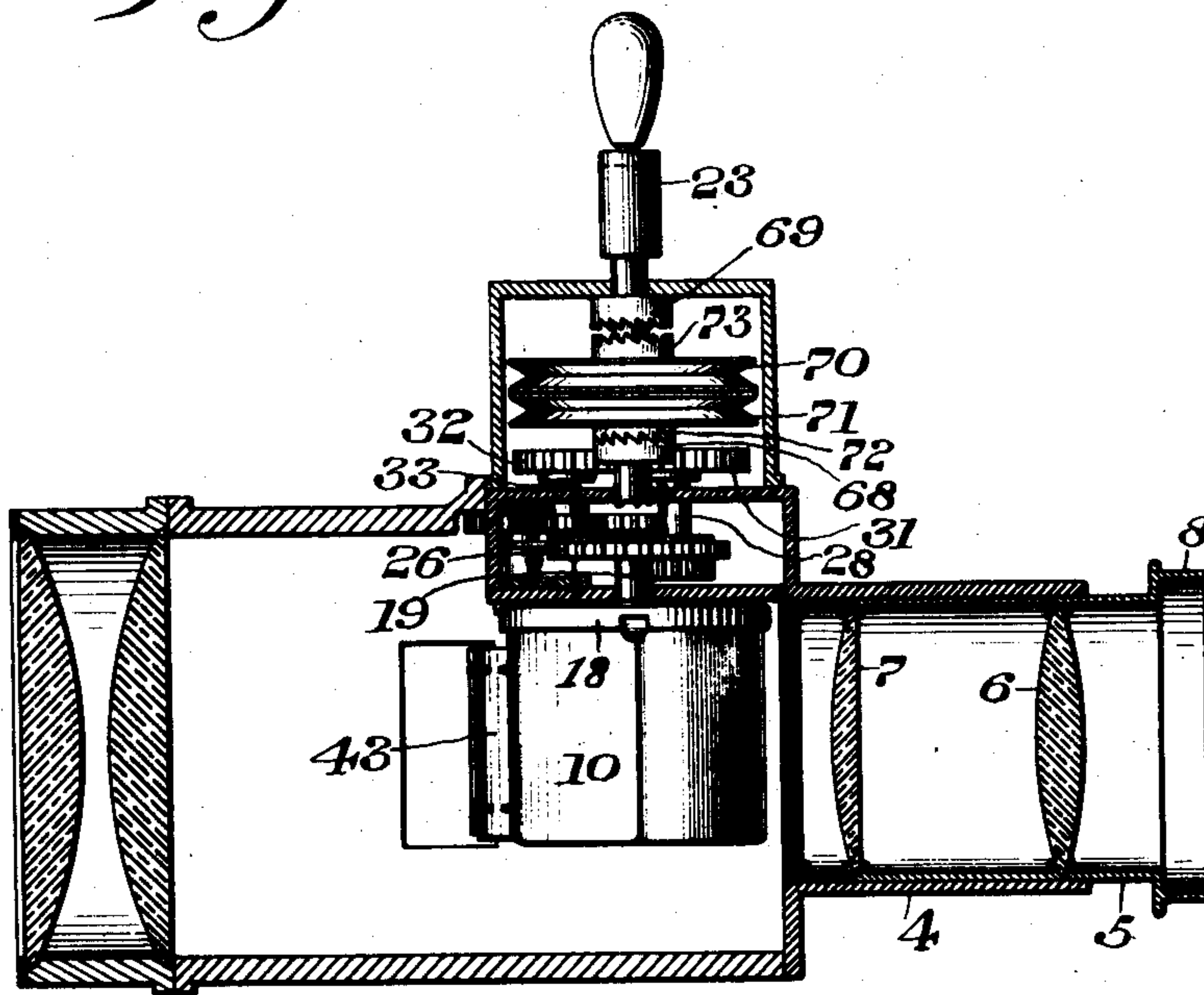
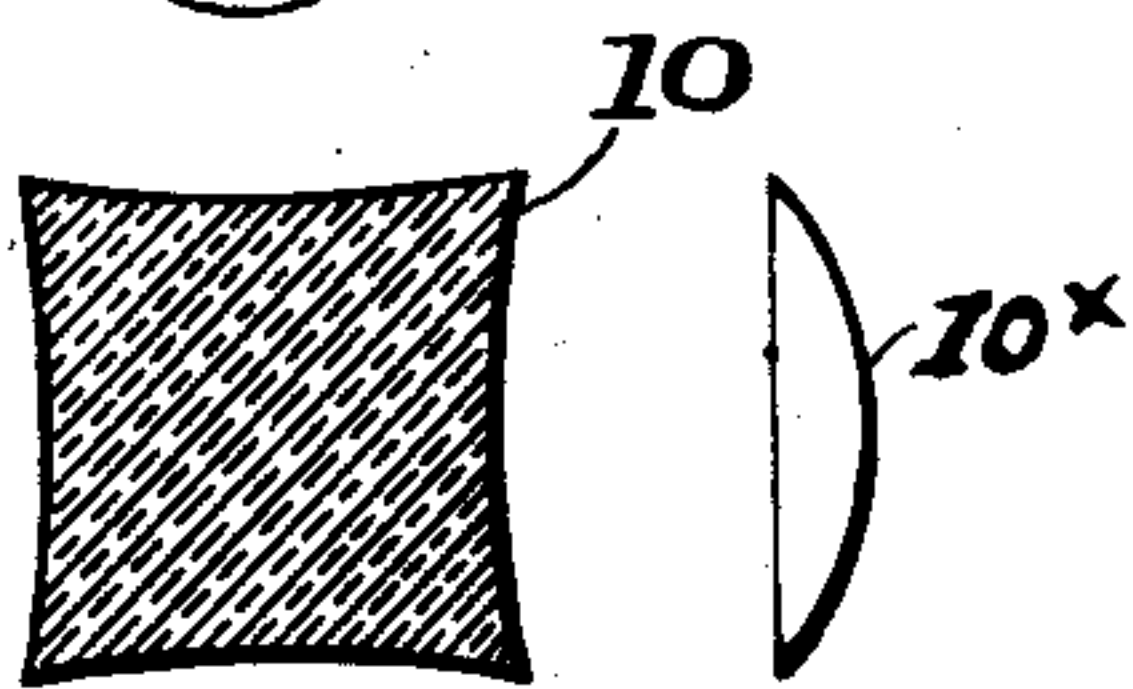


