No. 679,070. Patented July 23, 1901.

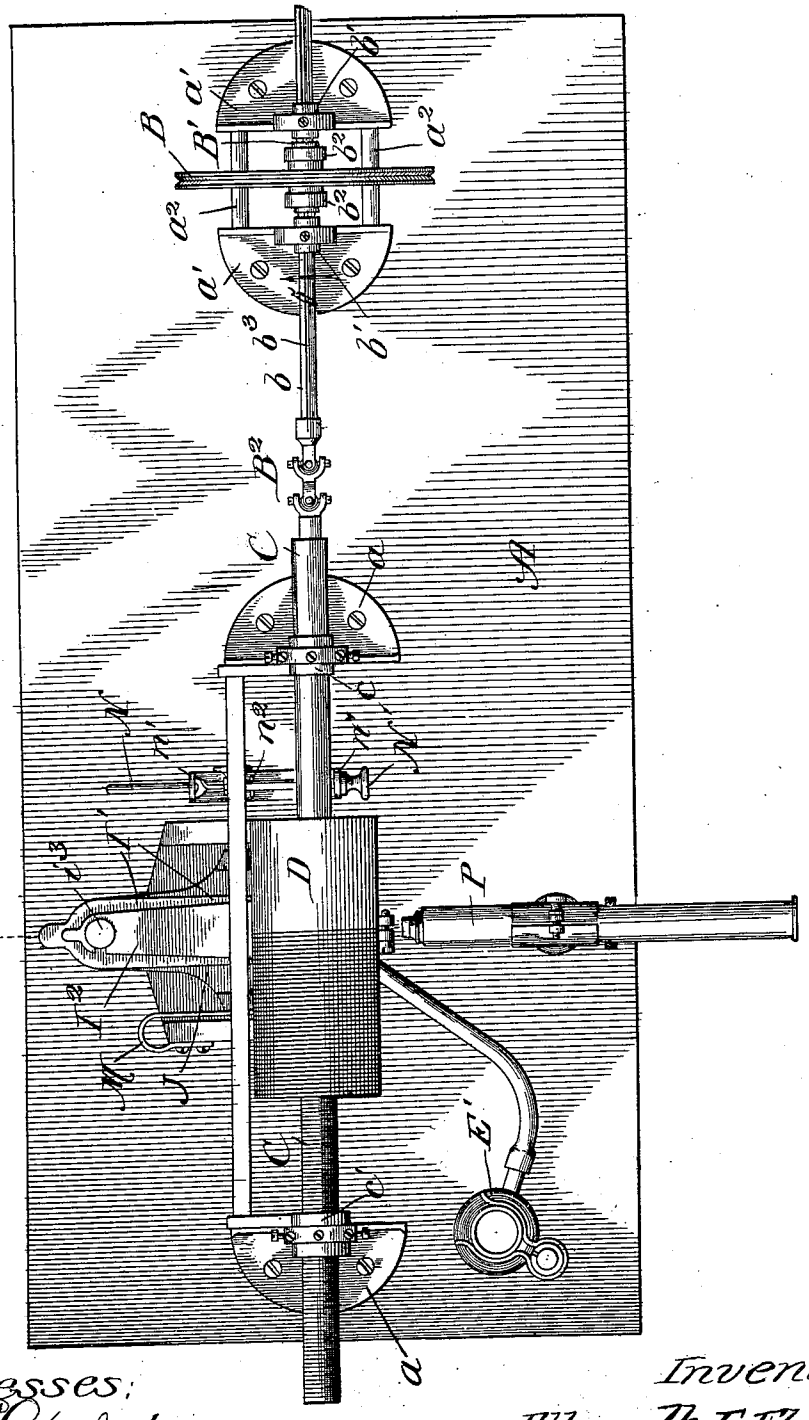
E. E. FLORA.

MACHINE FOR RULING PHOTOGRAPHIC SCREENS.

