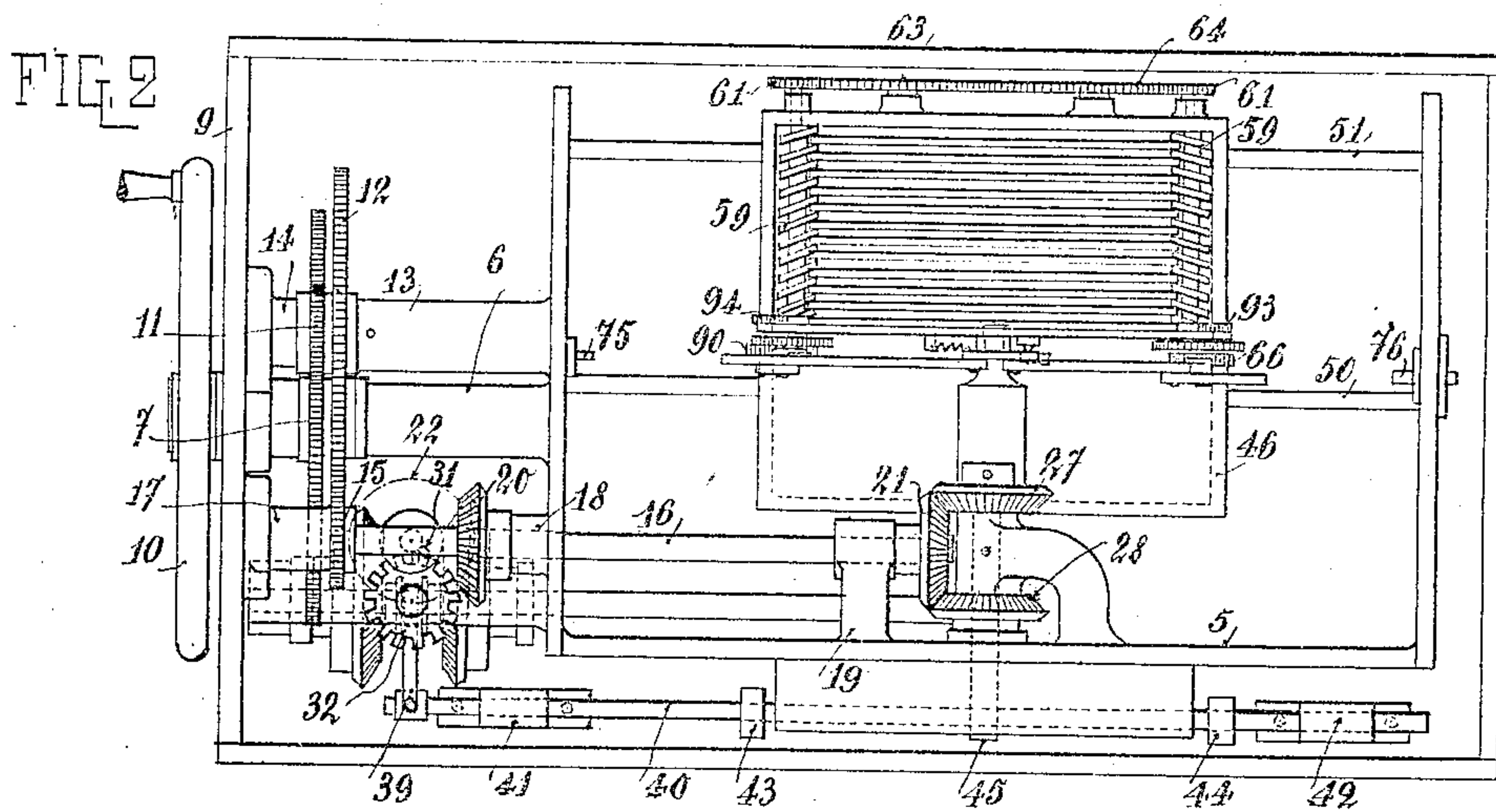
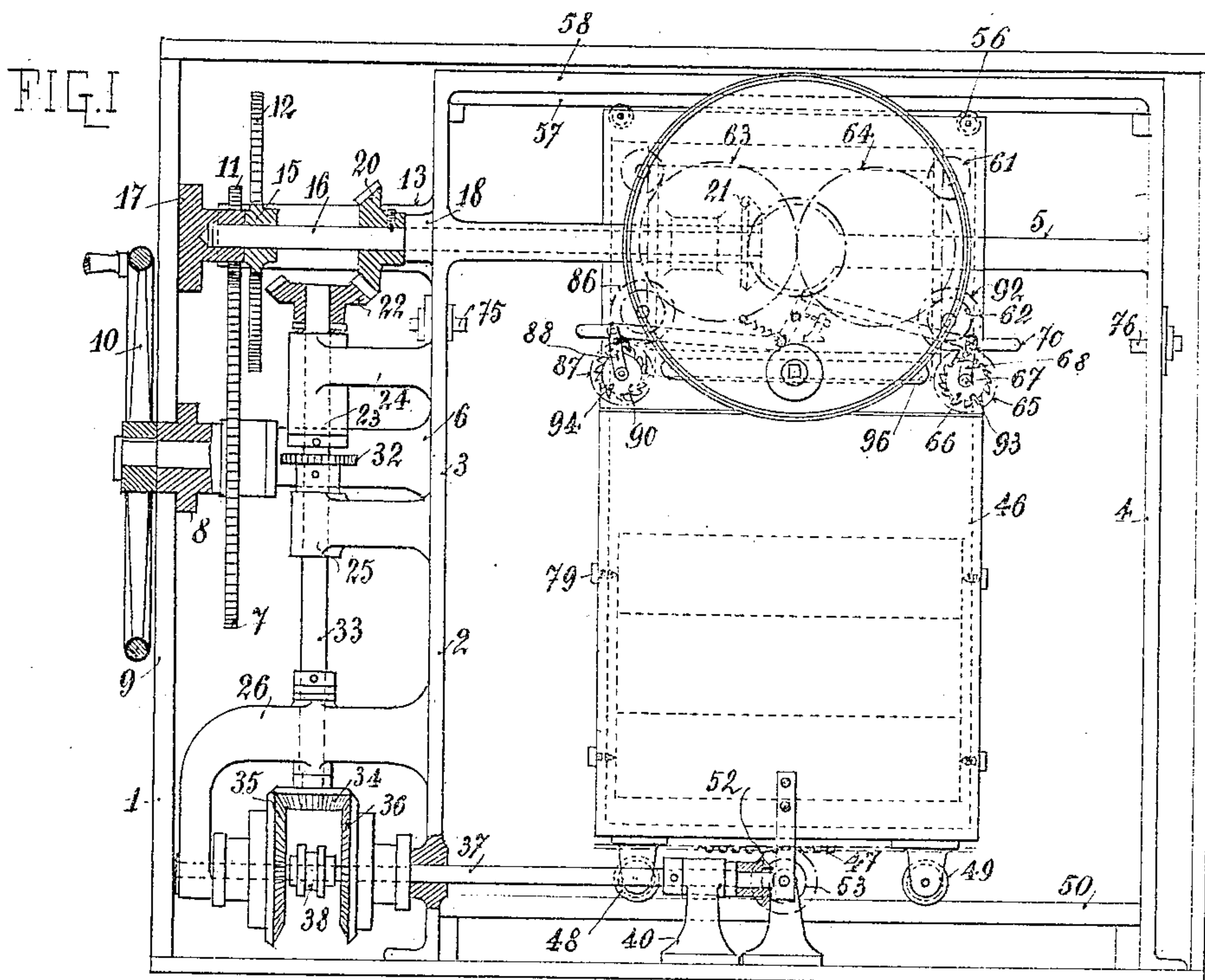


