

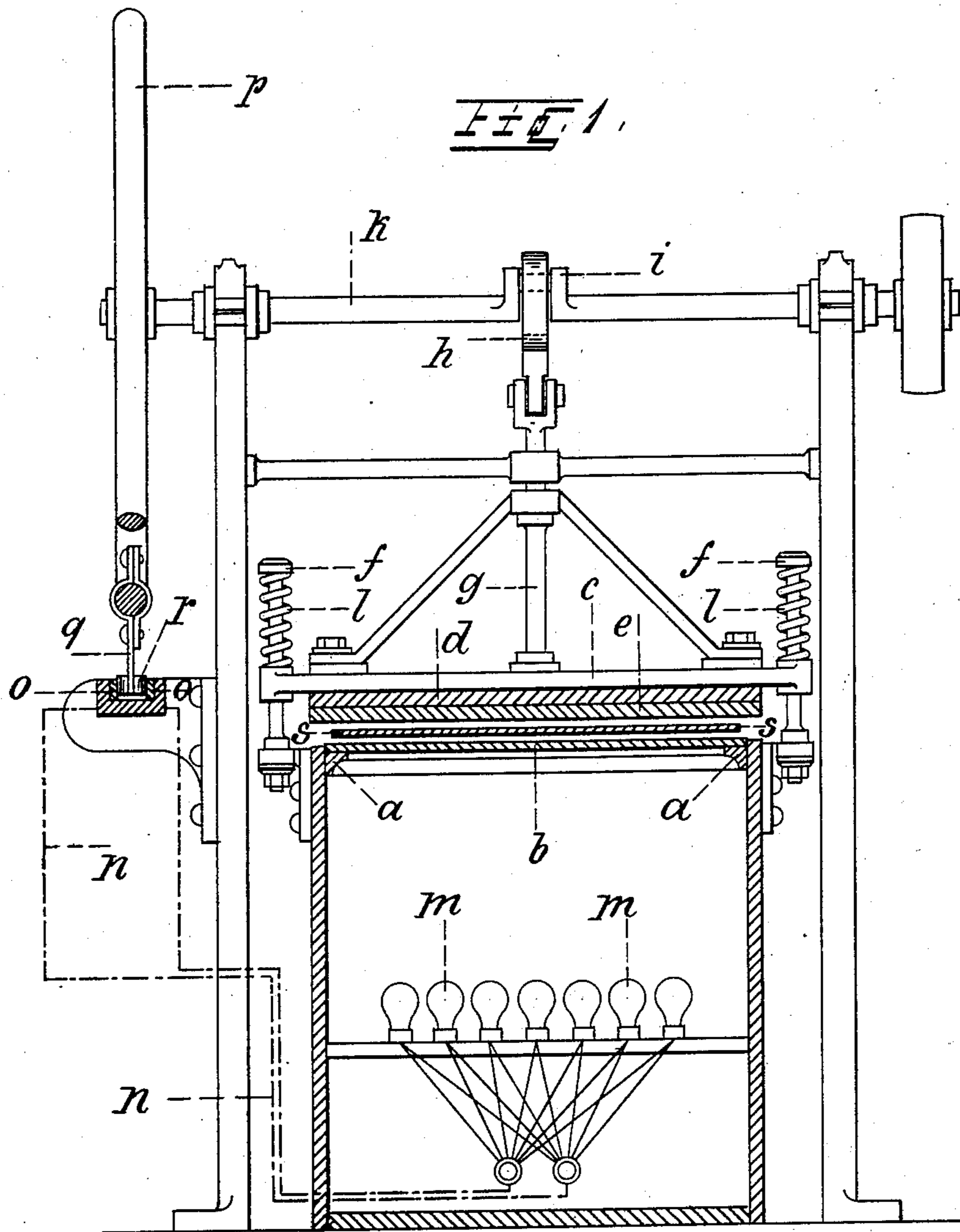
No. 728,730.

PATENTED MAY 19, 1903.