(Application filed May 7, 1898. Renewed Dec. 29, 1900.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 4 Sheets—Sheet 2.

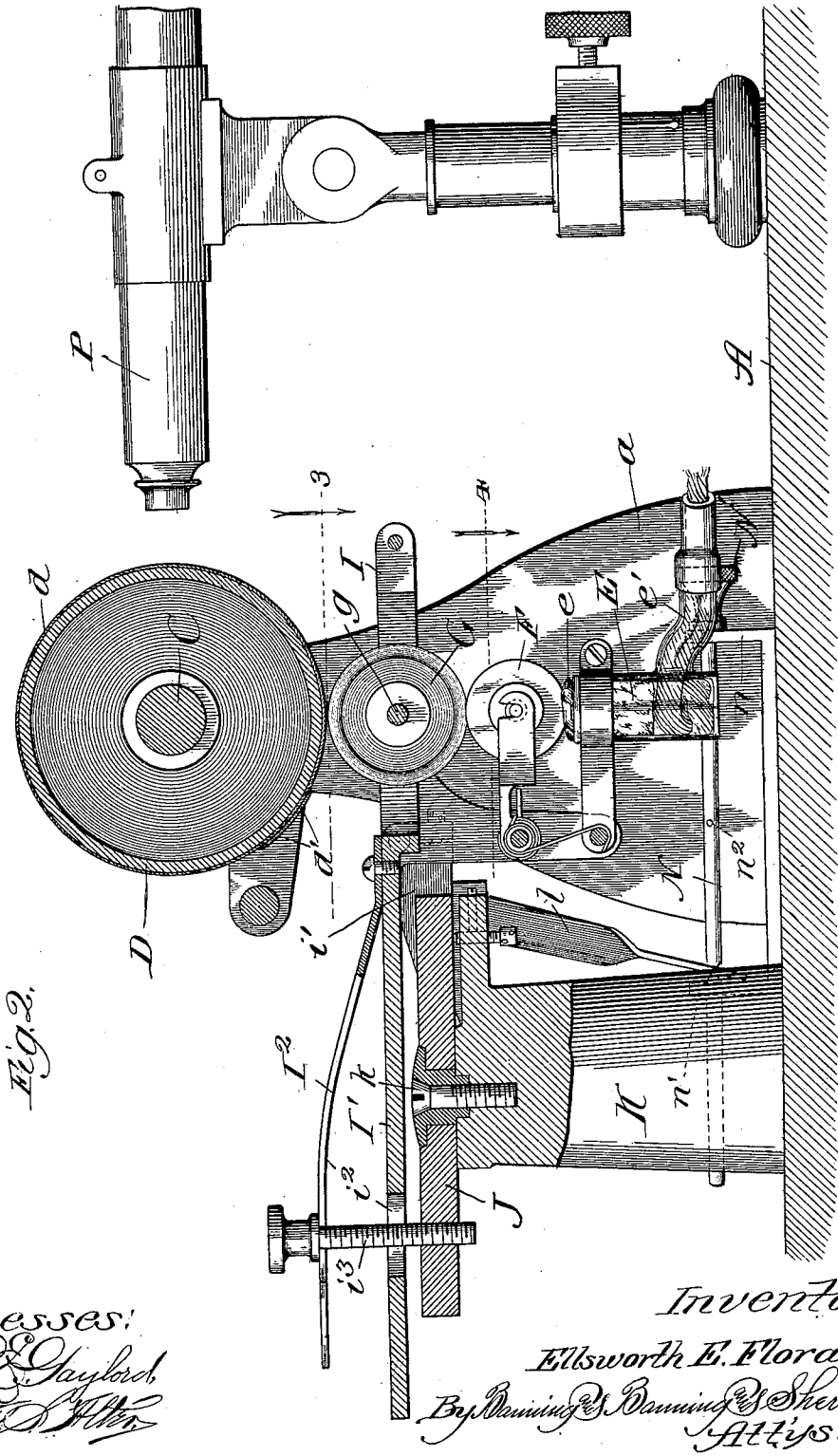


Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 4.