fig. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ANIMATED PICTURES.

No. 867,185.

Specification of Letters Patent.

Patented Sept. 24, 1907.

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To all whom it may concern:

Be it known that I, JOSEPH BIANCHI, a citizen of the United States, residing at Jersey City, county of Hudson, State of New Jersey, have invented a new and useful
5 Improvement in Apparatus for Animated Pictures, of which the following is a specification.

My invention consists more especially of an improvement in the construction of the refracting solid body used for producing what is known as "moving pictures"
10 and for which I obtained Letters Patent No. 708,303, issued Sept. 2nd, 1902.

The object of this improvement consists in curving the faces of the refractor (or solid body) in order to bring to a focus all the rays of light entering or transmitted through the pictures on the picture band at the
15 optical center to be properly taken up by the objective lens and projected on the screen without blur as it happens when using a flat sided body or prism.

When using the apparatus for projection on screen I prefer using a six sided convex body. But when used as a slot machine or simply viewing the pictures I use a four sided concave refracting body, as it answers the purpose at less cost. This four sided concave body has a tendency to reduce the size of the picture so I use a
20 convex lens in front in order to overcome this defect.

A further object of my invention provides for the adjusting of the feeding or sprocket drum with respect to the optical center or axis.

It also provides for connecting the feeding drum constantly with the operating gear while at the same time making it movable with respect to the optical center.
30

The object of this improvement is to give an independent means for adjusting the picture at the optical center by raising or lowering the sprocket feed drum
35 (when needed) in order to properly frame the pictures on the screen.

A further object is to provide a novel arrangement of feeding mechanism for the film reels whereby each, (feeding or winding reel) will be alternately actuated
40 by right or left movement of crank.

Figure 1 represents a partial side elevation and partial sectional view of a device embodying my invention. Fig. 2 represents a partial sectional view taken at an angle to that shown in Fig. 1. Fig. 3 represents a transverse sectional view thereof. Fig. 4 represents a side elevation of a portion of the device in detached position. Fig. 5 represents a sectional view of a portion of the device in detached position. Fig. 6 represents a sectional view of the rotatable refracting medium.
45

Similar numerals of reference indicate corresponding parts in the figures.
50

Referring to the drawings, 1 designates a casing or frame of suitable form having a rear wall 2 and a front wall 3. In the front wall is placed a lens tube 4 having therein a lens frame 5 containing the double convex
55 lens 6 and the plano convex lens 7. This lens frame is

provided with the usual enlarged front flat piece 8 upon which a cap may be placed. In the rear of the lens tube and in substantial line with the center thereof, that is in the optical center, I place a rotatable refracting
60 medium 10 which is in the general form of a prism mounted upon an axis 11 transverse to the optical axis of the lens, and consisting of an hexagonal body, but having slightly curved surfaces 12, 13, 14, 15, 16 and 17. This hexagonal body is mounted upon or within a plate
65 on frame 18 secured to the shaft 19 which shaft is rotatable within bearings in the frame at 20, 21 and 22 and is provided at its outer end with any suitable lever handle 23. By means of this lever, the refracting body 10 is rotated by reason of the rotation of the shaft 19 so as
70 to successively bring its various faces in proper positions with respect to the optical axis of the lens tube which is the optical axis of the system.

