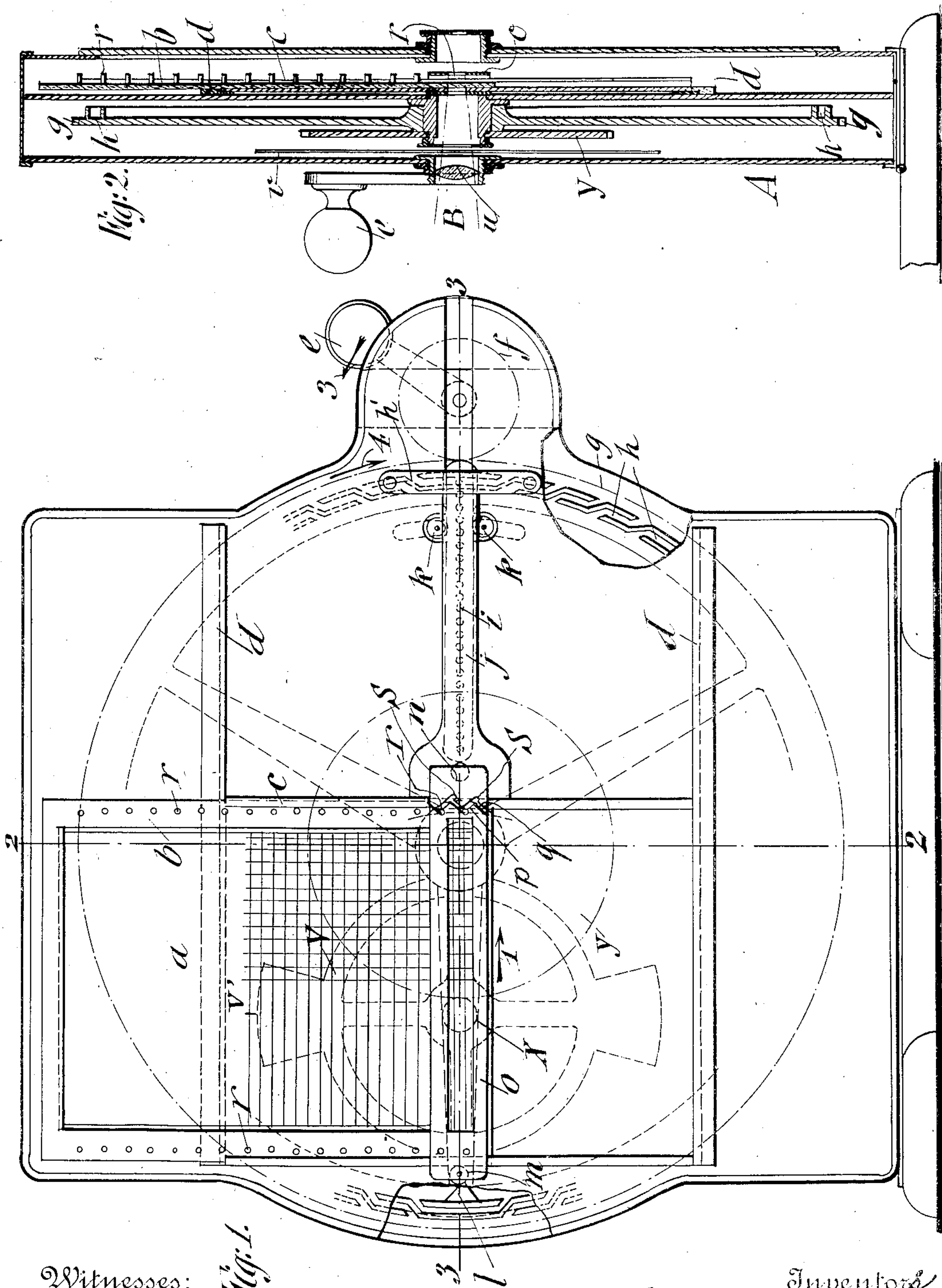


J. L. MULLER & J. ROUSSET.
KINEMATOGRAPHIC APPARATUS.
APPLICATION FILED JUNE 17, 1908.

955,666.