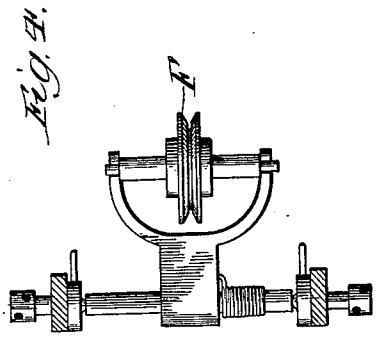
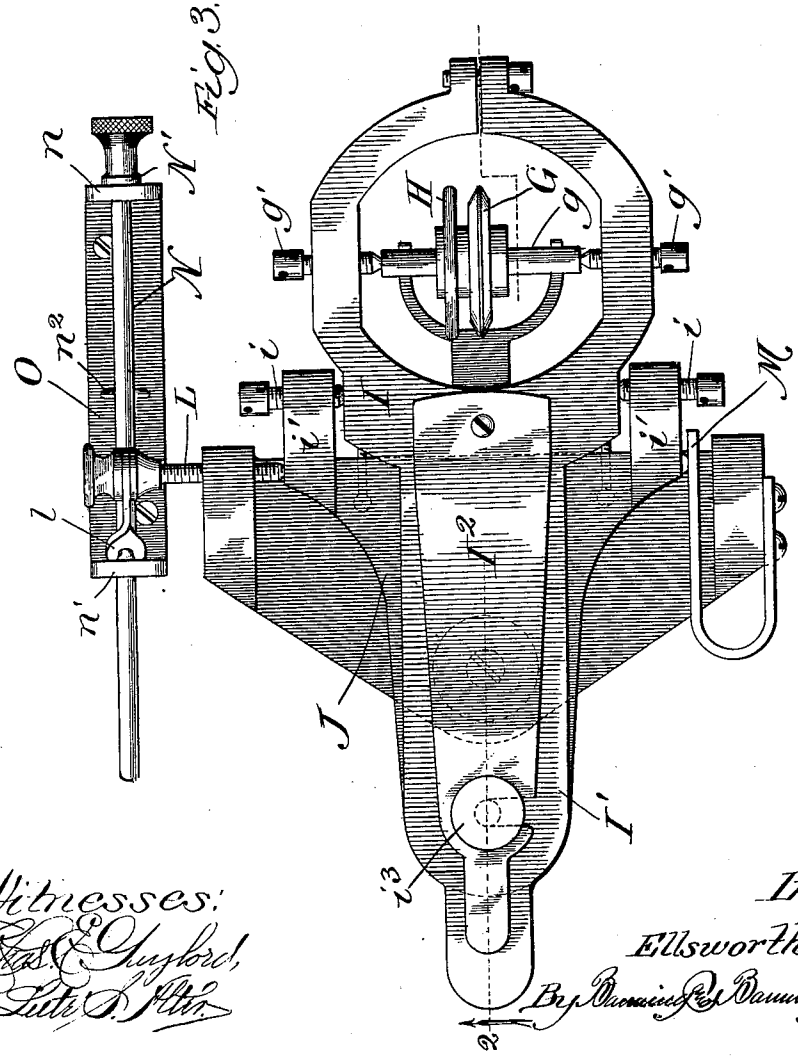


Fig. 3.