911,710.

Patented Feb. 9, 1909.

3 SHEETS—SHEET 1.



Witnesses

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KINEMATOGRAPH APPARATUS.
APPLICATION FILED SEPT. 23, 1907.

911,710.

Patented Feb. 9, 1909.
3 SHEETS—SHEET 2.

FIG. 4

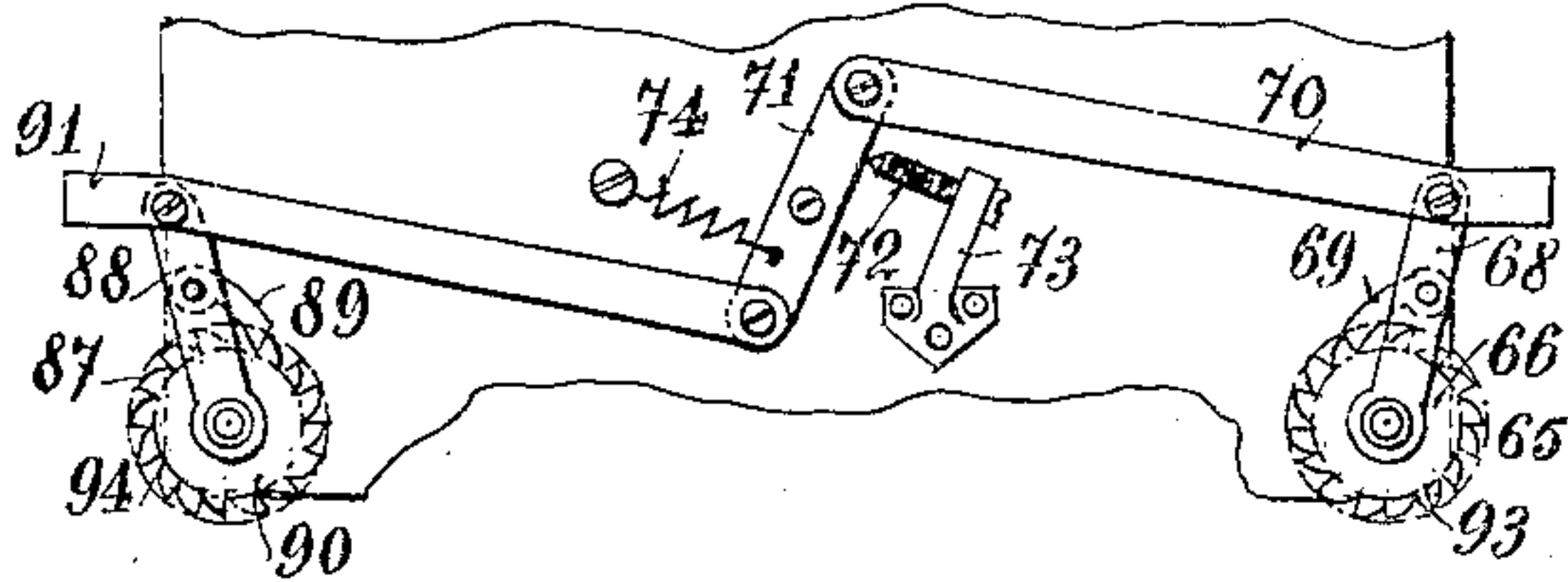


FIG. 5

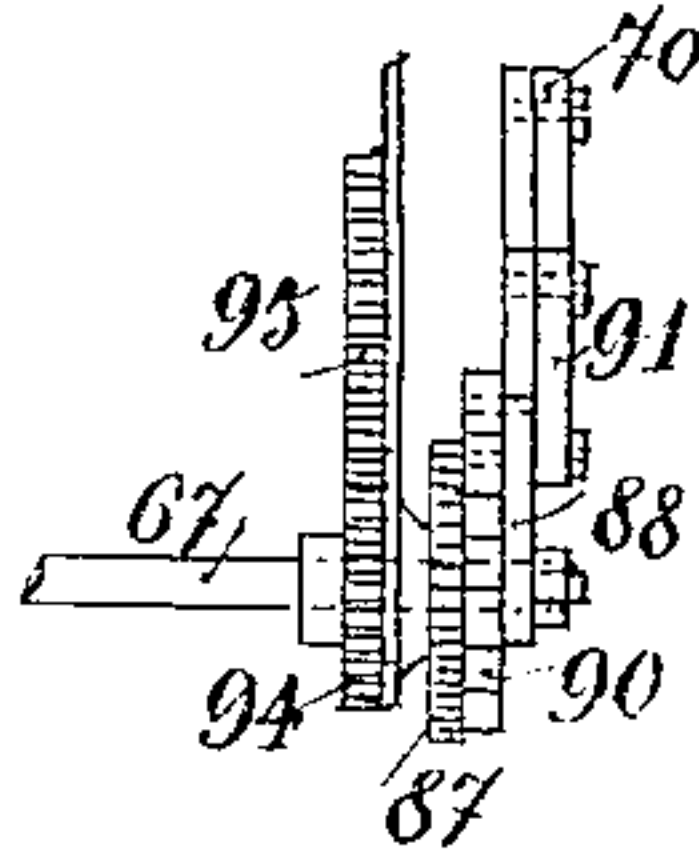
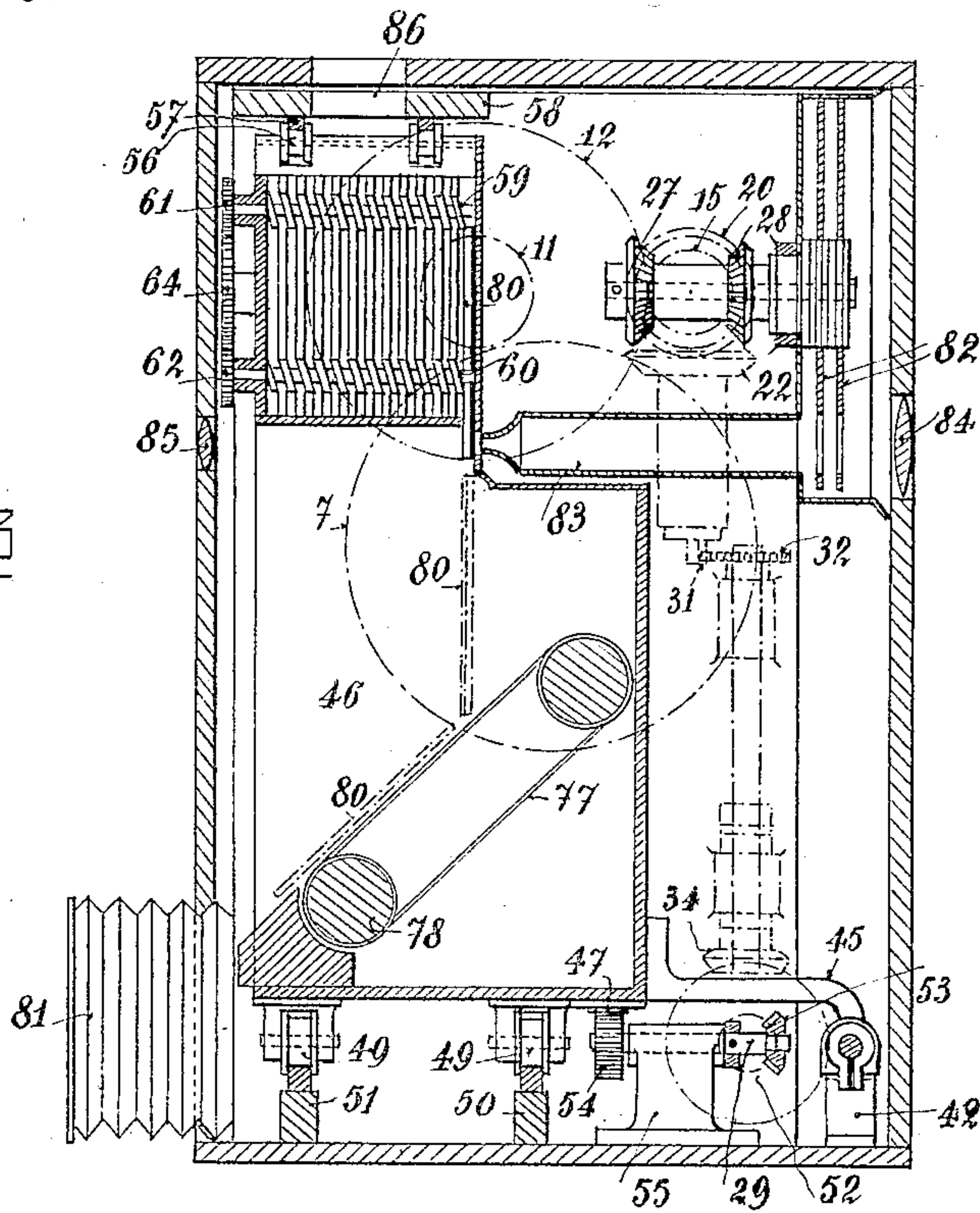


FIG. 3



Witnesses,

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APPLICATION FILED SEPT. 23, 1907.

