

Nov. 26, 1935.

A. E. OWEN

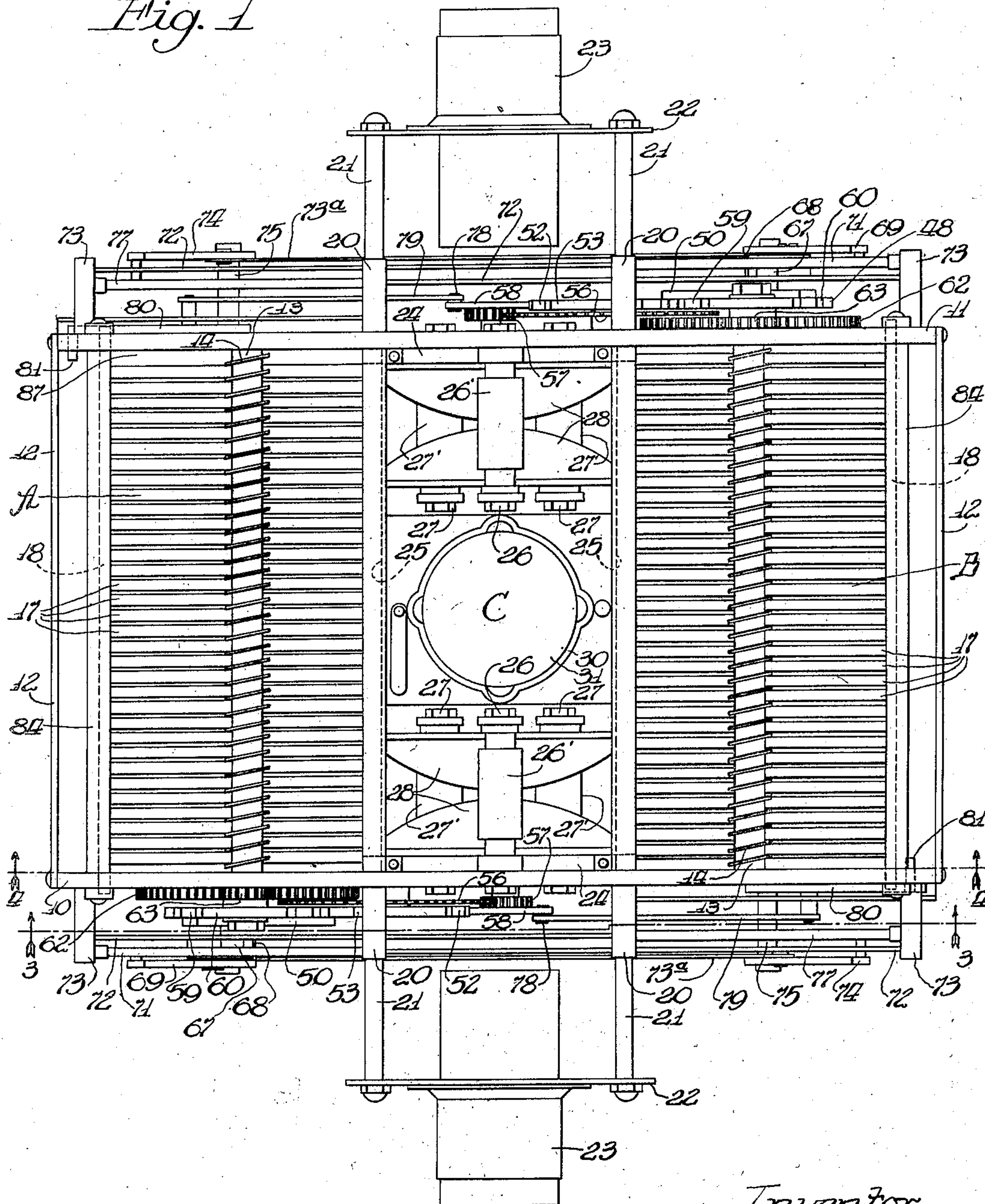
2,021,963

DISPLAY MACHINE

Filed May 12, 1934

4 Sheets-Sheet 1

Fig. 1



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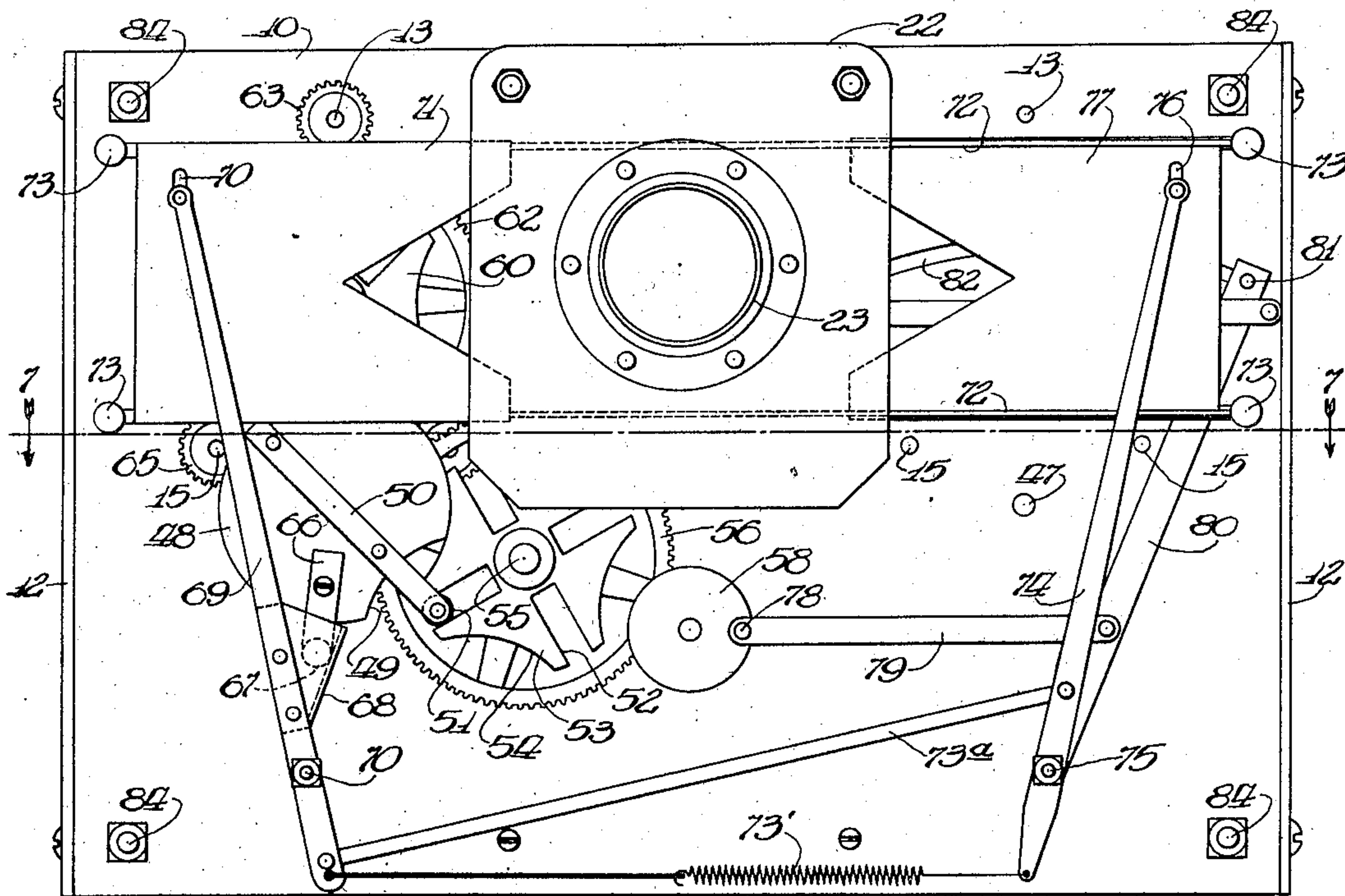
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4 Sheets-Sheet 3