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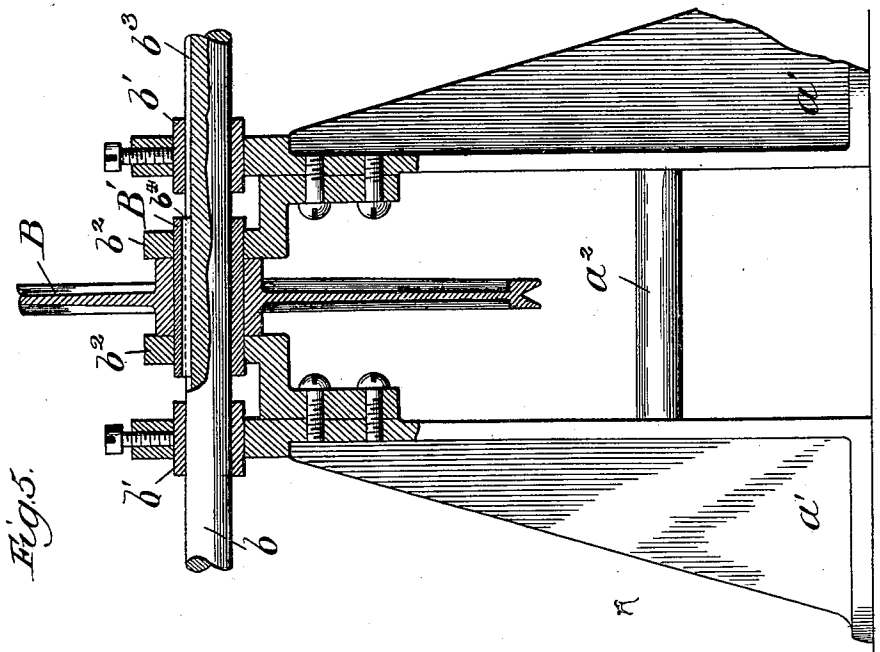


Fig. 5.

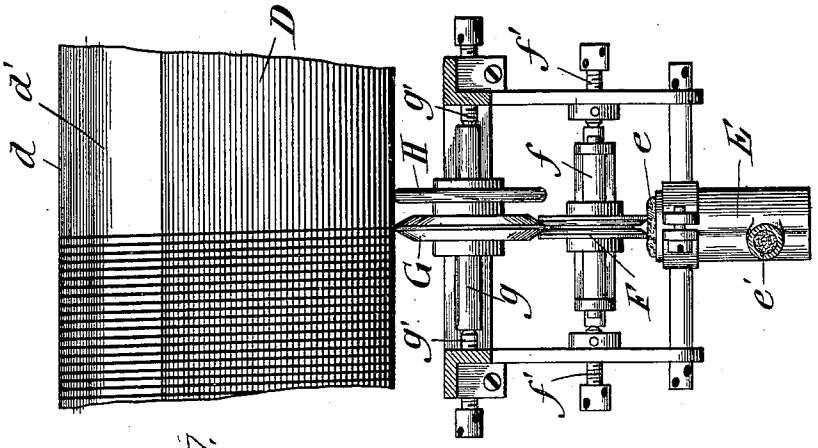


Fig. 6.

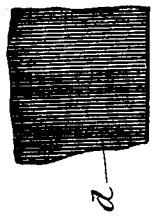


Fig. 7.

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UNITED STATES PATENT OFFICE.

ELLSWORTH E. FLORA, OF CHICAGO, ILLINOIS, ASSIGNOR TO DWIGHT K. TRIPP, OF SAME PLACE.

MACHINE FOR RULING PHOTOGRAPHIC SCREENS.

SPECIFICATION forming part of Letters Patent No. 679,070, dated July 23, 1901.

Application filed May 7, 1898. Renewed December 29, 1900. Serial No. 41,496. (No model.)

To all whom it may concern:

Be it known that I, ELLSWORTH E. FLORA, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Machines for Ruling Photographic Screens, Films, or Papers, of which the following is a specification.

The object of my invention is to make a machine on which flexible screens, films, or papers may be ruled for photographic purposes, either for use in color photography or other photomechanical work; and my invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of my improved ruling-machine; Fig. 2, a transverse sectional view on lines 2 of Figs. 1 and 3. Figs. 3 and 4 are plan sectional views taken on lines 3 and 4, respectively, of Fig. 2; Fig. 5, a broken sectional elevation taken on line 5 of Fig. 1; Fig. 6, an enlarged broken elevation showing the ruling device and a portion of the cylinder, and Fig. 7 a broken elevation of a portion of the film after it is ruled.