911,710.

Patented Feb. 9, 1909.

3 SHEETS—SHEET 3.

Fig. 8

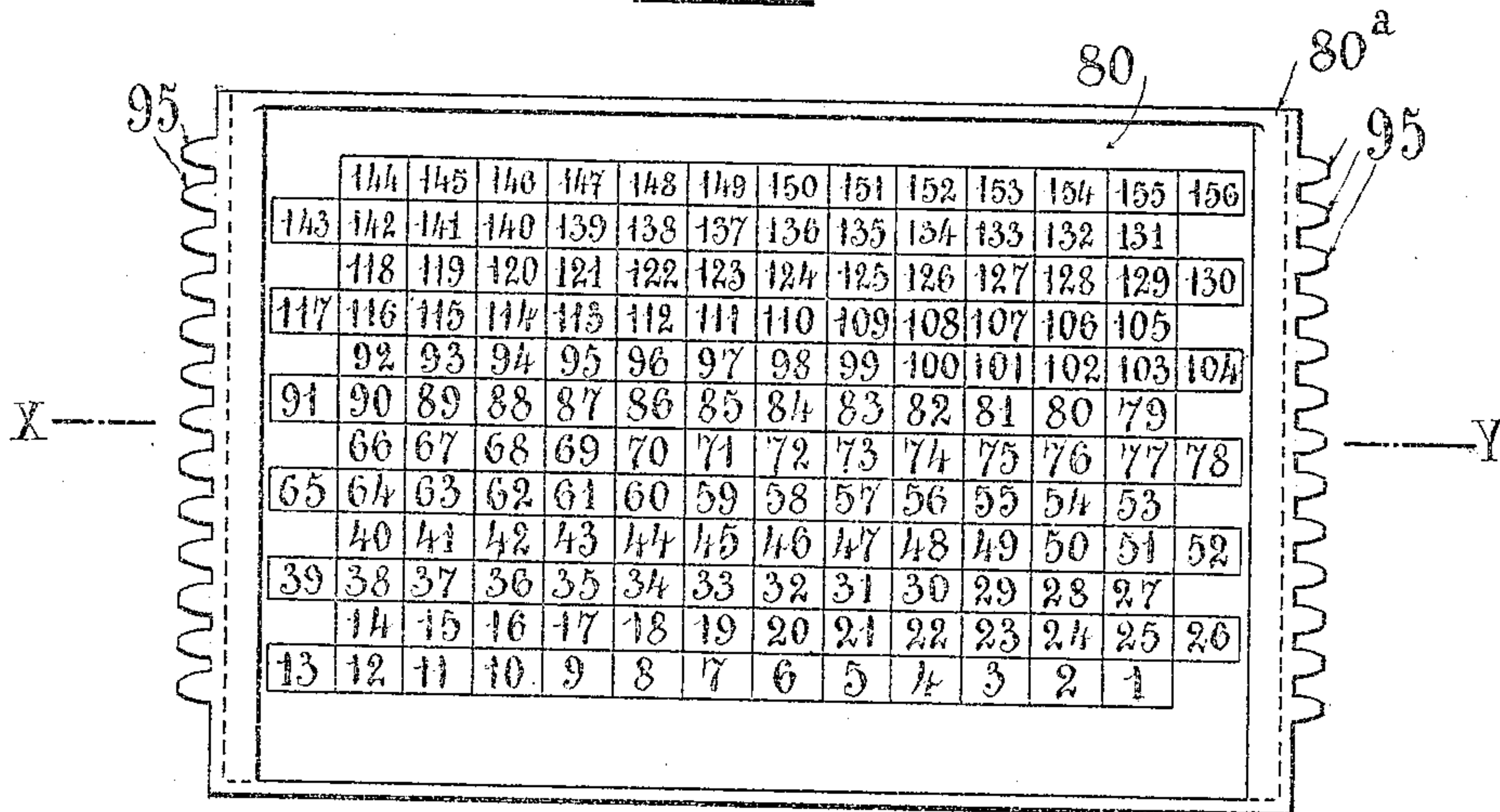


Fig. 9

