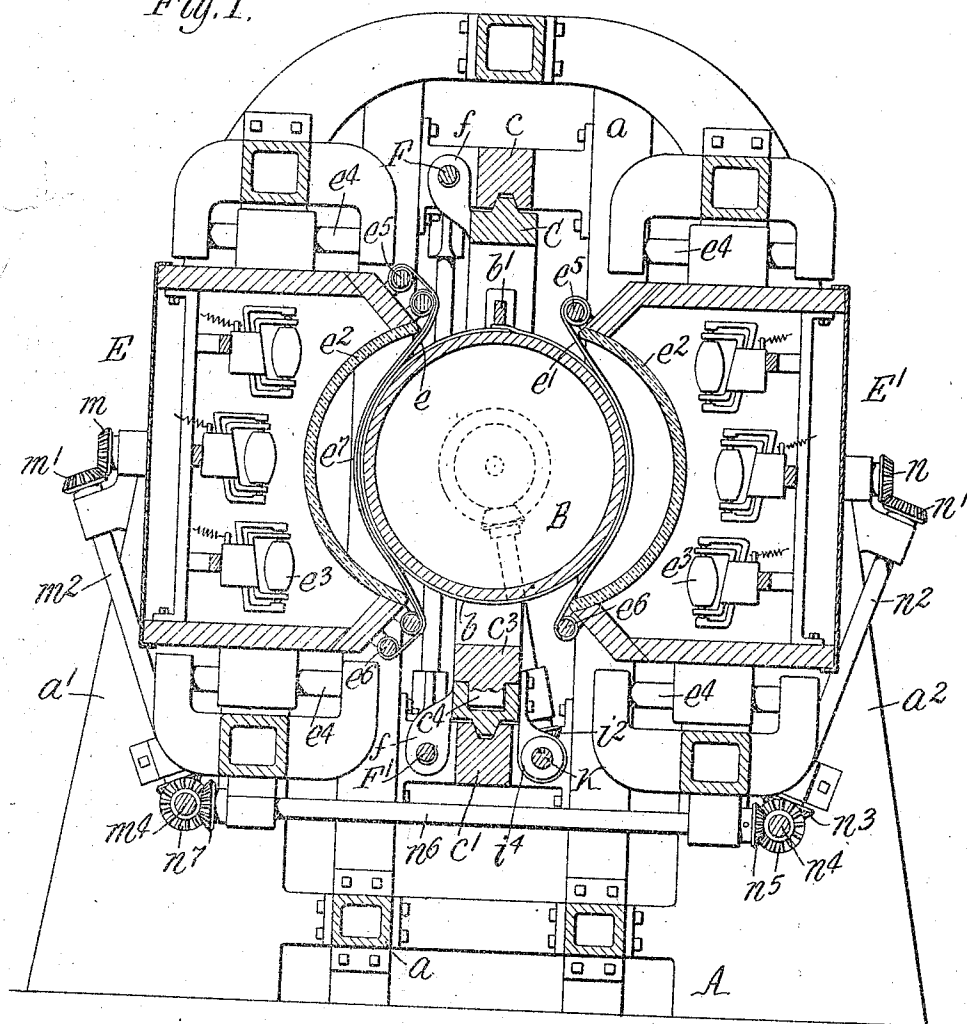


W. C. HUEBNER.
 PHOTOGRAPHIC PRINTING MACHINE.
 APPLICATION FILED JAN. 21, 1911.

1,043,430.

Patented Nov. 5, 1912.
 3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
 C. H. Bund.
 C. F. Dimond.