In making my improved machine for ruling screens, films, or paper for photographic purposes I employ a bed-plate A, which may be of cast-iron, marble, or other sufficiently firm and rigid material, although I prefer to make the bed-plate of metal. The bed-plate is made of a desired size and preferably so that it can rest upon a table or stand adapted to receive it and hold it at a suitable height for convenient use. I mount on the bed-plate vertical standards or supporting-brackets a and a'. The standards or brackets a are intended to support a portion of the ruling mechanism, and the brackets a' are preferably connected or united together by rods a^2, so that they form practically a single divided bracket. All of the brackets or standards are intended to be secured to the base-plate firmly and rigidly by bolts or screws or in any other suitable way.

I arrange a pulley B between the brackets a', preferably provided with a circumferential groove in its periphery to receive a cord, which is intended to pass around another pulley, (not shown,) which may be driven by an electric motor or other means, so as to impart rotation to the pulley B and the shaft b, on which it is mounted. This shaft is supported in journals b' in the upper part of the brackets a'. To further support the pulley B, I prefer to use supplementary brackets b^2, attached to the brackets a' by screws, as shown in Fig. 5, or in any other desired way. These supplementary brackets carry a short hollow shaft B', upon which the pulley B is rigidly mounted, so that the two will rotate together. The bore of the short shaft B' is intended to be somewhat larger in diameter than the diameter of the shaft b, as shown by dotted lines in Fig. 5. The short hollow shaft B' and the driving-shaft b are intended to be connected so as to rotate together, and to this end I provide the driving-shaft with a keyway b^3 (shown in Fig. 5, where the shaft is broken away) and the short hollow shaft B' with a key b^4, which engages loosely in the keyway of the driving-shaft, so that the driving-shaft will be permitted a longitudinal movement in the one direction or the other, as may be required in the operation of the machine.

The driving-shaft b is connected to a screw-shaft C by means of a universal joint B^2. This universal joint is preferably a double universal joint; but as I shall probably not claim any of the details of this joint connection I need not describe its various parts more fully or minutely. The screw-shaft is supported in bearings or journals c and c', arranged in the upper portions of the supporting brackets or standards a. The bearing c' is internally screw-threaded with threads of a desired fineness. It may have one hundred or any desired number of threads to the inch. The portion of the screw-shaft which passes through the journal or bearing c' is externally screw-threaded with threads of the same fineness or number to the inch as are the internal threads of the journal. As the screw-shaft is rotated through the instrumentality of the driving-shaft, it will move longitudinally in the one direction or the other with a degree of rapidity proportioned to the number of threads to the inch with which it is provided. The driving and screw shafts are adapted to be rotated in both directions,

so that they may be caused to travel back and forth, according to whether they are rotated in the one direction or the other.

I mount on the screw-shaft a cylinder D, which may be of any desired diameter, but which as I have the machine constructed and in use is about three inches in diameter. This cylinder is fast with the screw-shaft, so that it is rotated with it. It is intended to carry a flexible screen, film, or paper *d*, wrapped around it, as shown in Fig. 2. The meeting edges of the flexible screen or film may be held at their juncture by pasting a strip of paper *d'* over them, as shown in Fig. 2. The film or paper thus arranged is held smooth and tight around the cylinder, so that it will not wrinkle or buckle and so that it will be rotated with the cylinder.