Patented Apr. 19, 1910.

2 SHEETS—SHEET 1.



Witnesses:
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H. J. Selverbie.

Fig. 1.

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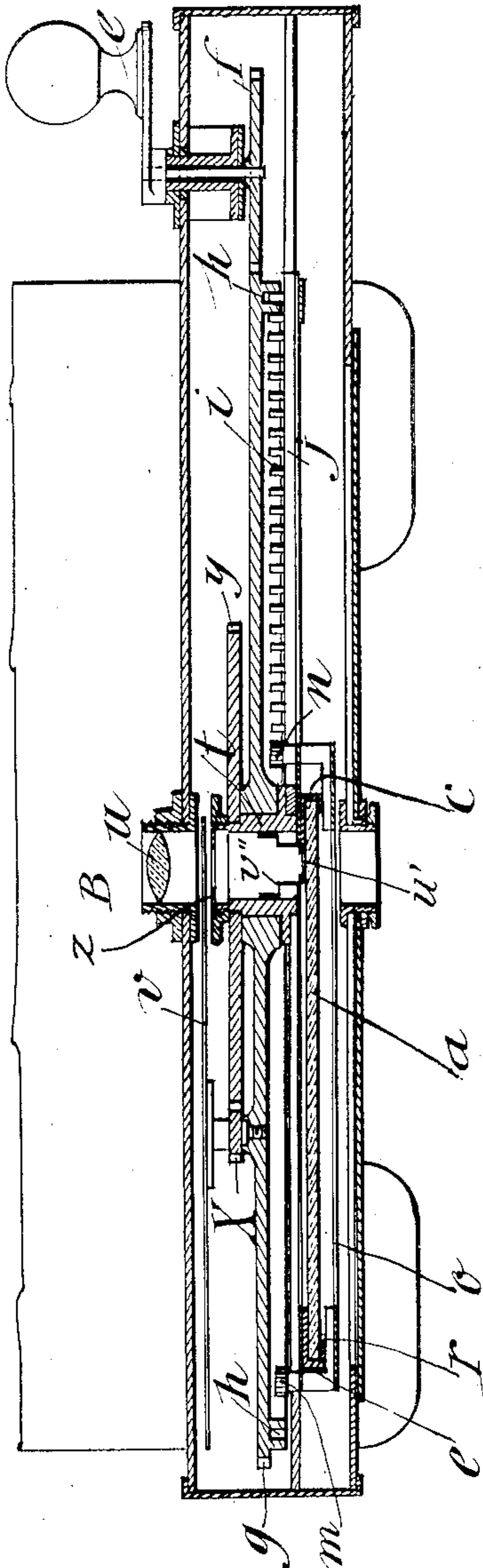
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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KINEMATOGRAPHIC APPARATUS.

955,666.

Specification of Letters Patent.

Patented Apr. 19, 1910.

Original application filed March 5, 1908, Serial No. 419,311. Divided and this application filed June 17, 1908. Serial No. 438,920.

To all whom it may concern:

Be it known that we, JEAN LEON MULLER and JULES ROUSSET, citizens of the Republic of France, the former residing at Sannois and the latter at Vincennes, in said Republic, have invented certain new and useful Improvements in Kinematographic Apparatus, of which the following is a specification.

10 This invention relates to kinematographic apparatus which can be used in the process of making kinematographic glass plates according to our application, Serial No. 419,311, filed March 5, 1908. The apparatus 15 may also be used as a projecting apparatus for use with such kinematographic plates after they have been made, and also as a device to directly take on one glass plate a number of views of animate objects.

20 With these ends in view the invention consists in the novel features of construction and combinations of parts to be hereinafter described and claimed.