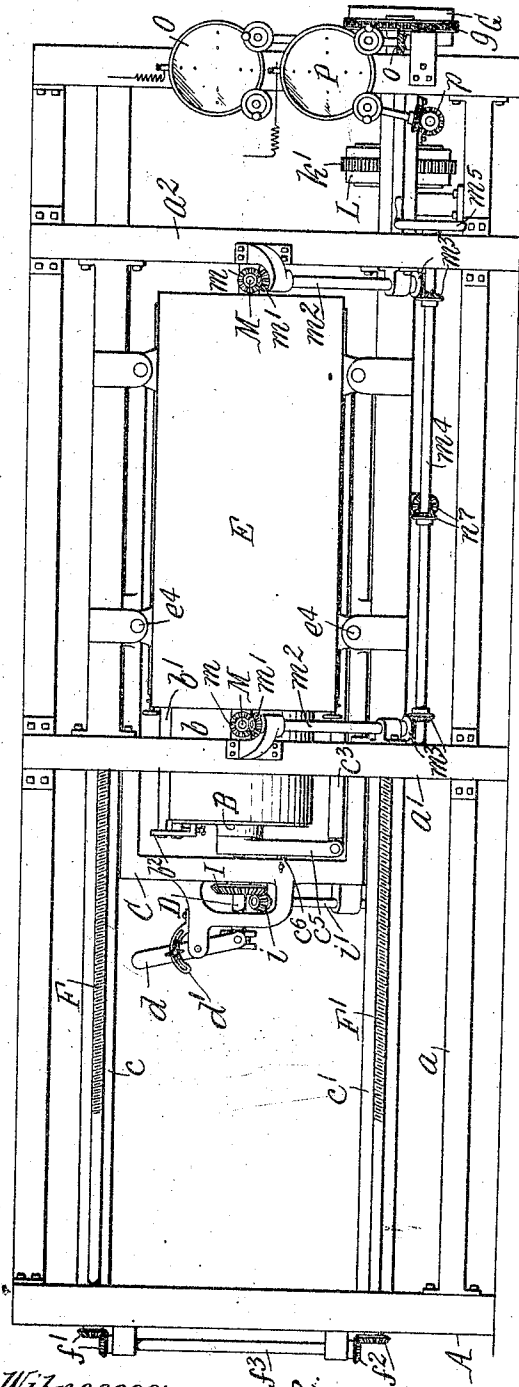
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3 SHEETS—SHEET 2



Witnesses:
 C. H. Bund.
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Fig. 2.

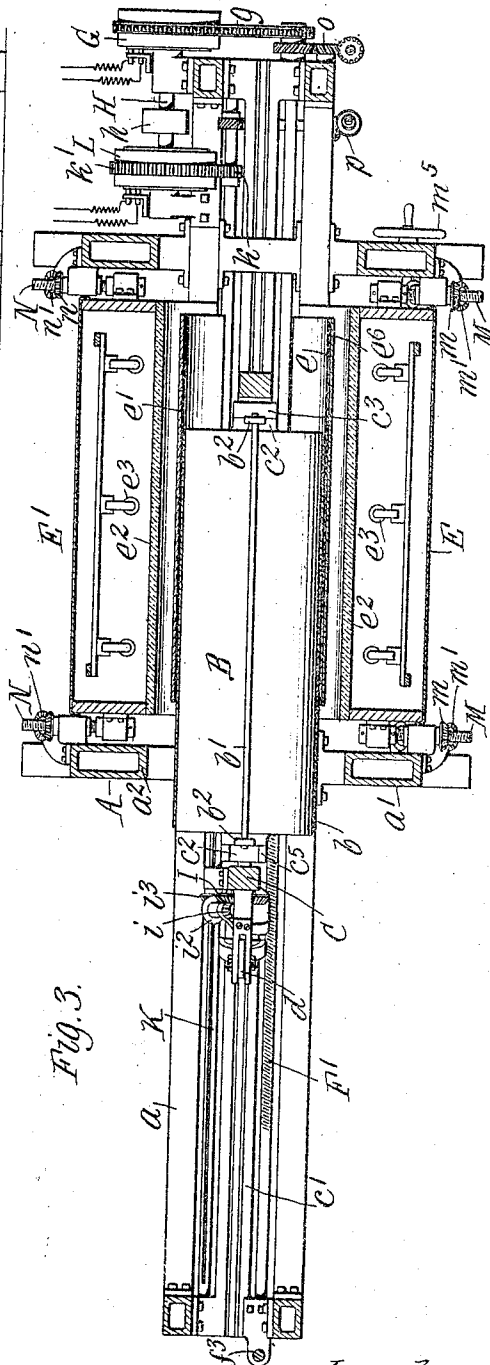


Fig. 3.

