April 18, 1933. F. G. KRUEGER ET AL 1,904,622

STEREOPTICAN OPERATING DEVICE

Filed Dec. 16, 1929 2 Sheets-Sheet 1

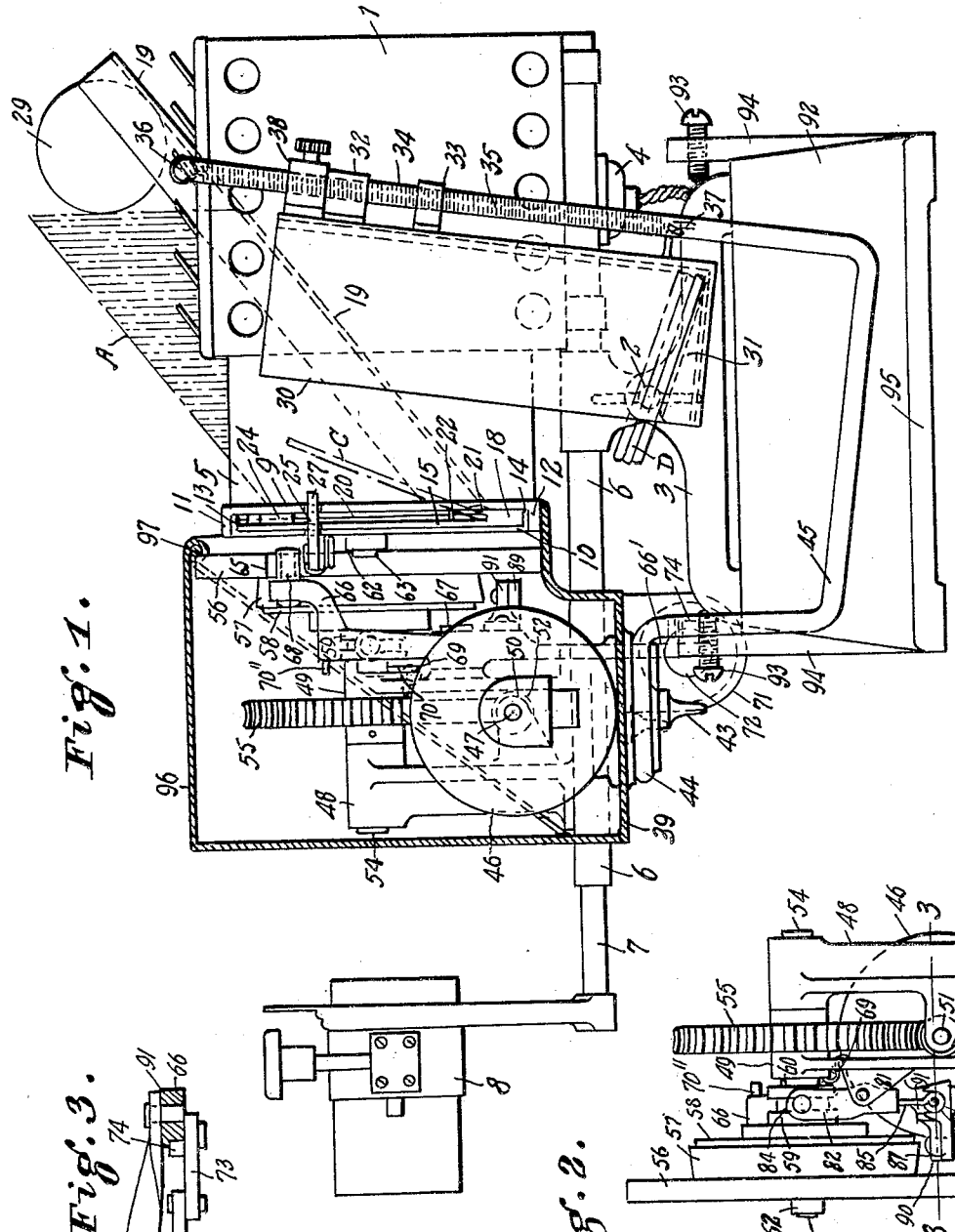


Fig. 1.

Fig. 2.