25 In the accompanying drawing, Figure 1 is a rear-elevation, with parts removed, of the apparatus, Fig. 2 is a vertical section on line 2, 2, Fig. 1, and Fig. 3 is a horizontal section on line 3, 3, Fig. 1.

30 The apparatus comprises a casing A in which a glass plate *a* is so moved that a number of small views may be photographically reproduced, side by side, over the entire surface of the plate, in connection with a light-opening B in the casing in which is 35 mounted an objective *u*. The plate *a* is fixed in a frame *b* capable of vertical displacement in slides *c*, which form part of an assemblage which is itself capable of displacement on the fixed horizontal slides *d*. These 40 displacements are regulated in such a manner that the different views of the lower horizontal row of the plate first of all pass in succession in front of the objective, the plate moving in the direction indicated by 45 the arrow 1; at the extremity of this row the plate is depressed by the height of a view; the plate is then again displaced horizontally, but in the opposite direction to the arrow 1, and all the views in the second 50 horizontal rows pass in succession in front of the objective; at the extremity of this

row the plate is again depressed and the third row of views is level with the objective. In this manner the plate is subjected to a reciprocating horizontal movement regularly interrupted at the end of each travel by a depression corresponding to the height of a view. The movement is produced by a handle *e* driving a toothed pinion *f* which meshes with a gear-wheel *g*. 55 60

The gear-wheel *g* carries on one of its faces, in proximity to its periphery, a series of ribs, the uniform arrangement of which serves to produce sinuous paths *h* in which pins *i* engage; these pins correspond in 65 number to the views in a horizontal row on the plate and they are provided on a horizontal bar *j* solid with vertical slides *c*. The direction of the sinuous paths *h* is opposite in each half of the wheel *g*, in such 70 a manner that a complete rotation of this wheel produces a displacement of the bar *j* and consequently of the plate *a*, first in the direction indicated by the arrow 1 and then in the opposite direction. The bar *j* is 75 guided in its displacements by the rollers *k*.

In addition to the ribs indicated, the wheel *g* is provided (at one only of the places at which the direction of the paths *h* changes) with a boss *l* acting at each semi-revolution 80 of the said wheel, alternately upon each of the rollers *m* and *n* solid with the whole constituted by the vertical slideways *c*, the bar *j* and a device located behind the plate-holding frame *b* and which, as will hereinafter 85 appear, serves to support the latter. This arrangement comprises a plate *o* carried by the part of the system which is movable in the horizontal direction; this plate is slotted at *p* and *q* in such a manner as to form slots 90 in which a certain number of pins *r*, fixed on the uprights or vertical parts of the frame *b*, are able to engage. Stops *s* are formed in the slots *p*, *q* and the pins *r* enter these stops after each vertical displacement 95 of the plate. The vertical interval between two consecutive stops *s* is equal to the height of a view, reckoned from the center of the lower view to the center of the view above it.

Taking the apparatus at the beginning of 100 the projection as represented in Fig. 1, if the handle *e* be turned in the direction indi-

cated by the arrow 3, the gear-wheel *g* is driven in the direction indicated by the arrow 4. The first pin *i* of the bar *j* traverses the sinuous peripheral path or groove *h* in which it is engaged; in doing so it reaches *h'* where the path forms an incline; the wheel *g* continuing to rotate, as will be understood, a tractive effort is produced upon the bar *j* and the part of the system which is horizontally displaceable moves in such a manner that the second view of the first horizontal row moves in front of the objective. At the same time the second pin *i* of the bar *j* has entered the following sinuous path; a displacement similar to the preceding one is produced. All the pins *i* come in succession in a path *h*; when the last pin is thus engaged the plate has reached the limit of its travel in the direction indicated by the arrow 1 and the wheel *g* has made a semi-revolution. At this moment the boss *l* encounters the roller *n* which has been displaced simultaneously with the plate. The effect of this encounter is the displacement of the plate *o* relatively to the frame formed by the ways *c* and consequently to the plate-holding frame supported by the said frame. The pins *r* leave the stops *s* and, sliding in the inclined path of the groove *p*, fall into the lower stops. The plate is thus depressed to the extent of a horizontal row of views. As the wheel *g* continues to rotate, it presents to the pins *i* sinuous paths *h* of inverse direction; the bar *j* moves intermittently in the opposite direction to that indicated by the arrow 1 and the second horizontal row of the views present themselves successively in front of the objective also in the direction opposite to that indicated by the arrow 1. When the wheel *g* has effected a complete revolution, the boss *l* encounters the roller *m* and the plate is again depressed. The operation is the same until all the views have passed in front of the objective in the order set forth.