If desired I may provide clips 24 to assist in holding the revoluble refracting medium 10 and the plate 18 or
75 cement, rivets or other desirable means may evidently be employed. Upon the shaft 19 I mount a gear 26 which meshes with a pinion 27 carried by the shaft 28 which is likewise mounted in bearings in the frame members 29 and 30. Upon the same shaft 28, I locate
80 a gear 31 which meshes with a gear 32 upon the shaft 33 likewise mounted in the frame 30 as a bearing. Upon the same shaft 33, I place a pinion 34 which meshes with a gear 35 separated from shafts 33 and 36 by means of links 37 and 38. Upon the shaft 36, which is mount-
85 ed in the movable frame 39 is placed a gear 40 in such a manner that the gears 34, 35 and 40 are constantly retained in mesh by means of the link connection notwithstanding that the distance between the shafts 33 and 36 varies.
90

The box 39 is movable between the frame members 29 and 30 and is retained from side movement by the end of these frame members, not shown, and is permitted a restricted longitudinal movement since the shaft 36 will contact with the limiting surface of the slots
95 41 and 42 within which the shaft is free to move longitudinally.

Upon the shaft 36 is mounted a drum 43, which is used for feeding purposes and which is provided with projections or teeth 44 to engage with the aperture in
100 the band from which views are projected. In order to keep the band in contact with this feeding drum and at the same time permit it to be movable therefrom when desired, I provide a roller 45 having annular projections 46, which roller is movable towards and
105 from the sprocket drum 43. The roller is carried upon arms 47 shown in Fig. 2 pivoted at 48 and is normally retained in contact with the drum 43 by spring 49 which presses against the extension 50 of the said arms 47. I provide also rollers 51 and 52 between
110 which the band is guided and retained at the end of the frame 1 opposite to that at which I locate the feed-

ing drum 43. The frame is provided with apertures 53 and 54 through which the band or strip 55 is adapted to travel on its way from one storage reel as 56 to the other 57. These rollers are mounted upon the shafts 58 and 59 carried in bearings 60 and 61 which are shown as mounted upon brackets 62 and 63 upon my frame 1. Intermediate the storage reels and preferably between the roller 52 and sprocket drum 43, I place the convex rollers 64 and 65 for the purpose of giving a slight curvature to the band so that as the film or band is passing the optical center, it is presented thereto in a curve.

66 designates a bar or rod which is in suitable connection with the movable frame 39 and which extends upwardly through the top of the casing 1, with which it is in threaded engagement, the end of said rod 66 being provided with a suitable thumb-nut 67 so that said nut can be rotated in order to raise or lower the frame 39 and thus adjust the position of the drum 43 and with it the position of the film 55 in the optical center.

68 and 69 designate clutch members which are secured to the shaft 19 while between these clutch members and mounted to move on the shaft 19 are the pulleys 70 and 71 which are situated adjacent each other and have on their outer sides the clutch members 72 and 73 which are adapted, at the proper time, moving with the pulleys, to engage with either one or the other of the stationary clutch members 68 and 69. 74 and 75 designate belts or other suitable means passing around said pulleys 70 and 71 and through openings 76 in extension of the frame 1, said belt 74 being adapted to pass around either of the fixed or loose pulleys 77 and 78 which are carried on the shaft 59 while the belt 75 is adapted to pass around either of the loose or fixed pulleys 79 or 80 carried on the shaft 58 for purposes herein after described.

The film or band containing the picture is carried on the upper reel 56 and is passed down between rolls 51 and 52, back of the curve roll 65, past the optical center, back of the curved roll 64 between the sprocket drum 43 and the roller 45 to the receiving reel 57, it being understood that a suitable curve or curved contour is given to the band at the optical center and the teeth on the drum 43 engage suitable openings adjacent the edge of the band. When now the handle 23 is operated in order to feed the band, the clutch member 72 is forced into engagement with the clutch member 68 which is connected with the shaft 19 so that the latter is rotated and carries with it the refracting body 10, so that the same presents its different surfaces in the optical center in suitable relation with respect to the movement of the band or picture so that the same will be properly reflected or refracted in the desired manner. It will be noted that as the handle 23 is rotated, the parts are in the position seen in Fig. 1, the belt 75 will be in engagement with the fixed pulley 80 and as the same is mounted on the shaft 58 it rotates the same carrying with it the roll of film on reel 57 and thus the band 55 will be drawn down. The belt 74 at the same time has been shifted to the loose pulley 78 which revolves without carrying with it shaft 59 or reel 56, said reel 56 being actuated by the picture band being drawn down by drum 43. Should it be necessary or desirable to rewind the band for any reason upon the roll 56 by rotating the handle in the opposite direction, the pitch of the teeth of the

clutch member will follow the teeth on the clutch 68 over the clutch 72 so that the clutch members 73 and 69 will engage, when in 69 the belt 74 will be on the fixed pulley 77, while the belt 75 will be on the loose pulley 79 in which event the reel 57 will be actuated only as the sprocket drum 43 draws the band therefrom in order to supply the machine with the necessary pictures to be taken up by the reel 56.