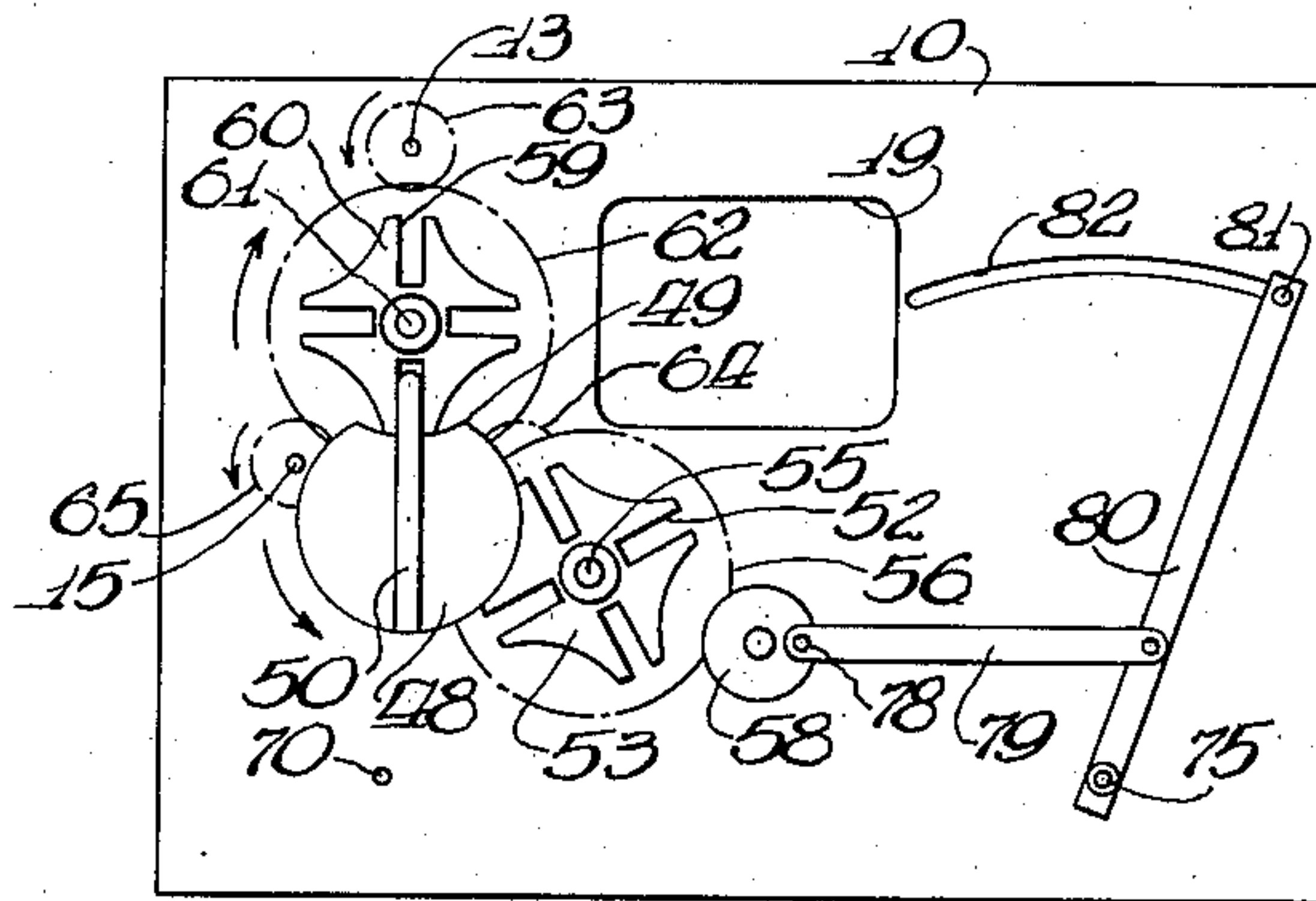
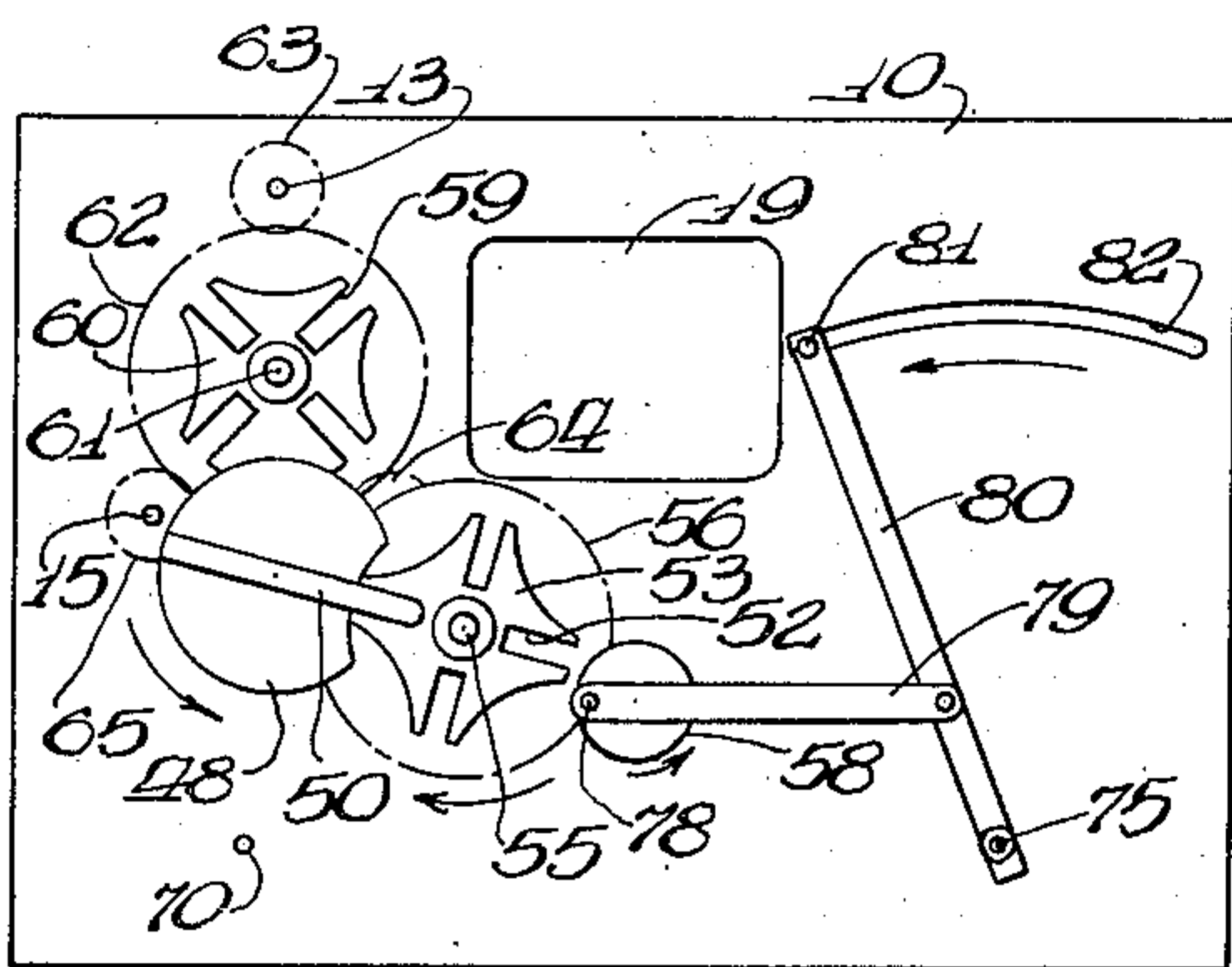