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3 SHEETS-SHEET 3

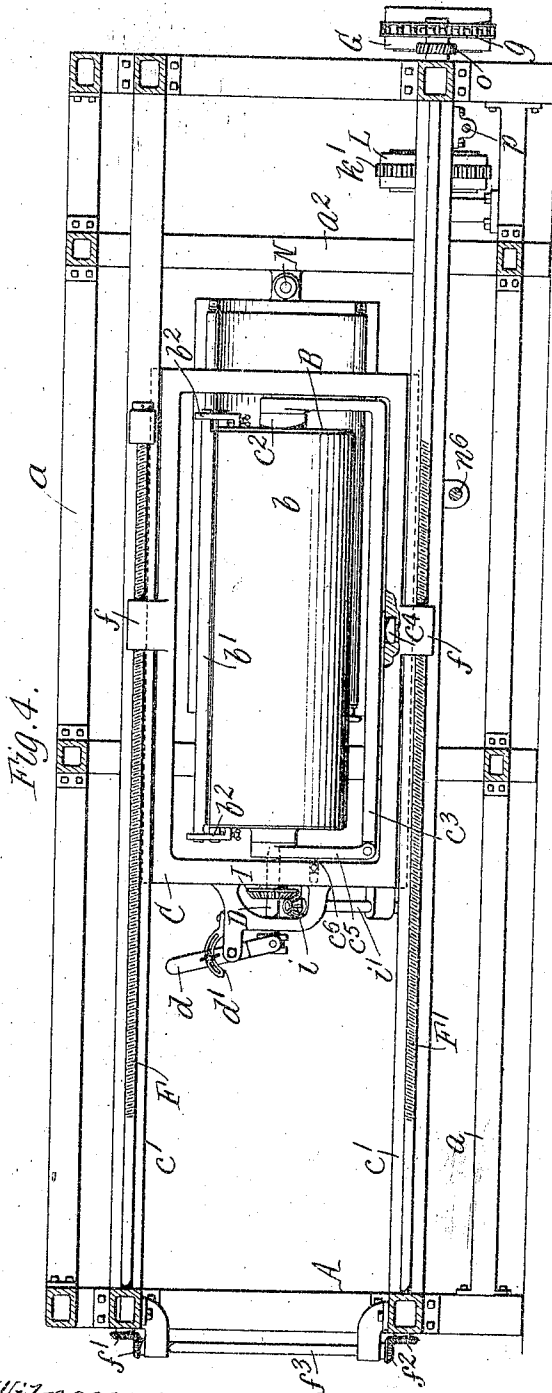


Fig. 4.

Fig. 7.

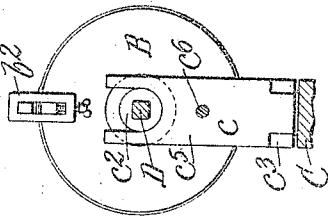


Fig. 6.

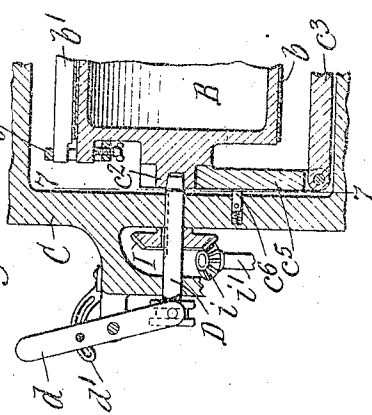
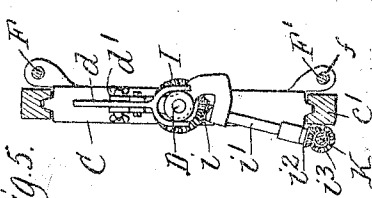


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM C. HUEBNER, OF BUFFALO, NEW YORK, ASSIGNOR TO HUEBNER-BLEISTEIN PATENTS COMPANY, OF BUFFALO, NEW YORK.

PHOTOGRAPHIC-PRINTING MACHINE.

1,043,430.

Specification of Letters Patent.

Patented Nov. 5, 1912.

Application filed January 21, 1911. Serial No. 603,944.

To all whom it may concern:

Be it known that I, WILLIAM C. HUEBNER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Photographic-Printing Machines, of which the following is a specification.

This invention relates to machines for producing photographic prints upon the sensitized surfaces of cylinders or rollers, such, for instance, as are used in printing wall paper and in other multicolor printing.

In color printing, when two or more colors are printed one over the other, to complete a subject, it is essential that the several prints composing the subject, which are on two or more cylinders, should register exactly when all the colors are assembled upon one sheet or print receiving part.

The object of the invention is to provide an efficient machine by means of which photographic prints can be expeditiously and cheaply produced upon sensitized cylindrical surfaces in the required position or arrangement; and furthermore, to construct a machine of this nature which is especially adapted for producing large prints or a plurality of prints simultaneously.