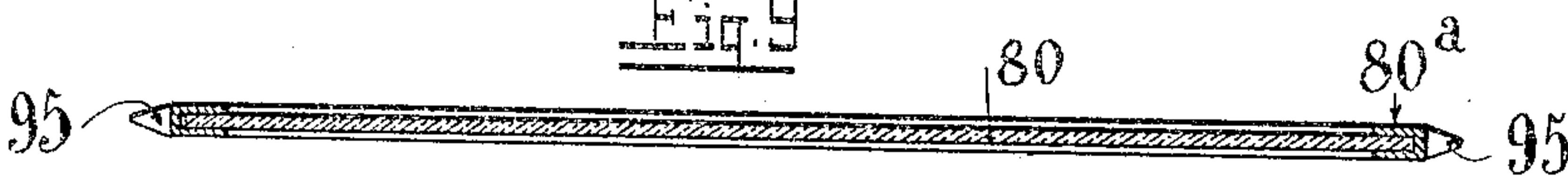


Fig. 6

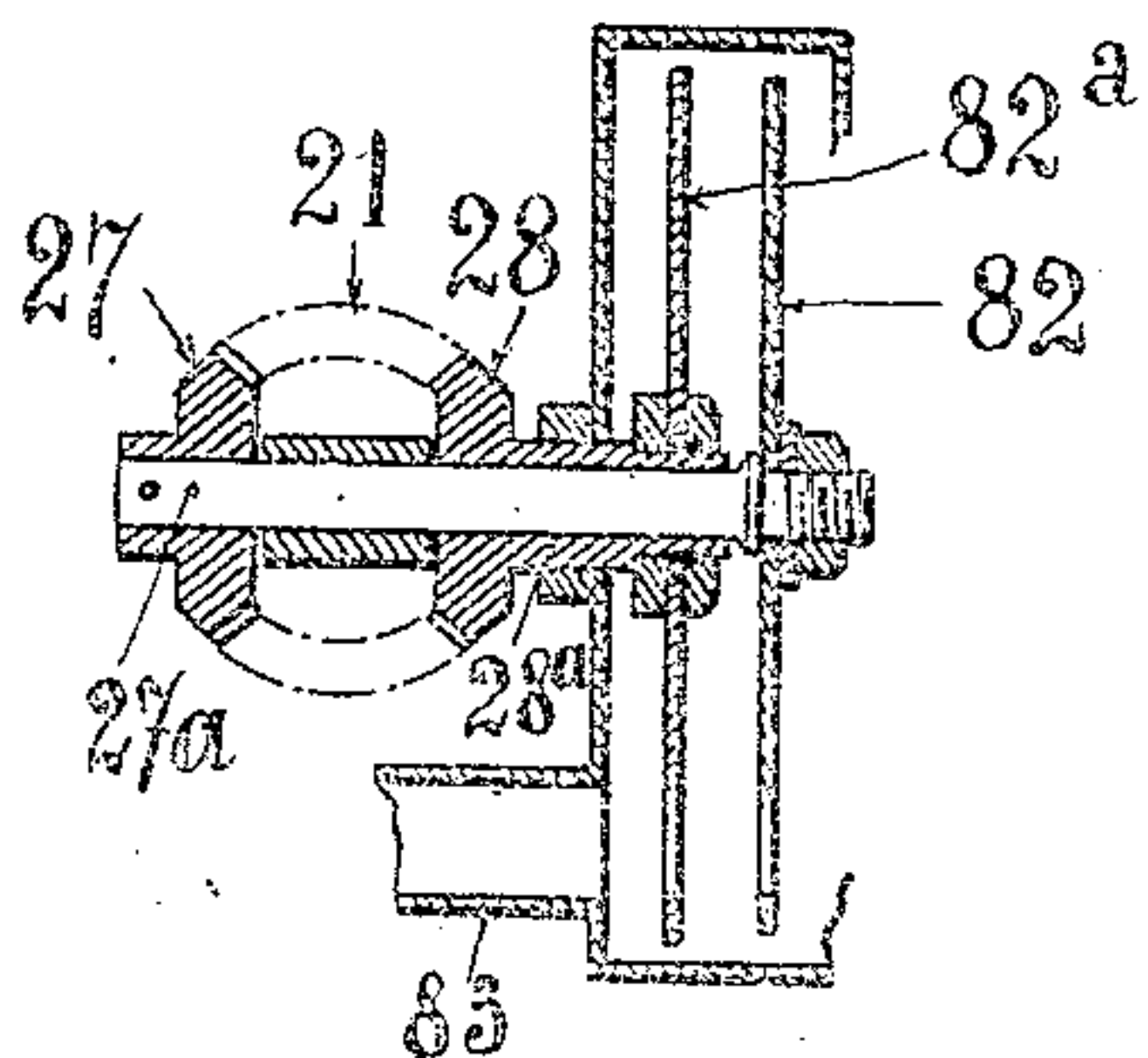
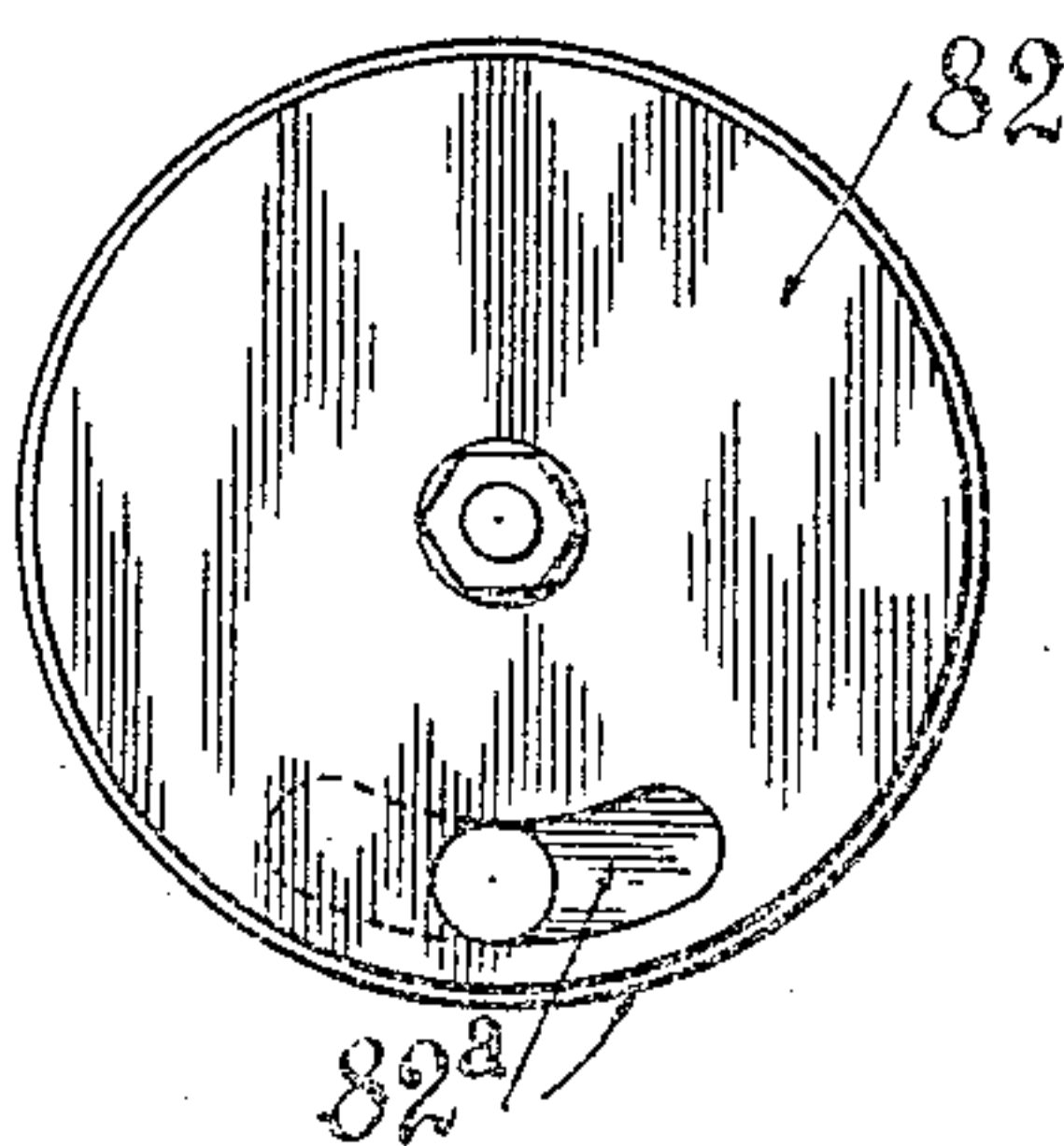