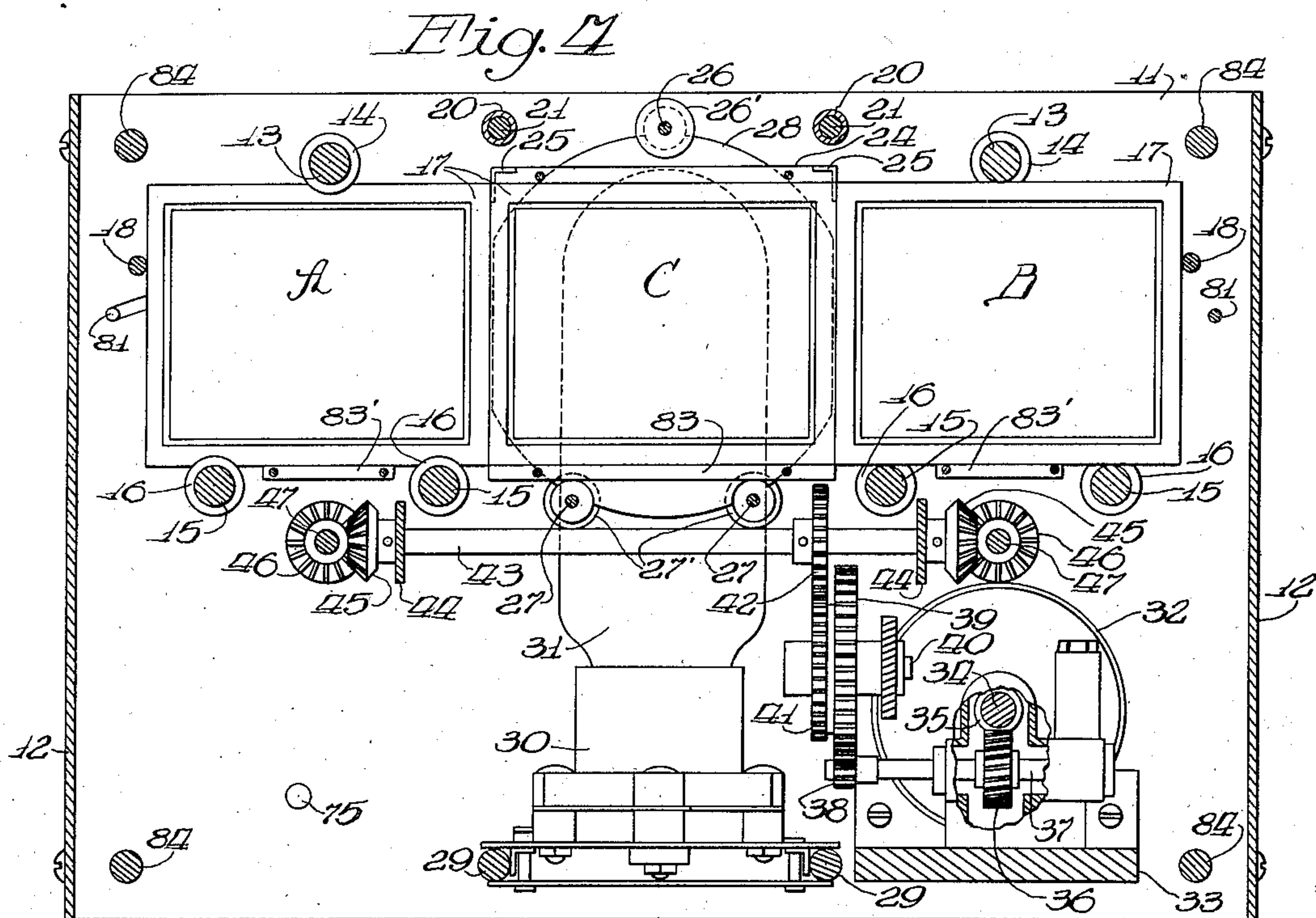