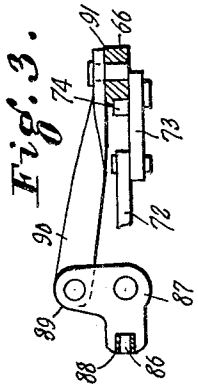


Fig. 3.

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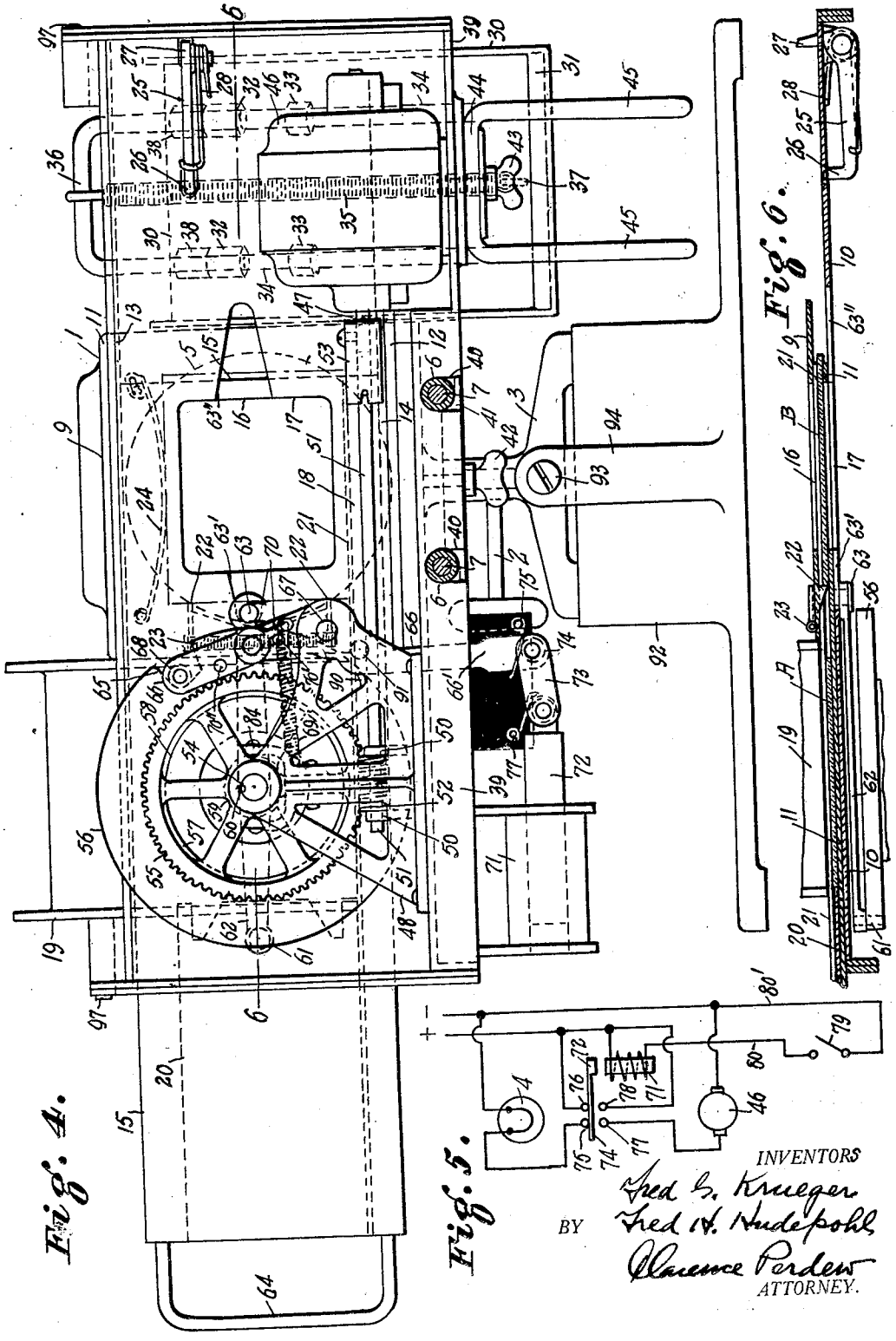


Fig. 4.

Fig. 6.

Fig. 5.