Fig. 7



Witnesses

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UNITED STATES PATENT OFFICE.

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KINEMATOGRAPH APPARATUS.

No. 911,710.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed September 23, 1907. Serial No. 394,211.

To all whom it may concern:

Be it known that I, ROBERT ARTHUR FAUCONNET, a citizen of the French Republic, residing at 36 Rue de Menilmontant, Paris, in the Department of Seine, France, have invented a certain new and useful Improvement in Kinematograph Apparatus, of which the following is a specification.

This invention relates to an improved kinematograph apparatus for taking "living pictures" and continuous projection thereof by the aid of photographic plates. The ordinary kinematographs by which pictures can be taken, and subsequently reproduced by the aid of plates arranged in series have various practical drawbacks. The pressure of the spring upon the series of plates is unequally distributed, and the first plates being held too tightly can only descend irregularly, so that the order of the succession of the pictures is sometimes inverted and a defective result obtained, which is still worse when the apparatus is used for the taking of the pictures because then more than one picture may be taken upon the same part which becomes spoiled; further whenever a plate has descended more than the half of its height, the following plate assumes a sloping position, which obliges the first plate to take the same position, thus giving rise to a foreshortening of the image vertically while retaining the full horizontal dimensions. Moreover the transporting box is liable to shocks, which interfere with the sharpness of the pictures taken or projected.

In order to obviate these drawbacks the improved kinematograph apparatus which forms the object of the present application for Letters Patent has been devised. It is composed of a carrying box in which there is arranged a series of endless screws causing the regular movement of the plates, the descent of which is effected independently of one another by means of a system of propelling fingers combined on the one hand with buffers and on the other with levers, of which one is common and the others provided each with a catch engaging in a spur wheel controlling gear wheels engaging with other gear wheels, which keyed upon the said endless screws are themselves in engagement with intermediate gearing; the shaking of the transporting box being altogether avoided by means of a system of endless bands adapted to receive each plate after

its fall, and to carry it into a container arranged in the form of a bellows, so as to occupy less space when the apparatus is at rest.

A construction of the invention is illustrated in the accompanying drawing.

Figure 1 shows an elevation and partial section, the front of the box being supposed to be removed. Fig. 2 is a partial plan view of Fig. 1. Fig. 3 is a transverse view of Fig. 1 partially in section. Figs. 4 and 5 show on a larger scale the detaining mechanism of the plate while changing its position. Figs. 6 and 7 illustrate in detail the mounting of the obturators. Fig. 8 shows a plate in its holder with side racks, said plate provided with 12 horizontal rows of images totaling 144 in all. Fig. 9 shows a horizontal section of Fig. 8 on the line X—Y.

The kinematograph is composed of a rectangular box 1, on the bottom of which is fixed a framework 2, preferably of light metal, comprising two uprights 3 and 4 connected above by a cross bar 5, and at one side by another cross bar 5'. The upright 3 has several projections, of which one marked 6 is devised to support one end of the axle of the toothed driving wheel 7, the other end of this axle being supported by the part 8 engaged in the panel 9 of the box 1. A fly wheel 10 turned by hand or by means of a pulley actuated by a motor, is keyed upon the other end of this axle. The wheel 7 drives a pinion 11 in one piece with another gear wheel 12 keyed upon an axle supported at one end by a bearing 13 on the upright 3 and at the other end by a projection 14 attached to the panel 9. The wheel 12 drives a pinion 15 keyed upon a shaft 16 supported at one end by the part 17 fixed upon the panel 9, at the middle by the projection 18 from the upright 3, and at the other end by the projection 19 on the cross-bar 5. Upon the shaft 16 are moreover keyed two toothed cone wheels 20 and 21. The wheel 20 drives a conical pinion 22 keyed upon the end of a vertical shaft 23 supported in a bearing 24 on the upright 3 and having at its lower extremity a spur 31 which can engage and cause to turn by one tooth a gear wheel 32 keyed to the upper end of a shaft 33 supported by two bearings 25 and 26 on the upright 3.