P. LATTA.  
PHOTOCOPYING MACHINE.  
APPLICATION FILED JULY 11, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:  
J. Chebret.  
A. Witt.

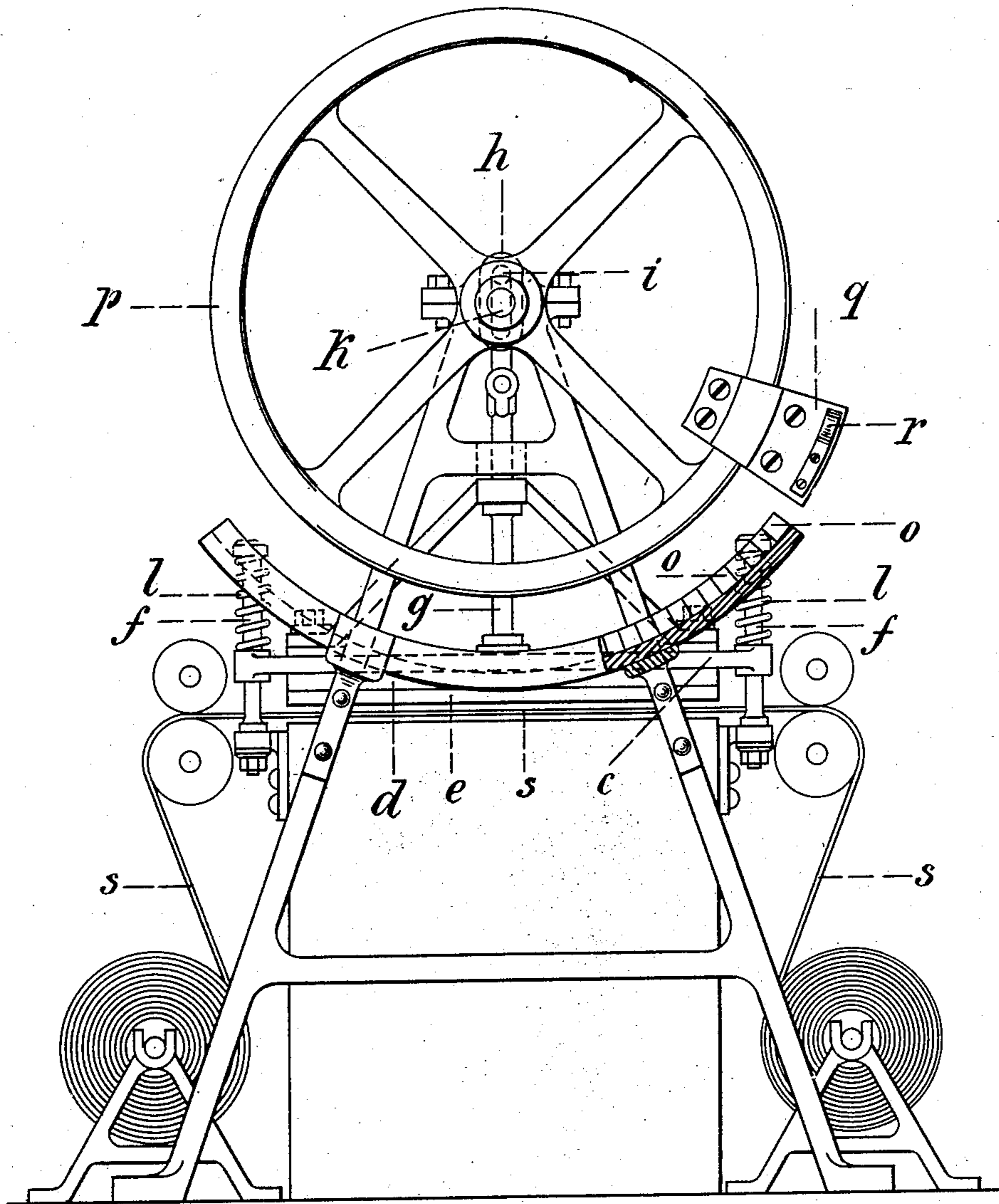
Inventor:  
Paul Latta,  
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2 SHEETS—SHEET 2.