Fig. 5

Fig. 6

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DISPLAY MACHINE

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4 Sheets-Sheet 4

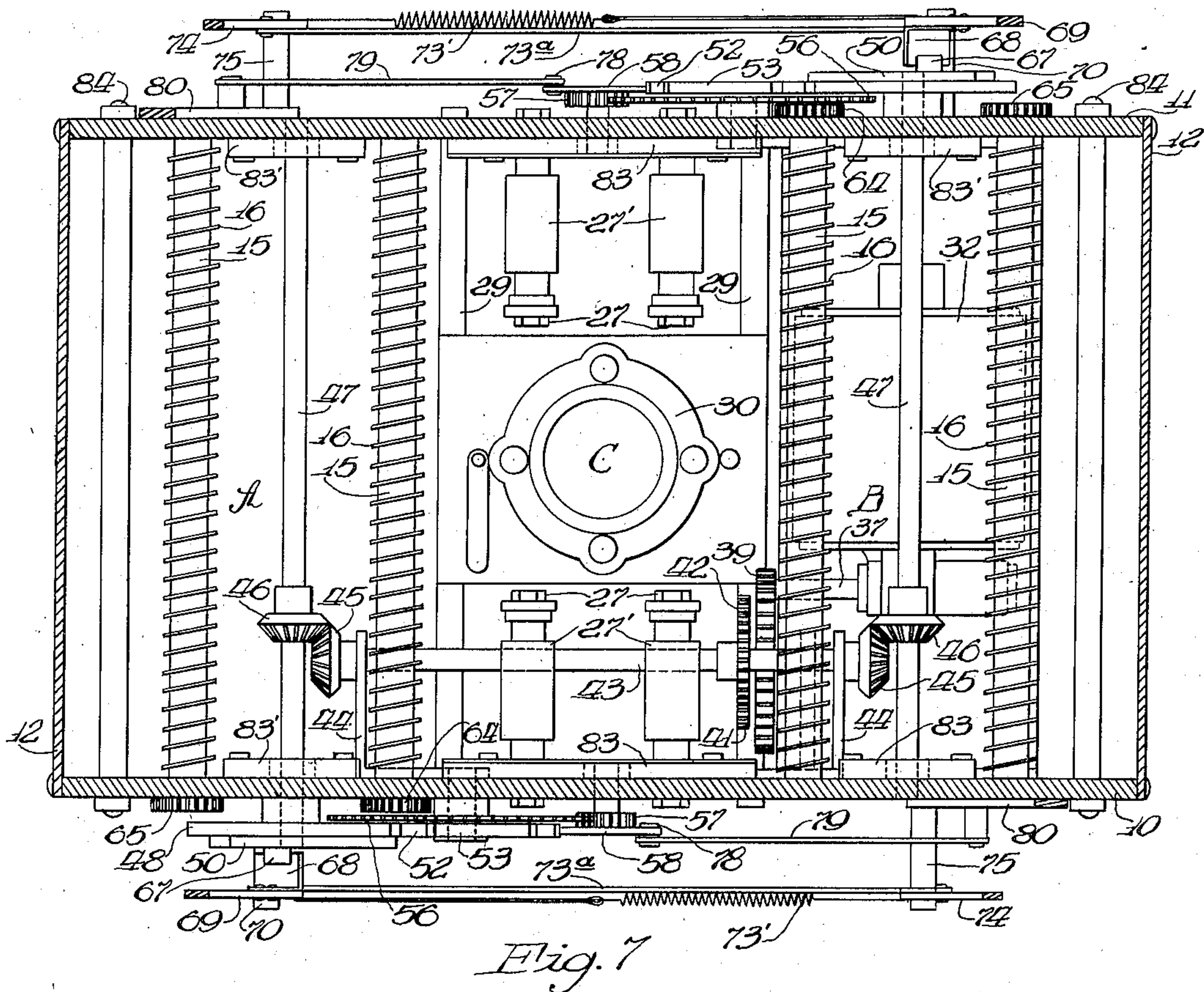


Fig. 7

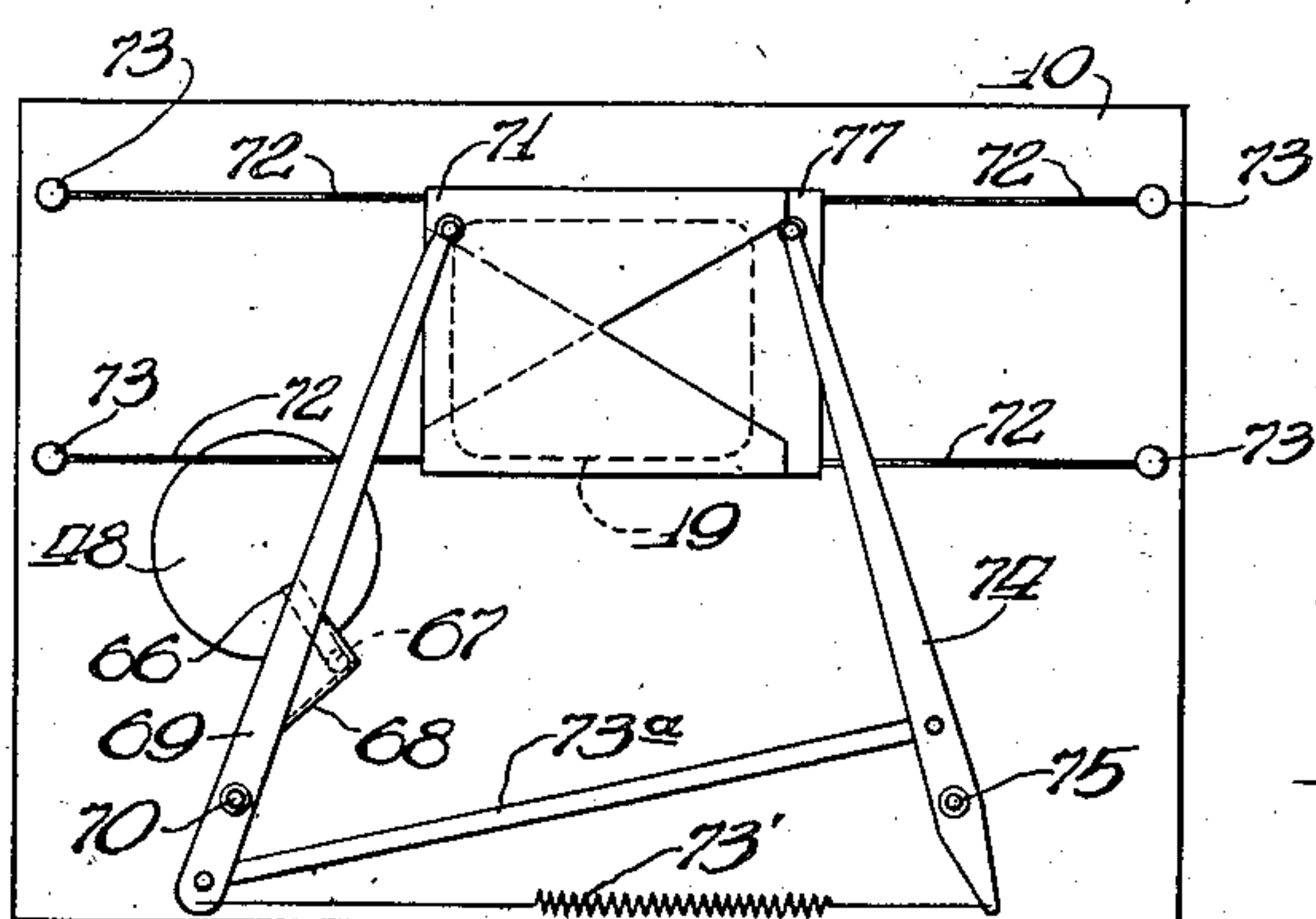


Fig. 8

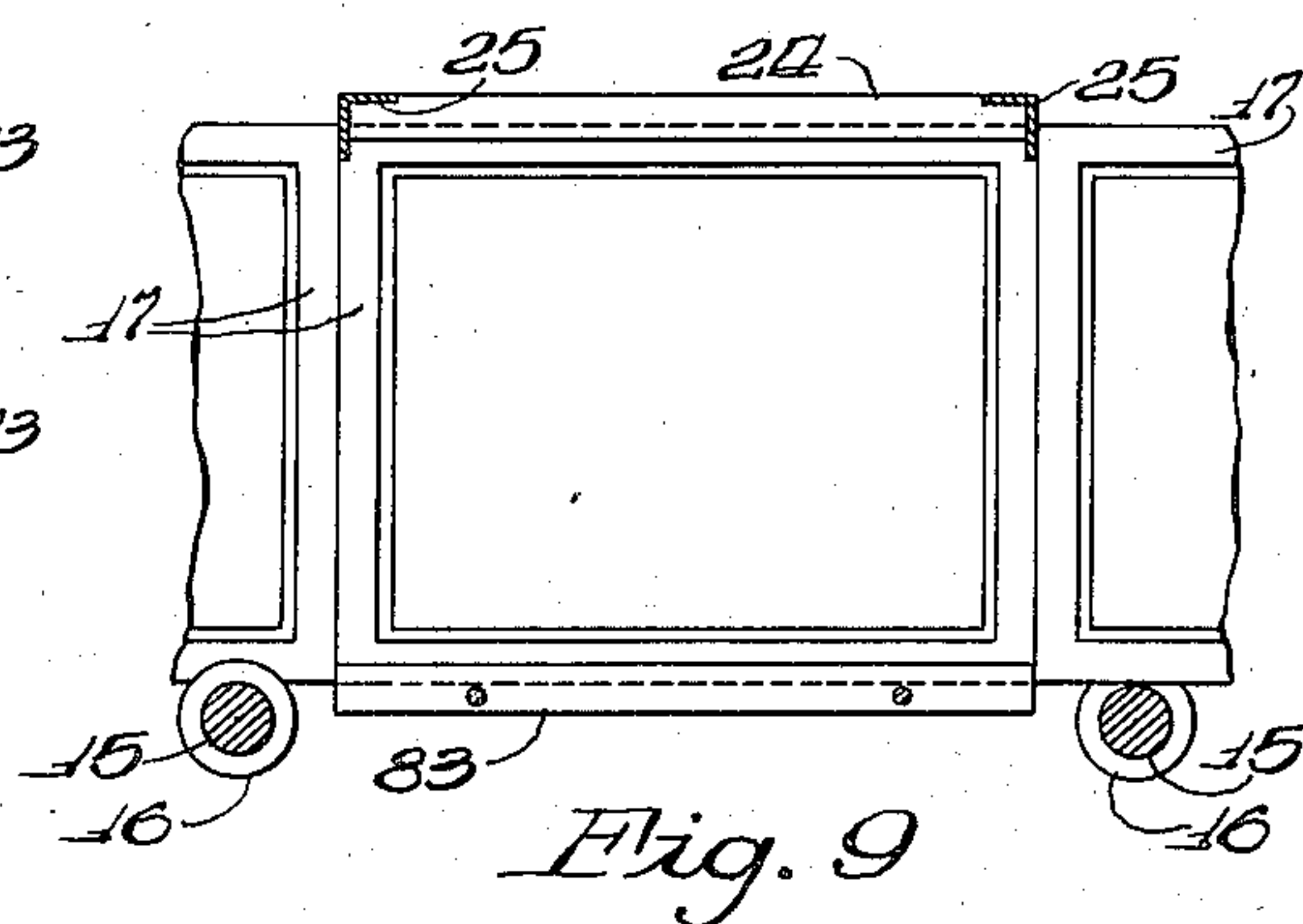


Fig. 9

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UNITED STATES PATENT OFFICE

2,021,963

DISPLAY MACHINE

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Application May 12, 1934, Serial No. 725,245

16 Claims. (Cl. 88—28)

My invention relates to a stereopticon or other display mechanism and particularly to the plate handling and shifting means for such devices.

Projection and display machines of this type as now known in the art comprise a box containing a lamp and lenses while the plate or slide handling and shifting mechanism is remotely spaced therefrom which results in a machine lacking compactness. Consequently such machines are awkward to transport or carry. Further the driving mechanism of the plate or slide shifting means is such that the slides or plates cannot conveniently be stored in the magazine of the machine during transport because they become easily dislodged. Due to their arrangement such machines also can project only in one direction.

It is desirable, therefore, to provide a machine that will be more compact to eliminate waste space so that the machine can be conveniently handled and carried around; and one in which the plates or slides may remain in the machine while it is being carried; and to provide a self-locking drive arrangement that will hold all parts, including the slides, securely in place while so handling the machine.

Accordingly, the primary object of the invention is to provide plate changing and handling mechanism causing the plates to move around the light source and lenses, the plates being moved flatwise in a horizontal path of movement on opposite sides of the lamp and lenses and horizontally edgewise in front and back of the machine.

Another object is to provide such a machine which is capable of projecting pictures or the like in two opposite directions, either in both directions simultaneously, or in one direction at a time.