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UNITED STATES PATENT OFFICE

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STEREOPTICON OPERATING DEVICE

Application filed December 16, 1929. Serial No. 414,413.

Our invention relates to view changing devices for magic lanterns or stereopticons; and is an improvement upon our invention set forth and claimed in our prior application Serial No. 351,686, filed April 1, 1929. The objects of our invention, in addition to those which it has in common with our prior invention just alluded to, are to afford a simpler driving transmission, to allow starting and stopping of the mechanism, and to set and remove the slides, with less shock and friction, and to afford a better arrangement of the parts of the apparatus, making it more compact and allowing it to have a simpler supporting means, entirely upon the stereopticon and supported thereby. Other objects will appear in the course of the following description.

We attain these objects by the device illustrated, for example, in the accompanying drawings, in which—

Figure 1 is a side elevation of our invention installed upon a stereopticon, the front transmission casing being in section;

Fig. 2 is a corresponding view of part of the transmission mechanism, but looking from the left;

Fig. 3 is a sectional plan of part of the same, the section being on the plane of the line 3—3 of Fig. 2;

Fig. 4 is a front elevation, the projection lens of the stereopticon being omitted;

Fig. 5 is a diagram of the electrical connections; and

Fig. 6 is a horizontal partial section on the plane of the line 6—6 of Fig. 4.

The stereopticon lamp house 1 is clamped at any desired inclination by a screw 2 on a base 3, contains a lamp 4, has a condenser 5 on its front, and has a pair of tubes 6 on its bottom extending forwardly and receiving slidably a pair of rods 7 supporting the projecting lens 8. This is a stereopticon of well known construction.

Our device comprises a supporting plate 9 adjacent to and having an opening in front of the condenser casing 5, and secured to the track plate 10 by flanges 11 and 12 extending forwardly and straddling the rearwardly extending flanges 13 and 14 of the track plate. Between these plates 9 and 10 and the flanges 13 and 14 the carrier 15 slides. The track plate 10 has an aperture 16 in line with the lantern lenses, and the carrier 15 has a similar aperture 17 registering with aperture 16 when the carrier is at the left end of its travel. This carrier 15 also has at its bottom a rear ledge 18, down toward which the supply chute 19, at the left of the lamp house 1 and casing 5, slopes. On the rear of the left end part of this carrier 15, above the ledge, the pusher plate 20 is secured, having its right edge just to the left of the inside of the left wall of the chute 19 when the carrier is at the left end of its travel. The ledge 18 has projecting up along its rear edge the bead 21, and the floor of the chute 19 has its lower end just above the top edge of this bead.

Between the right hand side of the chute 19 and the casing 5 a pawl device 22 comprises an upright part hinged to the supporting plate 9 and having at its top and bottom forwardly extending pawl parts with their left edges inclined across the path of a slide carried on the ledge 18 and their right edges squarely thereacross, when the device is held forward by a torsional spring 23 coiled around the pivot pin of the device. The device thus is swung back by a passing slide, to spring forward across the left edge of the passed slide, preventing the return of the slide to the left. A downwardly bowed flat spring 24 has one end pivoted and the other end slidably mounted on the upper part of the carrier 15, to grip down on the top edge of the slide thus having passed the pawl device 22.

On the right hand end part of the track plate 10 the dog 25 is pivoted to swing in a horizontal plane with a finger 26 extending back through an opening in the plate 10 at the left of the pivot, and a finger 27 extending back through a slot in the right end part of the plate 10 at the right of the pivot; a spring 28 normally holding the dog so that this latter finger 27 is back across the path of the slides and the other finger 26 is forward out of this path.

In the supply chute 19 the slides A stand upright, and a roller 29, rolling down behind

the slides, feeds the slides down to the carrier 15 each time the carrier reaches the left end of its travel; the foremost slide A, which, during the right hand and return left hand travel, has been resting against the smooth pusher plate 20, thus passes over the ledge bead 21 onto the ledge with its left edge close to the right edge of the pusher plate 20. Supposing, in this left hand return movement, a slide B has been left in exhibiting position across the apertures 16 and 17, and accurately located by the gripping spring 24, in coaction with the ledge 18, pulling the slide B against the members of the pawl device 22, the next right hand travel of the carrier 15 will bring slide A to exhibiting position by its pusher plate 20 pushing on the left edge of the slide A, and slide B will be carried to the right from exhibiting position.