Of course the object sought or the work to be accomplished is the ruling of lines on the flexible screen, film, or paper. To do this, I employ ruling mechanism comprising a feed-reservoir E, containing an absorbent material *e*, which preferably protrudes slightly above the top of the feed-reservoir, which reservoir may be supplied with ink through a pipe *e'*, communicating with a desired source of supply E', Fig. 1, which pipe may also be filled with an absorbent material, if desired; an inking-wheel F, provided with a groove, preferably V-shaped around its periphery and which contacts with the absorbent material filled with ink as it is revolved; a shaft *f*, on which the inking-wheel is mounted, which shaft is supported on studs *f'*, fitting into jeweled bearings or sockets in the ends of the shaft; a ruling-wheel G, beveled around its edges, so as to fit and run in the circumferential groove around the periphery of the inking-wheel; a shaft *g*, on which the ruling-wheel is mounted, which shaft is supported on studs or pins *g'*, fitting into jeweled bearings or sockets in the ends of the shaft, so as to insure as smooth and frictionless a rotation of the ruling-wheel as practicable, and a flexible disk H, contacting with the screen or film being ruled, so as to impart rotation to the ruling-wheel and through it to the inking-wheel. These various parts entering into the ruling mechanism are substantially the same as those described in an application, Serial No. 677,960, filed by me on the 18th day of April, 1898, and need not be further described in detail. They are mounted and carried in a frame I, pivoted on pins or studs *i*, as shown particularly in Fig. 3, so that the frame is permitted to rise and fall when passing over the strip of paper *d'* or, in short, to accommodate itself to any inequalities on the surface of the screen or film being ruled. The pins or studs *i* are mounted in the ears *i'* of a plate J. (Particularly shown in Fig. 2.) This plate is arranged on the top of a vertical standard K, rising from the bed-plate, and is permitted to oscillate in a horizontal direction through the fact that it is held in place by a screw, stud, or bolt *k* passing down into the top of the standard, as particularly shown in Fig. 2. The frame I is provided with an extending tail I', which extends back over the plate J and is provided with a large hole i^2, as shown in Fig. 2. An overreaching spring I^2, made in whole or in part of spring material, is mounted on the frame and extends back over the tail to permit a screw i^3 to pass down through a notch in it (shown in Fig. 3) and through the large hole i^2 of the tail and enter a screw-threaded hole in the plate J. By bearing down on the end of the spring I^2 slightly, so as to loosen and turn it aside from the under head of the screw, the pivoted frame, with its ruling mechanism, is permitted to tip or turn on the studs or pins *i*, so as to drop the ruling mechanism away from the screen or plate. This is permitted through the fact that the hole i^2 in the tail of the frame is made large, so that it can move up or down the screw i^3 without interference. To restore the ruling mechanism to its ruling position, the parts are simply brought back into the position shown in Figs. 2 and 3. The spring is of sufficient resiliency to hold the frame and the ruling mechanism up with the desired pressure against the screen or film being ruled.

After one line has been ruled it is necessary to adjust the ruling mechanism laterally the distance desired for the ruling of the next succeeding line. It is to permit this that the plate J is mounted on the screw or stud, so as to permit horizontal oscillation, as already explained. In order to effect the lateral adjustment or movement of the ruling mechanism the desired distance, I arrange an adjusting-screw L, (shown in Fig. 3,) having an arm *l* extending down from it, so that as such arm is swung out or in the screw L will be turned and the plate J and the ruling mechanism moved laterally in the one direction or the other. To hold the plate J against the end of the screw L, I employ a spring M. (Shown in Fig. 3.) This causes the plate and the ruling mechanism to follow the screen when it is loosened or turned from the plate, and thus certainly secure the desired adjustment irrespective of the way the screw is turned. To turn the screw by swinging the arm L, I arrange a horizontal rod N, to which the arm is attached, in the upturned ends *n* and *n'* of a plate O, fastened to the bed-plate of the machine. The rod N is provided with a stop n^2, which prevents the rod from being drawn out beyond a predetermined distance, while the head N' of the rod prevents it from being pushed in beyond a predetermined distance. This insures the invariable rotation of the screw L the desired distance to secure the lateral adjustment or movement of the plate J and the ruling mechanism the desired distance. If, for instance, a given number of lines are to be ruled on this screen or film and one line is placed, the rod N is drawn out or pushed in, according to the direction the cylinder is rotating, and the ruling-wheel

will by such action be moved laterally the width of one line, so that the next line may be commenced. Of course after the line is started the right distance from the preceding line the ruling-wheel will place it such distance as long as the cylinder is rotating and traveling past the ruling mechanism through the threaded screw C, on which it is mounted, as already explained.