Still another object is to provide an improved form of driving mechanism for the plate changing means, said mechanism including special gearing forming an automatic lock for all moving parts and the plates when not operating, thus insuring when the loaded stereopticon is being carried around that no parts, or plates, will get out of place, or adjustment.

A further object is to provide a very compact arrangement of the plate magazine, lenses, and lamp in the box containing these parts.

It is also an object to provide an improved form of shutter mechanism to cut off the projected light momentarily while the plates are being shifted from and to projecting position.

Other important objects will be apparent to those skilled in this art as the disclosure is more fully made.

Briefly, these desirable objects are achieved in the preferred example of the invention herein to be described and illustrated by providing a suitable frame or box containing a plate or slide storage and handling magazine divided into two, horizontal, spaced parallel halves, one at each side of the frame or box. A predetermined number of conveyer screws are embodied in the split magazine to carry and shift the slides flatwise. One portion of the magazine moves the slides in one direction and the other half portion moves the plates or slides flatwise in the opposite direction.

Across the front and rear ends of these screws are display or transfer bridges for supporting the slides, one at a time as they are shifted endwise across the projection opening from one magazine section to the other. Thus the slides move in a square, or rectilinear path within the frame or box. This compact arrangement permits location of the lenses and lamp within the path of movement of the slides. An improved drive is provided for the slide handling mechanism including gearing providing an automatic lock for all moving parts when the machine is not in use. A shutter mechanism is associated with the projector to cut off the light during the slide changing operation. The compact arrangement thus generally described makes the machine convenient to carry or transport, even when loaded with slides; and, additionally makes it possible to project in two opposite directions at once. This is highly desirable if it is desired to place the machine in the center of a street car, for instance, for advertising and the like purpose.