The carrier 15 is so proportioned that when slide B is in exhibiting position, against the members of the pawl device 22, the right hand edge part of the slide extends slightly past the right end of the carrier 15. As the latter approaches the right end of its stroke, the edge of slide B engages the right hand finger 27 of the dog 25 and is retarded so that the right end of the carrier 15 comes even with this edge of the slide, upon which this carrier end swings the dog 25 so that its left finger 26 pushes back, tilting the slide backward with the lower edge of the slide retained on the ledge 18 by the bead 21 of the latter, as the slide C in Fig. 1. The relative motion of the carrier 15 and slide at this time is permitted by the slippage of the slide on the gripper spring 24 due to resistance of the dog spring 28.

The slide C thus tilted backward, falls out of the carrier 15 into the receiving receptacle 30, which has elongated upright back and sides and open top and front, and is inclined backward and has its bottom 31 considerably more inclined backward than is the receptacle as a whole. The receptacle is set at such distance back from the carrier 15 that the slides fall over into it with their top edges against the back of the receptacle, as the slides D in Fig. 1; and is located along the path of the carrier so that when the right end of the latter, with the slide even with this end, has completed the tilting of the slide, the latter is in position to fall easily between the sides of the receptacle 30. This evening of the slide with the end of the carrier 15 thus acts as a gauge to locate the slide for thus correctly entering the receiving receptacle.

The back of the receptacle 30 has upper ears 32 and lower ears 33 embracing respective upright parts of the inverted U-shaped frame 34. A tension spring 35 is stretched from the transverse top part 36 of this frame 34 down to a hook 37 on the back of the receptacle 30, near the bottom thereof. Collars 38 are clamped on the upright members of the frame 34 to limit the upward movement of the receptacle under action of the spring 35. The inner sides and bottom 31 of the receptacle preferably are lined with a suitable soft material to avoid injury to the slides.

The bed 39 is fixed to the lower edge of the supporting plate 9, and has downwardly opening notches 40 receiving the tubes 6 of the stereopticon, to which this bed 39, and consequently the entire operating device, is clamped by a bar 41 engaging its end parts up against the tubes 6 as held by a clamp screw 42 passing up through the middle of the bar 41 and threaded into a boss on the bottom of the bed 39. This bed 39 extends to the left and to the right of these tubes 6. On the bottom of its right end part a clamp screw 43 holds the front upper U-shaped member 44 from the rear of which members 45 extend downwardly and rearwardly, with their rear end parts integral with the respective side members of the frame 34 that supports the receiving receptacle 30.

On the top of this right hand part of the bed 39 the electric motor 46 is mounted, with its shaft 47 extending to the left. On the top of the left hand part of the bed 39 two standards 48 and 49 are fixed, the latter behind the other. The lower part of the front standard 48 has bearings 50 projecting backward, in which is journaled a shaft 51 with a worm 52 fixed thereon between the bearings. The right end of this shaft 51 is connected to the motor shaft 47 by a coupling 53. The tops of the standards 48 and 49 have bearings in which is journaled the front to rear shaft 54 having fixed on it a worm gear 55 between the bearings; this gear meshing with the worm 52.

This latter shaft 54 has the crank disk 56 rotatable on its rear end part. On the front of this disk 56 is fixed the conical clutch member 57 receiving the clutch member 58, which has on its front the annularly grooved hub 59; the member 58 and its hub 59 being splined on the shaft 54 by the key 60, so that when slid back with the member 58 wedged in the member 57 the disk 56 will turn with the shaft 54.

This disk 56 has a wrist 61 on which is pivoted the pitman 62, the opposite end of which has a hook detachably connecting it to a stud 63 on the slide carrier 15. The track plate 10 has at one end of its aperture 16 a slot 63′ and at the other end of this aperture a slot 63″; these slots 63′ and 63″ admitting the stud 63 at the respective ends of the travel of the carrier 15 imparted to it by means of the pitman 62, which may be swung off the stud 63 to allow hand operation of the slide, upon which the ends of these slots 63′ and 63″ act as stops to insure the correct degree of sliding of the carrier 15.