The shaft *t* which carries the gear-wheel *g* is hollow. When the apparatus is used for photographing on a reduced scale the images from a band of film, the tubular shaft *t* is provided in front with a perforated diaphragm plug *z*. The luminous rays then pass through the objective *u* and fall on the plate where their area is limited by the window *u'* formed at the extremity of the cone *v''*. When the apparatus serves for projection, the plug *z* is unscrewed and the rays of an appropriate source of light pass through the tubular shaft, the plate, the window and the projection objective in the opposite direction. The shutter *v* with four screens *v'* is actuated by the toothed pinion *x* which meshes with another pinion *y* keyed upon the shaft *t* of the gear-wheel *g*. Thus it is automatically operated by the

plate-moving mechanism. Finally it should be noted that the special apparatus which has just been described may be utilized, without modification, for photographing animate objects directly whenever the magnitude of the projection does not exceed the limit at which the grain of the plate would be visible. In this case the apparatus is arranged in a light-proof casing and a very rapid special plate is replaced by a sensitized plate.

Having thus described our invention, we claim:

1. In a cinematographic apparatus, the combination of a movable plate-frame, a wheel having a plurality of sinuous grooves, and means engaging in said grooves and operatively engaging said frame for moving said frame.

2. In a cinematographic apparatus, the combination of a casing, a frame in said casing having a bar with a plurality of pins, and a gear-wheel in the casing having a plurality of sinuous peripheral grooves to engage said pins and move said frame laterally.

3. In a cinematographic apparatus, the combination of a casing, a frame in said casing having a bar with a plurality of pins, and a gear-wheel in the casing having a plurality of sinuous peripheral grooves to engage said pins and move said frame laterally, said grooves being arranged in oppositely disposed series to effect the movement of said frame in opposite directions.

4. In a cinematographic apparatus, the combination of a casing, a frame in said casing having a bar with a plurality of pins, a gear-wheel in the casing having a plurality of sinuous peripheral grooves to engage said pins and move said frame laterally, said grooves being arranged in oppositely disposed series to effect the movement of said frame in opposite directions, and means for moving the frame vertically.

5. In a cinematographic apparatus, the combination of a tubular shaft having an objective therein, a revoluble wheel on said shaft, a movable plate-frame behind said objective, and operative connection between said wheel and frame for moving said frame when said wheel revolves.

6. In a cinematographic apparatus, the combination of a tubular shaft having an objective therein, a revoluble wheel on said shaft, a movable plate-frame behind said objective, sinuous grooves on said wheel, and means engaging in said grooves and operatively connecting with said frame for moving said frame as said wheel revolves.

7. In a cinematographic apparatus, the combination of a tubular shaft having an objective therein, a revoluble wheel on said shaft, a movable plate-frame behind said

objective, operative connection between said
wheel and frame for moving said frame when
said wheel revolves, a shutter adapted to
move over said objective, and means oper-
5 atively connecting the shutter with said rev-
oluble wheel.

In testimony, that we claim the foregoing

as our invention, we have signed our names
in presence of two subscribing witnesses.

JEAN LEON MULLER.
JULES ROUSSET.

Witnesses:

EMILE LEDRET,
H. C. COXE.