In the sheets of drawings accompanying this application is shown a practicable example of my invention, wherein:

Figure 1 is a general plan view of the stereopticon with the top cover removed to illustrate the interior parts;

Figure 2 is an end elevational view showing the driving means and shutter mechanism;

Figure 3 is an end elevational view, similar to Figure 2, with the shutter removed to show the driving gearing, as viewed from the line 3—3 of Figure 1, and looking in the indicated direction;

Figure 4 is an end elevational view, partly in section as seen along the line 4—4 of Figure 1 looking in the direction of the arrows;

Figure 5 is an end view, on a reduced scale showing the gearing that operates the slide shifting mechanism;

Figure 6 is a view similar to Figure 5 showing the same parts in a different position;

Figure 7 is a horizontal sectional view taken along the line 7—7 of Figure 2 looking in the indicated direction with the lamp removed;

Figure 8 is a detail elevational view, on a reduced scale of the shutter mechanism; and,

Figure 9 is a fragmentary, detail view, in elevation, of the display bridge.

As shown in Figures 1 and 7 the stereopticon comprises a substantially rectangular box having end walls 10 and 11 and side walls 12. A cover, not shown, is also provided to enclose the interior parts. The box thus formed is generally divided into three spaces A, B and C. Across each space A and B the walls 10 and 11 carry an upper shaft 13 formed with a screw conveyor 14 and below each shaft 13 is a pair of spaced, parallel shafts 15 in each space A and B, said shafts 15 also including screw conveyers 16. The spaces A and B constitute the slide magazine which thus is split into two halves, arranged horizontally in parallelism and spaced apart by the compartment C. Individual, or separate, picture slides 17 are arranged between each set of three screws 14 and 16 in each space A and B. Removable cross rods 18 hold the plates or slides in the magazine thus formed.

The walls 10 and 11 in line with the space C are provided with projection openings 19. Outwardly of each wall 10 and 11 above the openings 19 are a pair of spaced tubes 20 in which are telescopically fitted, rods 21 that carry a plate 22 for mounting a projection or object lens 23. Thus it will be seen that each wall 10 and 11 is the same in the respects mentioned to provide a double end projector as will presently more fully appear.

As shown in Figures 1 and 4, above each opening 19 the respective walls 10, 11, have secured thereto a transverse bridge guide piece 24 spanning the ends of the middle compartment C. Carried on the ends of these two pieces 24 are spaced, parallel, cross angle bars 25 (see also Figure 9) which serve as a means of delineating the respective spaces A, B and C. Each wall 10 and 11 at the ends of the space C carries an upper bolt 26 and two lower spaced bolts 27. These bolts 26, 27 carry appropriate clamping collars 26' and 27' for securely holding pairs of condensing lenses 28 in cross alignment with the openings 19 and projectors 23. A pair of cross frame pieces 29 are carried by the walls 10, 11 as shown in Figure 4, to mount a socket support 30 for an appropriate electric lamp 31, which extends upwardly in the space C between the lenses 28 and between the split magazine slide packs 17 as shown. From this description it must now be appreciated that an exceedingly compact arrangement results from this relative positioning of the parts, which arrangement uses all the space within the box in an efficient manner so that no waste space results. Consequently the size of the box may be reduced to minimum proportions.

A small electric motor 32, as shown in Figures 4 and 7, is located on a platform 33 in the space B below the plates 17 therein, said motor having a shaft 34 carrying a worm gear 35 driving a worm wheel 36 on a shaft 37. The shaft 37 drives a spur gear 38, in turn driving a gear 39 on a shaft 40 suitably journaled as shown. The other end of the shaft 40 carries and drives a gear 41, in turn driving a gear 42 on a long shaft 43 journaled in brackets 44 mounted on the wall 10 at its inner side. The shaft 43 spans the space C and at each end it carries and drives bevel gears 45 which drive bevel pinions 46 fast on

respective cross shafts 47 under the plates 17 in the magazine, these shafts being journaled in the walls 10 and 11. The shaft 47 in space A projects at one end through the wall 10 and the shaft 47 in space B projects similarly through the wall 11. Each projected end of these shafts drives gearing mounted on the outer faces of the walls 10 and 11 which is identically the same except that one set of such driven mechanism is left and the other is right. For that reason it will suffice to describe only one set and for that purpose reference is to be had to Figure 3 showing this driven mechanism on the wall 10.

As shown in Figure 3, and Figure 7, the projecting end of the shaft 47 in space A carries a wheel 48 having an arcuate cut away portion 49 and carrying a diametrically disposed driving lever 50, one end of which is extended radially beyond the periphery of the wheel. This end carries a roller 51 adapted to engage in radial slots 52 of a Geneva type intermittent stop gear 53 having actuated quadrants 54 to lock releasably with the circular periphery of the wheel 48. This gear 53 is fast on a shaft 55 carried in the wall 10, said shaft also carrying fast thereon a relatively large reduction spur gear 56, which drives a small gear 57 on a shaft to turn a blank wheel 58 on the same shaft. The purpose of the wheel 58 will presently appear.

The driver wheel 48 also causes the roller 51 to engage at times in the slots 59 of a gear 60 similar to the gear 53 heretofore described, said gear 60 being fast on a shaft 61 and turning a large spur gear 62. This gear 62 drives a small gear 63 on the reduced end of the screw conveyor shaft 13 to drive the screw 14. Similarly the gear 62 drives a gear 64 and a gear 65 to drive the two lower screw conveyers 16.

The driver wheel 48 carries another radially extending arm 66 and roller 67 to engage a shoe 68, as shown in Figure 2, to swing a lever 69 pivoted at 70 to the wall 10, said lever carrying the shoe. The upper end of the lever 69 is carried in a slot 70 formed in a shutter plate 71 which plate is slidably mounted at its upper and lower edges on a pair of rods 72 appropriately carried on end brackets 73 on the wall 10. The lower end of the lever 69 is pivoted to a link 73a connected to a lever 74, above its fulcrum 75 at the other end of the wall 10. The upper end of the lever 74 is similarly mounted in a slot 76 in another shutter plate 77 also slidably mounted on the rods 72. These rods span the opening 19 to carry the shutters at the proper time in light cutting off position with respect to the opening 19. This shutter arrangement just described for the wall 10 is also duplicated on the wall 11 as will be readily understood. See also Figure 8. A spring 73' connects the lower ends of the two levers 69 and 74.