The left end of this carrier 15 has a handle 64 for this hand operation.

The throw of the wrist 61 is such as to give the carrier 10 the correct right hand feeding stroke and left hand return stroke to act on the slides as has been described; the stroke in each direction being caused by a respective half revolution of the disk 56. To limit the turning of the disk 56 to a single revolution, as thus required, the disk has a notch 65, and a lever 66 is fulcrumed on a pin 67 in rear standard 49 and has a detent roller 68.

A spring 69 is connected to the end of an arm 70 pivoted on the lever 66 above the fulcrum pin 67 thereof, and has its other end connected to the rear standard 49. This pivoted arm 70 may be swung down against a lower pin 70′ on the lever 66 to give less tension to the spring 70, or up against an upper pin 70″ on this lever to give more tension to the spring 70, according to working conditions. This spring 70 holds the detent roller against the periphery of the disk 56 while the latter is rotating, and as soon as the disk notch 65 reaches this roller 68 the latter enters the notch and stops rotation of the disk; these parts being so related that the disk stops with the carrier 15 at the left end of its travel.

On the bottom of the left hand part of the bed 39 the electromagnet 71 is fixed and has its sliding core 72 connected to a downward extension 66′ of the lever 66 by a link 73; this extension working through a slot in the bed 39. A contact member 74 is carried upon but insulated from the pivotal connection of the link 73 to the lever extension 66′. Contact blades 75 and 76 are mounted on an insulating support on the bottom of the bed 39 in such position that when the lever detent roller 68 is in the disk notch 65 the member 74 connects them to light the lamp 4, but as the lever withdraws its roller 68 from the disk notch 65 it brings the member 74 to connect blades 77 and 78, also mounted on the support just mentioned, to complete the circuit through the motor 46. Thus these alternate positions of the lever 66 results in lighting the lamp 4 and deenergizing the motor 46, or extinguishing the lamp 4 and starting the motor 46. Energization of the solenoid or electromagnet 71 is controlled by a push button switch 79 (Fig. 5) connected to the magnet 71 by cables 80 and 80′, which may be long enough to allow the lecturer, for instance, stationed at the screen, to control operation of the stereopticon at the proper projecting distance from the screen, dispensing with a special operator for the stereopticon, as in our prior application hereinbefore mentioned. The closure of such switch is only momentary, long enough to release the disk 56, which thereafter maintains the running condition until the roller 68 again enters the notch 65.

The rear standard 49 has a rear extension 81 in which a lever 82 has its fulcrum to swing in a vertical plane forwardly and rearwardly. Above this fulcrum this lever has a fork 84 with pins entering the annular groove of the clutch member hub 59. Below the fulcrum the lever 82 has a resilient extension 85 with its end bent into a loop 86. The base of this rear standard 49 has an upstanding boss in which a lever 87 has its fulcrum to swing in a horizontal plane. The left arm of this lever has in its end a notch 88 in which the end loop 86 of the lever 82 engages. The rear arm 89 of this horizontally swinging lever 87 is connected by link 90 to a boss 91 on the rear side of the detent lever 66 below the fulcrum 67 thereof.

These parts are so proportioned and arranged that when, upon energization of the solenoid 71, the detent lever 66 is caused to withdraw its roller 68 from the disk notch 65, the lower arm of this detent lever 66 pushes the rear arm 89 to the left by means of link 90, swinging the left arm forwardly, and, along with this arm, the lower resilient extension 85; resulting in the upper fork 84 swinging backwardly and pushing the clutch member 58 back to wedge in the disk clutch member 57, connecting the disk 56 with the worm gear shaft 54 to rotate therewith under action of the motor 46 through the medium of the motor shaft 47, coupling 53, shaft 51 and the worm 52 and worm gear 55, which motor 46 has been supplied with current by the contact as before described. Thus the motor 46 starts before being connected with the load, allowing a wider choice of windings for the motor than in the case of our prior application before mentioned in which the crank disk is permanently operatively connected with the motor.