Fig. 2.



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## UNITED STATES PATENT OFFICE.

PAUL LATTA, OF BERLIN, GERMANY.

## PHOTOCOPYING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 728,730, dated May 19, 1903.

Application filed July 11, 1901. Serial No. 67,886. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL LATTA, photographer, a subject of the King of Prussia, German Emperor, residing at Kottbuserdamm 6, in the city of Berlin, Kingdom of Prussia, German Empire, have invented a certain new and useful Improvement in Photocopying-Machines, of which the following is a specification, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to a device for exposing a sensitized plate or film to the action of light, and it is especially intended for use in the manufacture of the so-called "mile" photographs or kilometer photographs, where a long band or sheet of paper is used for producing the copies, though the device is equally adaptable to the manufacture of other kinds of photographic copies. The rotary machines used heretofore for the manufacture of such long-sheet photographs have been found in practical working to show various inconveniences which seriously interfered with their use. Copies printed by means of such machines were either lacking in distinctness or the ground was not sufficiently clear, and the machines were also liable to get out of order and could only be adjusted and put in condition for working with difficulty. Of the original negative pictures diapositives had to be printed, and of these other negatives were taken, which were then fixed to the exposing-roller. All these inconveniences are avoided in my machine, where a flat copying-frame is made use of, the sensitized band or ribbon being intermittently fed and the light being also permitted to act intermittently. Ordinary negative plates may be directly used, which has the further advantage that the photographic picture obtained in this manner retains all the nice features of the original, which are generally lost or at least greatly weakened in the printing process where a rotary machine is used. In my machine that part of the sensitized band of paper on which the light is to act is fed for a distance equal to the breadth of the frame. During this time the electric light is cut out and the frame has to be opened. After the position of the new and still unex-

posed part of the paper has been properly adjusted in the frame the cover of the frame is closed and pressed down tightly, whereupon the exposure to the light takes place. It is evident that the machine will be governed in the rapidity and the exactness of its operation by the rapidity with which the change of position of the operating parts takes place, assuming the time required for exposure and the strength and resistance of the paper to be always constant. The yield with these kinds of machines will increase and the quality of the products obtained will be enhanced in proportion as the operation of the machine becomes quiet and uniform and the time of exposure accurately regulated.

In the accompanying drawings I have shown a machine embodying my invention, Figure 1 being a front and Fig. 2 a side view thereof.

The copying-frame itself is of well-known construction. The glass plate *b*, to which the negative is attached, is mounted in the lower part of the frame *a*, resting upon suitable supports. *c* is the frame-cover, upon which the elastic plates *d e* are mounted. This cover is vertically displaceable and is attached to the bar *g*, connected to the crank *i* of the shaft *k* by means of the link *h*. Bolts *ff* are attached to the lower frame and serve as vertical guides for the cover *c*. A slot in the said link *h* serves for the reception of the crank-pin of the part *i*, which causes the action of the shaft upon the cover *c* of the exposing-frame to become intermittent. During that part of the rotation of the shaft where the exposing device is not in operation the cover *c* is kept tightly pressed upon the glass plate in the copying-frame by the action of the spiral springs *l*, surrounding the bolts *ff*, and while the cover, with its elastic plates *d e*, is in its depressed position the exposure to the light takes place. In the preferred form of construction shown in the drawings the light is thrown from below by means of electric lamps *m*, which are fed by the current from the conductor *n*, connected to the trough-shaped contact-piece *o*. The electric current is transmitted to the lamps in any well-known manner. It may, for instance, be connected to a terminal *q* upon the