Upon the lower end of the shaft 33 there is keyed a conical toothed pinion 34 con-

trolling two toothed plates 35, 36, loose upon the shaft 37; this shaft is supported at one end by the bearing 26 and at the other end by the upright 3 and a bearing 40 secured to the bottom of the box 1. The plates 35 and 36 have each of them a cavity which enables them to be placed alternately in connection with a clutch 38 sliding on the shaft 37 and controlled by a fork 39 in one piece with a rod 40 sliding in two supports 41, 42 attached to the bottom of the box 1.

Upon the rod 40 are keyed two rings 43, 44 arranged to serve as stops to a catch 45 secured to a transporter box 46. This box is provided at its lower part with a rack 47 and with two pairs of wheels 48 and 49 revolving upon the rails 50 and 51 secured upon the bottom of the box 1. Upon the shaft 37 there is also keyed a conical toothed pinion 52 meshing with a pinion 53 keyed upon an axle 29 revolving in a support 55 and in one piece with a toothed pinion 54 engaging with the rack 47. The transporter box 46 is guided at its upper part by two pairs of wheels 56 revolving under the rails 57 secured to the top 58 of the box 1.

The box 46 is provided with two endless screws 59 placed in its upper part and with two endless screws 60 placed in the lower part of the upper part of this box. These screws 59 and 60 are provided at one end respectively with pinions 61 and 62 engaging with the gear wheels 63 and 64 which engage together. Upon each screw 60 is moreover keyed a pinion 92 or 86 respectively which engages with a corresponding pinion 65 or 87 in one piece with a ratchet wheel 66 or 90.

Upon each axle 67 of the pinions 65 and 87 there is mounted a lever 68 or 88 each of which possesses a catch 69 or 89 engaging with the ratchet 66 or 90 and is articulated to one end of a bar 70 or 91, each of said bars forming a link, and being pivoted at its other end to the end of a lever 71, pivoted upon the front face of the upper part of the box 46. Each axle 67 also bears a toothed pinion 93 or 94 engaging respectively with racks 95 so held at each side by the plates 80 that the last teeth of said racks are level with the upper and lower edges of the plates. The screws 72 supported on the bracket 73 attached to the box 46 serves to regulate the motion of the lever 71, which lever is constantly drawn towards its original position by means of the spring 74. The levers 70, 91 are respectively fitted in face of two buffers 75, 76 each placed in one of the uprights 3 and 4 and so arranged that they can be adjusted by means of screws and nuts. In the lower part of the apparatus which is larger than the box 46, there is placed the endless band 77 mounted upon two rollers 78, the axles of which are supported in bearings 79 screwed into the lat-

eral walls of the box 46. This endless band is devised to receive the photographic plates 80 after their fall from the upper part of the box 46 and to transport them into the compartment 81 constructed in bellows shape and placed in the lower part of the box 1.

Upon the shaft 27^a actuated by the pinion 27 is keyed the disk 82, and upon the tubular shaft 28^a actuated by the pinion 28 is keyed a similar disk 82^a; the disks each having a perforation corresponding to the tube of an objective 83 arranged in front of a concentration lens 84 placed in an aperture of the front wall of the box 1. The upper front wall of the box 46 possesses a slot 96 which admits of it sliding upon the end of the objective 83, the said end possessing a square opening corresponding to the size of the images which are to be presented in superposed rows upon the plates 80, so that the order of the succession of the images of one row will be inverted in the row placed immediately above it. The light rays concentrated by the lens 84 traverse each successive image of the plates 80 and are projected by a lens 85 arranged in the rear wall of the box 1 upon a support not represented in the drawing.

The photographic plates 80 are introduced according to their serial order between the threads of the endless screws 59, 60 through a suitable opening 86 made in the partition 58 and the upper wall of the box 1. Upon the actuation of the wheel 10 the wheel 7 engaging with the pinion 11 causes the wheel 12 to revolve. This turns the pinion 15 keyed upon the axle 16, and consequently turns the pinion 20 which turns the pinion 22 and simultaneously the pinion 21 which by means of the pinions 27 and 28 revolves the obturators 82. These obturators shown in sectional elevation in Fig. 3 are provided with apertures, the coincidence or obscuration of which causes the intermittent display and concealment of the projection on the screen in the usual manner.

The pinion 22 at each rotation causes the toothed wheel 32 to turn by the amount of one tooth, and consequently the pinion 34 revolving the pinions 35, 36 and 52 as well as the pinion 54 in one piece with the pinion 53 causes the transporting box 46 to move forward, which box at the beginning should be placed in the end position, so that the first image to be reproduced may be in line with the objective. While the transporting box is being moved along all its length, the rotation of the endless screws 59 and 60 causes the first plate 80 to advance by one step. This plate has been previously arranged in the second thread of the screw, so that at the moment when the lever 91 engages for the first time against the buffer 75 this lever causes the lever 71 to swing uselessly, because the pinions 65 are not yet in

engagement with the racks of the plates 80. At this moment the lever 45 in consequence of its engagement against the ring 43 engages the clutch 38 in the plate 35, whereupon the rotation of the shaft 37 is reversed and the rack 47 consequently moves the transporting box in the other direction. During this second operation the first plate 80 is moved forward by another step and at the end of this operation it falls and presents its first image in face of the objective 83, at the same time as the racks of this plate put their first lower tooth in engagement with the pinions 93 and 94, which are simultaneously actuated, the one 93 by means of the ratchet 66 operated by the catch 69 engaged by the lever 68 and the lever 70 pushed back by the buffer 76; and the other 94 operated by the ratchet 90 actuated by the catch 89 under the influence of the lever 88, lever 91 and the lever 71 actuated by the lever 70.