During the operation of the device, it will be noted that by reason of the train of gears, the motion is imparted to the drum 43, it being understood that the gears 34, 35 and 40 are always in mesh by reason of the links 37 and 38, so that continued motion will be imparted to the drum 43 as is necessary. It is further apparent that by the curving of the faces of the refracting body 10, the rays of light entering said body (from the picture band at the optical center) are bent towards the axis of the objective lens instead of being distributed outside of the lens tube and thereby causing said lens to fail to properly focus on the screen, resulting in blur and distortion. (This defect is mainly seen when the prism presents a corner in the optical center, or when half of one picture and half of another forms a complete picture.)

By reference to Fig. 6 it will be seen that I present the four sided refractor with concave faces. This is intended for use on apparatus when needed as a slot machine, or when viewing the pictures only. In this case, the four sided prism will stretch the picture vertically when the corner of said prism is presented, so by giving concave faces to the prism it reduces the picture the same as a reducing lens and overcomes the effect of stretching. But in order to reduce this stretching effect (when the corner of said body is presented) it also slightly reduces the picture when the concave face is parallel to the picture band or when a single picture is seen through the refracting body. This additional defect is overcome by placing in front of said body a stationary magnifying cylindrical lens $10\times$ of the proper focus (as seen at Fig. 6) which enlarges the picture once more to its proper proportions.

The refracting bodies are preferably though not necessarily of cylindrical shape faces.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a moving picture apparatus, a lens, feed mechanism for a picture band, a revoluble solid refractive body having curved surfaces, adjacent ones of which are at an angle to each other, and means for raising or lowering said feed mechanism independently of the optical center of the lens.

2. In a device of the character described, a feed drum having projections thereon to engage with a band, gearing for driving said roller, links between said feed drum and gearing, a movable frame carrying one of the gears on the shaft of which the feed drum is mounted, means whereby said shaft limits the movement of said frame and a screw-threaded rod operatively connected with said frame for varying the angle of the links.

3. In a device of the character described, an objective lens, a picture band feed mechanism embodying a feed sprocket roller, a solid body of refractive material disposed between the objective lens and the picture band and having a series of surfaces curved upon a different radius from the radius of said body, and means for moving the feed roller vertically independently of the driving mechanism.

4. In a device of the character described, feed mechanism for a picture band, means for raising and lowering the

same independently of the driving mechanism, projecting lenses coöperatively related, and a refracting revoluble body having curved faces, those adjoining being at an angle to each other.

5 5. In a device of the character described, projecting lenses and a rotatable transparent body intermediate the band and the lenses, said body having the opposite sur-
10 faces of the same curvature, the lines connecting the centers of these curves passing through the centers of said body.

6. In a moving picture apparatus, the combination of means for moving a picture band, and a revoluble solid body of refractive material mounted in the optical center of the apparatus and having a series of surfaces curved
15 upon a different radius from the radius of the said body.

7. In a moving picture apparatus, the combination with means for actuating a picture band or surface, of a solid body of refractive material having curved faces, and a stationary lens in the optical axis, of refracting power op-
20 posite to that of the solid body.

8. In a moving picture apparatus, the combination with means for actuating a picture band or surface, of a solid body of refractive material having curved faces, a stationary lens in the optical axis, of refractive power op-
25 site to that of the solid body, and means for raising and lowering the feed mechanism independently of the optical center of the lens.

9. In a device of the character described, means for driving a picture band embodying a train of gears, a feed drum and its shaft, a movable frame, in which said shaft
30 is mounted, said shaft carrying one of the said gears and limiting the movement of said frame, and means embodying links operatively connected with the said frame for varying the position of the picture band driving mechanism with reference to the optical center of the apparatus.
35

10. In a device of the character described, a storage roller, a take-up roller, shafts upon which said rollers are mounted, fixed and loose pulleys on each of said shafts, and belts adapted to be in engagement with a loose pulley on one shaft and a fixed pulley on the other shaft alter-
40 nately.

11. In a device of the character described, a storage roller, a take-up roller, shafts upon which said rollers are mounted, fast and loose pulleys upon each of said shafts, a plurality of belts adapted to be engaged with either the
45 fast or loose pulleys on said shafts, a driving shaft, clutch members thereon, and pulleys around which said belts pass, said pulleys carrying clutch members mounted for movement into engagement with the first-mentioned clutch members.

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