fly-wheel *p* of the driving-shaft *k*. A small roller *r* is suitably fastened to the contact-piece *q* and is guided along the curved contact-piece *o*. I may also make the contact-piece *o* in two sections, the two parts being connected by the conductor *q*, while a suitable non-conductor arranged lengthwise serves for the insulation of the contact-piece *o*, the current being admitted to one of the sections and leaving the contact-piece by the other section. The operator is at liberty to close the current by the aid of this device for only as long as it is needed. The duration of lighting or exposure is controlled by the length of the curved contact-piece *o* and by the speed of rotation of the fly-wheel *p*. Thus the opening of the frame, the feeding of the sensitized paper, and the reclosing of the frame will have to be effected during the time which after deduction of the time for exposure is left for a full revolution of the fly-wheel. The time for exposure may therefore be shortened or may be prolonged by increasing or retarding the movement of the driving mechanism. It is, however, preferable to make the curved contact-piece *o* of a series of sections, as shown in Fig. 2 of the drawings, instead of having it consist of one piece only, with a view of eliminating the effects of variations of speed of the driving mechanism, for inasmuch as the time for opening, advancing the paper, and reclosing the lighting-frame will be shortened in proportion it is necessary to take this into consideration in the construction of the machine and figure on an excess of times for these operations in order to be sure to have sufficient time at disposal for opening, feeding the paper, and closing the frame under any circumstances even by cutting down the time for exposure and without injuring the band or ribbon of paper. This difficulty is solved by making the contact *o* in sections, and in this form of construction of my improved lighting-machine the fly-wheel *p* may be given a very small diameter, which when the sections of the contact *o* are all in place and the wheel is turning at its normal speed will just suffice to leave sufficient time between the closing and interruption of the current to carry on the operations of opening, feeding the paper, and reclosing the frame without any injury to the sensitive paper. If it is desired to shorten the time of exposure, it is only necessary to remove so many of the sections of the curved contact *o* that the time of exposure will correspond to the production of a properly-lighted picture. The sections which have been removed are then inserted again if it is desired to increase the duration of exposure. In the form of construction shown by way of example the contact-piece *o* is made up of thirty sections of that kind. Assuming that the time of exposure under certain circumstances will last two seconds, it is possible to vary the time of exposure for tenths of a second, beginning with one-tenth

of a second. I am thus enabled to control the time of lighting or of exposure with exactness and accuracy, which has been impossible heretofore without interfering with the run of the machine.

Instead of interrupting the current for the lamps intermittently this periodical interruption may also be effected by providing the lamps with a movable screen, which while the lamps are burning is placed periodically in front of the lamps.

The mode of operation of the novel and improved lighting-machine is as follows: It is assumed that the fly-wheel is rotating in the direction indicated by the arrow shown in the drawings. The exposure-frame has been opened and the sensitive paper has been introduced into the copying-frame. Any suitable device is used to advance the paper for the amount of its length that has been already exposed; but I prefer that shown, wherein a sector-gear 10, carried by the main shaft *i*, brings about an intermittent rotation of the receiving-roll 11 by coming in contact with the gear-wheel 12, carried by the shaft 13, which is also provided with a gear-wheel 14, meshing with a wheel 15, carried by the receiving-roll 11, on which the exposed sheet is wound up, being drawn off from the feed-roll 16 by such intermittent rotation of such receiving-roll 11. As soon as the rotating contact-piece *r* has left the curved contact-piece *o* the lamps *m* are extinguished, while the fly-wheel *h* continues to rotate with uniform speed. While the rotating contact-piece *r* is moving from the right side of the curved contact-piece *o* to the left side of the same the crank portion of the shaft at *i* is also rotated, thereby raising the cover-plates *c d e* of the exposing-frame until the crank-pin of the crank portion of the shaft has reached its highest position, which will cause the springs *l* to become distended, which press against the cover *c*. After the highest part of its stroke has been reached the crank portion will descend, in which position it will cease to force the covers *c d e* downward; but in view of a slot being provided at the extremity of the link *h*, Fig. 2, the cover is descending slowly by the tension of the springs *l*, which push the cover-plates *c d e* against the paper *s*, the paper being forced in turn against the glass plate *b*, provided with the negatives, when the crank portion of the shaft has assumed the position corresponding to the position of the contact-piece *r*, which, having reached the left side of the curved contact *o* during the rotation of the fly-wheel *p*, is just about to touch the curved contact *o*. The sensitized paper *s* has meanwhile been fed through the copying-frame for a distance corresponding to the part which has just been lighted, and when the parts have assumed the position above indicated the movement of the paper is interrupted. The fly-wheel *p* now continues its movement, which causes the contact-piece *r* to touch the curved contact *o* and