When the disk 56 has been turned one revolution by the motor thus connected, and the detent roller 68 reenters the disk notch 65, with a reverse movement of the lever 66, the clutch member 58 is withdrawn from the disk member 57, so that the disk 56 is free from the motor by the time the edge of the disk notch 65 engages the roller 68, so that the mechanism is stopped without shock to the parts or to the motor, and is not wedged against the detent roller and will permit easy starting at the next operation.

To raise the device far enough to accommodate the depending support of the receptacle 30, a supplementary base 92 supports the regular stereopticon base 3, which is clamped thereon by set screws 93 in lugs 94 on the front and rear sides of the supplementary base 92. This base 92 has its feet 95 extended laterally in both directions, for stability. The transmission mechanism is covered by a housing having its top part 96 hinged at 97 at the top of its back, so that

the housing may be opened for access to the mechanism.

The receptacle 35 has its spring 35 of such strength that it descends a distance approximately equal to the thickness of a slide as the weight of each additional slide is imposed thereon. Thus the topmost slide in the receptacle 30 always is substantially the same distance below the carrier ledge 18 that the bottom 31 of the receptacle 30 was at the beginning of deposit of the slides, keeping the distance through which the slides must fall substantially uniform, resulting in a neat and even piling of the slides for easy removal and replacement in the feeding chute 19 for the next exhibition, or for packing and transportation to the next place of exhibition. The collars 38 may be clamped in position on the frame 34 to stop the receptacle 30 at the right height when it is returned upward by the spring 35 upon removal of the slides.

The pawl device 22 sets the slide upright in the carrier 15 and the bowed gripping spring 24 keeps the slide upright, in addition to allowing the adjustment of the slide at the end of the travel of the carrier to enter the receptacle 30 correctly as before described; and the spring 24 also prevents the slide from falling out of the carrier 15 prematurely, before the dog finger 26 pushes it out, thereby also contributing to the uniform stacking of the slides in the receptacle 30.

We have rather specifically set forth a preferred example of our invention, but modifications may occur, and therefore we are not limited to such precise disclosure, but what we claim as new and desire to secure by Letters Patent is:

1. In a device of the character described, view-element shifting means comprising a carrier, a crank, a pitman connecting said crank and carrier, a motor-driven shaft, a clutch to connect said shaft with said crank, a lever to retentively engage said crank, and an operative connection from said lever to said clutch whereby said clutch and lever are alternatively engaged with said crank.

2. In a device of the character described, a view-element carrier, means gripping the view element edgewise in said carrier, and pawl means preventing movement of the view-element lengthwise of the carrier in one direction out of the grip of the gripping means.

3. In a device of the character described, a view-element carrier, means gripping the view element edgewise in said carrier, pawl means preventing movement of the view element lengthwise of the carrier, said carrier moving said view element away from said pawl means, and means adjusting said view element along said carrier toward said pawl means during said movement away from said pawl means and then discharging said element laterally from said carrier.

4. In a device of the character described, a view-element carrier, rotary means to move said carrier, a lever to stop said rotary means, a spring, an arm swinging on said lever and connecting said spring to said lever, and engaging means on said lever with which said arm may alternatively be engaged to vary the pressure of said spring on said lever.

5. In a device of the character described, view-element shifting means comprising a carrier sliding in a straight path, a crank and a worm gear on a common axis at right angles to said path, a pitman connecting said crank and carrier, a clutch slidable on said axis to connect the crank to the worm gear, a lever swinging in a plane parallel with said path to retentively engage said crank, a motor with its shaft parallel with said path, a worm on said shaft meshing with said worm gear, and an articulated connection from said lever to said clutch, translating the movement of said lever in said plane to the movement of said clutch on said axis.

6. In a device of the character described, view-element shifting means comprising a carrier, a crank, a pitman connecting said crank and carrier, a driving shaft, a clutch to connect said shaft with said crank, a lever to retentively engage said crank, an electric motor operatively connected with said driving shaft, a switch controlling supply of current to said motor, and means whereby said lever operates said switch and said clutch.

7. In a device of the character described, a view-element shifting device comprising a crank and a member to retentively engage said crank, a motor, a clutch to connect said motor to said crank, means to start and stop said motor, and means movable with said member whereby when said member is disengaged from said crank said motor is started and said clutch is operated to connect said motor and crank.

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