In order to inspect the work from time to time as the lines are being ruled, I arrange a microscope P in front of the cylinder, so that the lines which are too fine for the naked eye are brought out in sufficient size to be examined. In case it appear from such inspection that from any cause a line is being placed too close to or too far from the preceding line the rod N can be moved in or out a desired distance, so as to secure just such lateral adjustment of the ruling mechanism as may be necessary to correct the defect or imperfection.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling parallel lines on the material while wrapped around the cylinder at a predetermined distance apart, and means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, substantially as described.

2. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling parallel lines on the material while wrapped around the cylinder at a predetermined distance apart, means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, and means for adjusting the ruling mechanism laterally on the cylinder a desired or predetermined distance, substantially as described.

3. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling parallel lines on the material while wrapped around the cylinder at a predetermined distance apart, means for moving the ruling mechanism out of contact with the material, and means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, substantially as described.

4. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling parallel lines on the material while wrapped around the cylinder at a predetermined distance apart, means for permitting the ruling mechanism to adjust itself to inequalities on the surface of the material, and means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, substantially as described.

5. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling parallel lines on the material while wrapped around the cylinder at a predetermined distance apart, means for holding the ruling mechanism in yielding contact with the material, and means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, substantially as described.

6. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling parallel lines on the material while wrapped around the cylinder at a predetermined distance apart carried by a pivoted frame mounted on a horizontally-adjustable plate, and means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, substantially as described.

7. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling lines on the material while wrapped around the cylinder carried by a pivoted frame mounted on a horizontally-adjustable plate, a vertical standard carrying the plate, a screw, stud or bolt connecting the plate to the standard, and means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, substantially as described.

8. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound, means for rotating the cylinder, mechanism for ruling lines on the material while wrapped around the cylinder carried by a frame provided with an extending tail having a hole therethrough and with an overreaching spring over the extending tail having a notch therein and mounted on a horizontally-adjustable plate having a screw or pin passing up through the hole in the extending tail and the notch in the spring, and means for moving the cylinder longitudinally, while rotating, past the ruling mechanism, substantially as described.

9. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound and mounted on a screw-shaft threaded at one end, a threaded bearing through which the threaded portion of the screw-shaft passes, a

driving-shaft provided with a longitudinal keyway, a short hollow shaft surrounding the driving-shaft and keyed thereto in the longitudinal keyway, a driving-pulley mounted on the short hollow shaft, and mechanism for ruling parallel lines on the material while wrapped around the cylinder at a predetermined distance apart, substantially as described.

10. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound and mounted on a shaft threaded at one end, a threaded bearing through which the threaded portion of the screw-shaft passes, a driving-shaft provided with a longitudinal keyway, universal-joint connection between the threaded screw-shaft and the driving-shaft, a short hollow shaft surrounding the driving-shaft and keyed thereto in the longitudinal keyway, a driving-pulley mounted on the short hollow shaft, means for rotating the pulley, and mechanism for ruling lines on the material while wrapped around the cylinder, substantially as described.

11. In a machine for ruling flexible photographic screens, films or papers, the combination of a rotatable cylinder for carrying the material to be ruled wrapped therearound and mounted on a screw-shaft threaded at one end, a threaded bearing through which the threaded portion of the screw-shaft passes, a driving-shaft provided with a longitudinal keyway, a short hollow shaft surrounding the longitudinal shaft and keyed thereto in the longitudinal keyway, supplementary brackets in which the short hollow shaft is mounted, a driving-pulley mounted on the short hollow shaft, and mechanism for ruling lines on the material while wrapped around the cylinder, substantially as described.

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