to light the lamps in consequence, which now continue to burn as long as the contact-roller *r* is moving along the curved contact *o*. During this time the crank portion *i* has of course  
 5 also continued its rotation, but without operating the cover of the exposing or lighting frame, inasmuch as the crank-pin is descending within the slotted part of the link *h*, Fig. 2, without performing any action. The crank-  
 10 pin then rises within the slot in the same manner without operating the other parts, this movement being effected gradually. From this it appears that the springs *l* will serve to keep the copying-frame closed during the  
 15 time of exposure only when the contact-piece *r* has again reached the right-hand extremity of the curved contact-piece *o* and is leaving the same. The crank portion *i* has been sufficiently rotated to bring the crank-pin in po-  
 20 sition to touch the upper extremity of the slotted part *h*, in which position it will operate to raise the covering-plates *c d e*. At this very moment the feeding mechanism for the paper band is operated, while the electric  
 25 light has been extinguished by the interruption of the current.

It is obvious that I may replace the curved or arc-like contact by contacts of any other shape, which, however, must be so arranged  
 30 that they make contact with the rotating contact-piece *r* for some part of their length for a time corresponding to the desired duration of exposure.

I wish it to be understood that I do not  
 35 limit myself to the particular form of construction of the contact-pieces *o* and *q*, nor is my invention limited to the employment of a rotating contact-piece *q* and to a curved arc-shaped contact *o*, made up of several small  
 40 sections, inasmuch as it is obvious that the latter contact may also be made straight, in which case the contact *q* is given a reciprocating movement. Instead of having one of the contact-pieces consist of several small sec-  
 45 tions or plates, by the removal or insertion of some of which the contacting surface may be shortened or lengthened in the direction of the movement of the other contact-piece *q* to suit circumstances, the contacting-piece *o*  
 50 may also be made up of two parts displaceable along each other.

What I claim, and desire to secure by Letters Patent, is—

1. In a device for reproducing photographs,

the combination with mechanism for inter- 55  
 mittently feeding a sheet or band of sensitized photographic paper, of a frame for holding the negative or negatives located below the path of the sensitized sheet, an electric light or lights below the negative or negatives, a  
 60 platen above the path of the sensitized sheet, mechanism for forcing the platen toward the sensitized sheet, so as to press the same against the negative or negatives and mechanism for automatically lighting the electric lamp or  
 65 lamps while the negative is in contact with such sheet and for shutting off the lamp-current while the paper is in motion, comprising a sliding contact-arc composed of a plurality of removable sections, substantially as shown  
 70 and described.

2. In a photographic machine the combination with means for intermittently feeding a roll of sensitized paper by the negative-frame, of an electric light or lights, a contact-piece  
 75 formed of a plurality of removable sections whereby the time and period of the closing of the circuit may be varied, included in the lamp-circuit, and a movable contact-piece by which the circuit is closed and the lamps are  
 80 lighted during the time that such contact-piece is in contact with the sectional contact-piece, substantially as shown and described.

3. In a photographic machine, the combination with means for intermittently feeding a  
 85 roll of sensitized paper by the negative-frame, of an electric light or lights included in a normally broken circuit of conductors, a stationary contact-piece, composed of a plurality of removable sections by which the period and  
 90 time of the closing of the circuit may be varied, a frame inclosing the light or lights, a cover for the frame, a crank-shaft, a slotted link forming a connection between the crank-shaft and the cover, and a rotating contact-  
 95 piece rotated by the crank-shaft adapted to intermittently close the circuit by contacting with the stationary contact-pieces so as to light the lamp or lamps during the time that the cover is lowered, substantially as shown and  
 100 described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

PAUL LATTA.

Witnesses:

HENRY HASPER,  
 WOLDEMAR HAUPT.