The rays proceeding from a source of light placed in front of the lens 84 pass through it and through the first image of the plate 80 which they project upon a screen placed at a suitable distance from the lens 85; the images will therefore be successively thrown upon the screen and at the moment of each displacement of one of them (amounting to about one-eighteenth of a second) the obturator will conceal this displacement.

When the last image of a plate has passed before the objective, the second plate is substituted for the first, so that not only an entire series of plates contained between the screws can be shown, but it may even be increased by the facility given by means of the apparatus to provide new plates succeeding to the first series without interruption of the action of the apparatus.

The interchange of the plates is effected continuously without jerks; the replacement of one plate by another which is superposed upon it takes place in the same manner; the shocks produced by the striking of the levers 70 and 91 against their respective buffers 75, 76 are deadened by the spring 74, and the fall of the plates is itself deadened by the endless band 77 which moves the plates one after the other and without jerks into the bellows compartment, so that the images reproduced are quite sharp and are only concealed during an infinitely short period at the moment of their replacement.

What I claim is:

1. Improved kinematograph apparatus comprising in combination an outer casing, an objective in said casing, a movable box adapted to reciprocate across the focus of said objective, and contain a series of photographic plates, screw mechanism for presenting said plates serially and with descending motion before said objective, a transporter within the casing adapted to re-

ceive and remove said plates one by one, and an expansible receptacle adapted to receive and hold said plates.

2. In combination in a kinematograph apparatus, a casing lens at one side of said casing, an objective on the other side of said casing, a supporting frame in said casing, a driving shaft passing into said casing, gearing on said shaft adapted to drive the kinematograph mechanism, a transporting box adapted to travel to and fro within said casing and to expose one by one photographic images before a lens in the casing, mechanism for transporting the said box to and fro in front of the objective, screws in said box adapted to present one of a series of plates in graduated horizontal and descending motion before the objective of the kinematograph, lever mechanism adapted to operate the said screw mechanism by means of ratchets and pinions, an obturator adapted to synchronize with the changing of the pictures, an endless band adapted to receive the photographic plates after exposure and a receptacle for said plates adapted to receive them from the said band.

3. Kinematograph apparatus for taking and projecting living pictures by means of plates on which the pictures are photographed serially in rows, one row above another; comprising in combination an outer casing a fixed frame in said casing, a driving wheel outside said casing, a shaft supporting said driving wheel and passing within said casing, gearing on said shaft adapted to impart motion to the mechanism within the casing, rails at the top and bottom of said casing, a movable box adapted to receive a series of photographic plates, wheels on said box adapted to support it on said rails, mechanism adapted to bring the box before the objective, a rack fixed on said box, a pinion engaging with said rack and rotated from the main shaft gearing, a catch supported by the box and adapted to act upon the engaging fork of the gear mechanism, an oscillating lever pivoted in the box, driving catches attached to said lever and adapted to engage with ratchets in one piece with the gear pinions, buffers on the fixed frame adapted to limit the motion of the catches, rotatable screws adapted to receive and move forward the photographic plates, catches and ratchets adapted to actuate the said screw mechanism, an obturator adapted to obscure the lens opening during the changing of the pictures, an endless band adapted to receive the plates from the screw mechanism and an expansible receptacle for said plates.

4. Kinematograph apparatus for taking and projecting living pictures by means of plates on which the pictures are photographed serially in rows, one row above another; comprising in combination an outer

casing, fixed frame in said casing, a driv-
 ing wheel outside said casing, a shaft sup-
 porting said driving wheel and passing
 within said casing, gearing on said shaft
 5 adapted to impart motion to the mechanism
 within the casing, rails at the top and bot-
 tom of said casing, a movable box adapted
 to receive a series of photographic plates
 and displaceable alternatively before the ob-
 10 jective, wheels on said box adapted to sup-
 port it on said rails, mechanism adapted to
 bring the box before the objective, a rack
 fixed on said box, a pinion engaging with
 said rack and rotated from the main shaft
 15 gearing, a catch supported by the box and
 adapted to act upon the engaging fork of
 the gear mechanism, an oscillating lever
 pivoted in the box, screw mechanism, a re-
 turn spring connected to said lever, a regu-
 20 lating screw connected to said lever, driving

catches attached to said lever and adapted
 to engage with ratchets in one piece with
 the gear pinions, buffers on the fixed frame
 adapted to limit the motion of the catches,
 rotatable screws adapted to receive and move 25
 forward the photographic plates, catches and
 ratchets adapted to actuate the said screw
 mechanism, an obturator adapted to obscure
 the lens opening during the changing of the
 pictures, an endless band adapted to receive 30
 the plates from the screw mechanism and
 an expansible receptacle for said plates.

In testimony whereof I have signed my
 name to this specification in the presence of
 two subscribing witnesses.

ROBERT ARTHUR FAUCONNET.

Witnesses:

PAUL CAGNET,
 DEAN B. MASON.