The wheel 58 carries an eccentric pin 78 to which is pivotally connected a link 79 in turn pivoted to a lever 80 above its fulcrum on the walls 10 and 11 as shown in Figure 3. The upper end of the lever carries a projection 81 movable through an arcuate slot 82 in the walls 10 and 11 to engage a slide 17 as will soon appear to shift the same endwise.

A bridge piece 83 spans the openings 19 at their lower edge, said pieces 83 being secured to the respective walls 10, 11 in a manner similar to the upper bridge pieces 24 heretofore described. See Figures 7 and 9. Also, as shown in Figure 4 similar rails 83' are arranged on the walls 10, 11 between the ends of the screws 16. Suitable brace

rods 84 are provided to brace the walls 10, 11 as shown.

Looking to Figure 1 the pack of plates 17 is so arranged as to leave a space 85, about the thickness of a plate 17, at the upper end of the space B and in the space A a similar space 86 is provided at one end of the plate pack, and another space 87 at the other end thereof.

In operating the improved stereopticon the rods 18 are removed after suitable doors, not shown, in the end walls 12 are opened. The slides 17 are then arranged on the lower screw conveyers 16 and below the upper conveyers 14, these conveyers being vertically spaced in each compartment A and B the proper distance to receive the plates between their screw formations. The spaces 85, 86 and 87 must be left. By means of a switch, not shown, the motor 32 is turned on to operate the gearing described to turn the driver 48 on the wall 10 and the same driver 48 on the other opposite wall 11. Of course, before the motor is started the rods 18 and walls 12 are replaced to close the box. Also it will be understood that both drivers 48 turn oppositely and their direction of rotation is toward the center space C.

Considering the driver 48 on the wall 10, as shown in Figure 5, its arm 50 turns the wheel 53, gear 56, gear 57, wheel 58 to reciprocate link 79, and swing the arm 80 from the position of Figure 6 to that shown in Figure 5. The boss 81 thus shifts the slide 17 in magazine B adjacent the wall 10 over the rail 83' and off the screws 16 to the bridge 83 where said slide is in display position in compartment C in front of the adjacent opening 19. While this endwise shift of said slide occurs the wheel 60 is held stationary and the screw conveyers 14 and 16 in compartment A are not driven. As soon as the plate or slide is in display position the arm 50 has moved to operate the wheel 60, gear 62, and gears 63, 64 and 65 to operate the feed screws 14 and 16 in the space A. Thence, all plates 17 in the magazine A shift flatwise one step due to the timing of the driving parts. By this time the wheel 58 has completed a revolution to move the arm 80 back to the position shown in Figure 6, there now being a space adjacent the wall 10 from whence the slide 17 was shifted from the magazine B. Assuming that a slide 17 was already in display position at opening 19 in the wall 10, the movement described will have caused said slide to be shifted over to the space 87 (Figure 1) before the screws in magazine A are operated.

The gearing and shifting mechanism on the wall 11 next operates in the cycle to shift a slide from the space 86 in magazine A to display position adjacent the opening 19 in the wall 11. The gearing on wall 11 next operates the screws in magazine B to shift the whole pack of slides one step toward the wall 10. In this fashion then the slides are shifted edgewise from the end of the magazine B across the display bridge 83 on wall 10, thence flatwise with the pack in magazine A toward the wall 11; thence edgewise again alongside the wall 11 and across the bridge 83 and opening 19 and back to the pack of slides in the magazine B at the wall end 11.

In timed relation with the shifting edgewise of the slides across the bridge 83, the shutters 71, 77 are caused to operate; the arm 66 of the driver 48 moving the lever 69, link 73 and lever 74 to accomplish this result. The timing is such that as a slide is about to shift the shutters close,

and when the shifted slide is in display position, the shutters open.

If it is desired to project simultaneously in opposite directions both openings 19 are open, and if it is desired to project only in one direction, one of the openings 19 can be closed off in any desirable manner and the adjacent projector lens 23 and carrier 22 can be easily removed by sliding it out of the carrier tubes 20.

The machine can be easily carried loaded with 10 plates 17 as the gearing is such that the drive parts shown in Figure 3 lock, when not operating, to hold all driven parts, including the plate packs, in fixed positions so that no part can accidentally become misplaced or be moved 15 relative to any other part.

Further the arrangement, of passing the slides in a horizontal rectilinear path around the lamp and lenses is such that remarkable compactness results, making it possible greatly to reduce the 20 size of stereopticons of this type. All of these features adapt the machine for installation in shallow places and easy portability.

While the present slide shifting mechanism has been particularly shown and described in 25 association with a stereopticon, the mechanism is equally adaptable for advertising purposes in the shifting and display of plates carrying advertising. In such instance the projectors and condensing lenses would not be used. The lamp, 30 of course, could be retained to produce interesting lighting effects. Therefore, the present invention is not to be limited to a small size stereopticon in the respects just mentioned, for it could be constructed in any desired size with ap- 35 propriately sized plates or signs in lieu of the small stereopticon slides herein particularly shown and described.

From this disclosure it will now be appreciated that an improved stereopticon has been pro- 40 vided which achieves all of the desirable objects heretofore recited.

It is the intention to cover herein all such changes and modifications of the preferred example shown and described which do not depart 45 from the spirit and scope of my invention as hereinafter claimed.

What is claimed is:

1. A device of the class described comprising a box having a slide pack therein, conveyer 50 screws for carrying the slides and shifting them in the pack flatwise, means on an end wall including a display opening and display means, a lamp at the side of the pack behind said opening and in line therewith, means to shift the 55 slides one at a time edgewise from the end of the pack to display position, a driver wheel including a lever, a Geneva wheel moved by the lever, means operated by the Geneva wheel to shift the plates edgewise, a second Geneva wheel 60 operated by the lever, and means to drive the feed screws from said second Geneva wheel to shift the slides flatwise.

2. A stereopticon comprising a box divided into three parallel side by side longitudinal spaces, a 65 a lamp and condenser lenses in the middle space, projector lenses carried by each end wall in line with the middle space, slide packs in the two side spaces, display means between the ends of the packs, means for shifting the slides flatwise in 70 the end spaces in opposite directions, gear means embodying connections for shifting the slides edgewise at the ends of the packs from one pack to the other across the display means, said slides traveling a path surrounding the lamp and con- 75

denser lenses, and a shutter driven from said connections and operating in timed relation with the edgewise shifting of the slides to cut off the display means during the edgewise shifting of the slides.

3. A device of the class described comprising a box having side walls and an end wall, a pack of individual slides arranged horizontally adjacent each side and spaced laterally apart in parallelism to provide a middle space in the box, a lamp in said space, at least three feed screws for carrying and moving the slides flatwise in the packs, the slides in each pack moving in opposite directions, display means including a transfer bridge associated with the end wall in line with the middle space, and gear driven means including a to and fro swinging member for shifting the slides edgewise across the bridge from the end of one pack to the proximate end of the other pack.

4. A device of the class described comprising a box having side walls and an end wall, a pack of individual slides arranged horizontally adjacent each side and spaced laterally apart in parallelism to provide a middle space in the box, a lamp in said space, at least three feed screws for carrying and moving the slides flatwise in the packs, the slides in each pack moving in opposite directions, display means including a transfer bridge associated with the end wall in line with the middle space, gear driven swingable means for shifting the slides one at a time edgewise across the bridge from the end of one pack to the proximate end of the other pack, and means including a rotary driver for said screws and shifting means, said driver when idle serving as a positive lock to hold all moving parts including the slides in position.

5. A device of the class described comprising a box having side walls and an end wall, a pack of individual slides arranged horizontally adjacent each side and spaced laterally apart in parallelism to provide a middle space in the box, a lamp in said space, at least three feed screws for carrying and moving the slides flatwise in the packs, the slides in each pack moving in opposite directions, display means including a transfer bridge associated with the end wall in line with the middle space, swingable gear driven means for shifting the slides edgewise across the bridge from the end of one pack to the proximate end of the other pack, and a shutter operatively associated with the last mentioned means for movement in timed relation with the slide shifting means to cut off the display means while a slide is moving across the transfer bridge.

6. A device of the class described comprising a box having a slide pack at each side thereof, display means on an end of the box between said packs, a lamp and condenser lens in the box between the packs, conveyer screws for carrying the slides and shifting them in the pack flatwise, means to shift the slides one at a time edgewise from the end of one pack to display position, a driver wheel including a lever, a Geneva wheel moved by the lever, said means that shifts the plates edgewise being operated by the Geneva wheel, a second Geneva wheel operated by the lever, and means to drive the feed screws from said second Geneva wheel to shift the slides flatwise as stated.

7. A device of the class described comprising a box having a slide pack at each side thereof, display means on an end of the box including a bridge associated with proximate ends of the

packs, a lamp in the box between the packs, conveyer means for carrying the slides and shifting them in the pack flatwise, a member to shift the slides one at a time edgewise from the end of one pack over said bridge in the direction of the proximate end of the other pack, a driver wheel, a stop motion gear driven by said wheel, means driven by said stop motion gear to operate the member that shifts the plates edgewise, and a second stop motion gear driven from said driver wheel to operate the conveyer means.

8. A device of the class described comprising a box having a slide pack at each side thereof, display means on an end of the box including a bridge associated with proximate ends of the packs, a lamp in the box between the packs, conveyer means for carrying the slides and shifting them in the pack flatwise, a member to shift the slides one at a time edgewise from the end of one pack over said bridge in the direction of the proximate end of the other pack, a driver wheel, a stop motion gear driven by said wheel, means driven by said stop motion gear to operate the member that shifts the plates edgewise, a second stop motion gear driven from said driver wheel to operate the conveyer means, and a shutter associated with the display means including operating connections therefor driven from said driver wheel.

9. A device of the class described comprising a box having a slide pack at each side thereof, display means on an end of the box including a bridge associated with proximate ends of the packs, a lamp in the box between the packs, at least three conveyer screws for carrying the slides in each pack and for shifting the slides flatwise, a driver wheel, an intermittently operable member driven by the wheel for operating said conveyer screws, and another intermittently operable member driven by the driver wheel and having connections for shifting the slides one at a time from one pack over the bridge in the direction of the other pack.

10. A device of the class described comprising a box having a slide pack at each side thereof, display means on an end of the box including a bridge associated with proximate ends of the packs, a lamp in the box between the packs, at least three conveyer screws for carrying the slides in each pack and for shifting the slides flatwise, a driver wheel, an intermittently operable member driven by the wheel for operating said conveyer screws, a swingable member for shifting slides edgewise from one pack over the bridge in the direction of the other pack, and another intermittently operable member driven by the driver wheel for operating said swingable member.

11. A device of the class described comprising a box having a slide pack at each side thereof, display means on an end of the box including a bridge associated with proximate ends of the packs, a lamp in the box between the packs, at least three conveyer screws for carrying the slides in each pack and for shifting the slides flatwise, a driver wheel, an intermittently operable member driven by the wheel for operating said conveyer screws, a swingable member for shifting slides edgewise from one pack over the bridge in the direction of the other pack, another intermittently operable member driven by the driver wheel for operating said swingable member, a movable shutter associated with the display means, and means operable from the driver

wheel in timed relation to the movement of the swingable member for operating the shutter.

12. A device of the class described comprising a box having a slide pack at each side thereof, display means on an end of the box including a bridge associated with proximate ends of the packs, a lamp and condenser lens in the box between the packs, a driver wheel including a lever, rotary means for carrying each pack of slides and for moving them in one pack flatwise, said driver wheel operating said rotary means, a swingable member for shifting slides one at a time over the bridge from one pack toward the other pack, and intermittent gear means driven from said driver wheel for operating said swingable means.

13. A device of the class described comprising a double ended box having a slide pack at each side thereof, display means on each end of the box including a bridge between the ends of the packs, a lamp in the box between the packs, a driver wheel on each end of the box, screws for carrying the slide packs and for moving the slides flatwise in each pack and in opposite directions in the respective packs, an intermittent gear at each end of the box driven by the adjacent driver wheel, a swinging member at each end for moving the slides edgewise across each bridge from one pack to the other, another intermittent gear at each end of the box driven from the adjacent driver wheel, and connections from said last mentioned intermittent gears to operate the proximate swinging member.

14. A device of the class described comprising a box having a slide pack therein, conveyer screws carrying the slides and for shifting them in the pack flatwise, means associated with an end wall including a display opening and display means, a lamp at the side of the pack behind said opening and in substantial line therewith, a continuously driven common rotary member, a mem-

ber to shift slides in relation to the display means edgewise from said pack, and intermittent rotary means driven by the common rotary member including connections for operating the screws and shifter member in timed relation to move the slides in the manner stated.

15. A device of the class described comprising a box having a slide pack therein, conveyer screws carrying the slides and for shifting them in the pack flatwise, means associated with an end wall including a display opening and display means, a lamp at the side of the pack behind said opening and in substantial line therewith, a continuously driven common rotary member, a member to shift slides in relation to the display means edgewise from said pack, and a pair of Geneva wheels driven from the common rotary member including connections for operating the screws and shifter member in timed relation to move the slides in the manner stated.

16. A device of the class described comprising a box having a slide pack therein, conveyer screws carrying the slides and for shifting them in the pack flatwise, means associated with an end wall including a display opening and display means, a lamp at the side of the pack behind said opening and in substantial line therewith, a continuously driven common rotary member, a member to shift slides in relation to the display means edgewise from said pack, intermittent rotary members driven by the common rotary member including connections for operating the screws and shifter member to move the slides in the manner stated, a movable shutter cooperable with the display means, and connections operable from one of the rotary members to move the shutter in timed relation to the edgewise shifting movement of the slides.

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