The machine comprises, briefly stated, the sensitized cylinder or roller, a carriage in which the cylinder or roller is journaled so that it can be rotatably adjusted, two chambers, cases or carriers containing suitable illuminating means which are arranged opposite to each other on opposite sides of the cylinder and which are provided with transparent concaved face plates adapted to press flexible transparent printing films or sheets against the sensitized cylindrical surface, means for simultaneously moving the illuminating chambers toward and from the cylinder to press the printing films or sheets against and remove them from the sensitized surface, mechanisms for adjusting the cylinder carriage longitudinally or in the direction of the axis of the cylinder and for rotatably adjusting the cylinder between the illuminating chambers so that the printing films or sheets can be applied with accuracy to those portions of the sensitized surface upon which it is required to make the prints.

In the accompanying drawings, consisting of three sheets: Figure 1 is a transverse

sectional elevation of a photographic printing machine embodying the invention. Fig. 2 is a side elevation thereof, on a reduced scale. Fig. 3 is a sectional plan view thereof. Fig. 4 is a longitudinal sectional elevation thereof. Fig. 5 is a fragmentary transverse section thereof, showing in elevation one end of the cylinder carriage. Fig. 6 is a fragmentary longitudinal sectional elevation, on an enlarged scale, of the cylinder carriage. Fig. 7 is an elevation partly in section on line 7-7, Fig. 6.

Like reference characters refer to like parts in the several figures.

A represents the main frame of the machine. This frame can be of any suitable construction, that shown comprising an upright rectangular central portion *a* in which the cylinder carriage is movable longitudinally, and opposite front and rear upright portions *a'* and *a''* in which the illuminating chambers are mounted to move toward and from the cylinder.

B represents the cylinder or roller having the sensitized printing surface. The sensitized surface can be provided either directly on the printing cylinder or roller itself, or on a separate thin plate, sheet or tube which is fastened on the cylinder or roller. A sensitized plate *b* is shown in Fig. 1 which is secured on the cylinder by a clamping bar *b'* which bears on the lapped ends of the sensitized plate and is fastened to the cylinder and operated by screw clamps *b''* at its ends.

C represents the movable carriage in which the cylinder B is rotatably and removably mounted. The carriage shown consists of an upright rectangular frame which is arranged to slide between suitable upper and lower longitudinal guide rails *c c'* in the central portion of the main frame. The cylinder B is journaled by trunnions *c''* at its ends in the upright ends of a bearing frame or support *c'''* which is pivoted centrally at *c''* to swing horizontally in the carriage C. One end *c''* of the pivoted frame *c'''* is hinged to the bottom bar of the frame and has an open-ended bearing seat for the cylinder journal to permit the removal of the cylinder. By first moving the carriage C to one end of the machine beyond the opposite upright portions *a'* *a''* of the main frame, the pivoted

cylinder support c^2 can be swung to a cross-wise position in the carriage to enable the cylinder to be readily placed in or removed from the carriage or the sensitized plate b to be secured on or removed from the cylinder. A spring-actuated bolt c^3 located in a socket in the end of the carriage C and adapted to bear against the hinged end of the pivoted cylinder support c^2 prevents end-wise movement of the cylinder in the carriage.

D represents a shaft journaled in one end of the carriage C for turning the cylinder and locking the pivoted cylinder support from swinging in the carriage. This shaft is adapted to slide endwise in a bearing in one end of the carriage for engaging and releasing the cylinder and is detachably coupled with the adjacent journal of the cylinder, for instance, by providing the shaft with a tapering square inner end adapted to enter a corresponding socket in the journal. The shaft is moved to engage and release the cylinder by suitable means, such, for instance, as a shifting lever d pivoted on the carriage and provided with means d' of any suitable kind for holding the lever and shaft in proper position. The cylinder could be removably mounted so as to rotate and be adjusted longitudinally in the machine in other suitable ways.

E and E' represent the illuminating chambers, cases or carriers, which are arranged at opposite sides of the cylinder B, and e and e' represent the flexible transparent printing films or sheets which are arranged between the concave face plates e^2 of the chambers and the sensitized surface of the cylinder. These chambers contain electric lamps e^3 , or other suitable illuminating apparatus, and are so mounted that they can be moved toward and from the cylinder for pressing the printing films or sheets against the latter and removing them therefrom. As shown, the illuminating chambers are mounted to slide toward and from the cylinder on parallel guide bars e^4 on the front and rear portions a' a^2 of the frame A. The transparent face plates e^2 of the chambers are of proper segmental cylindrical shape to fit the cylinder closely and press the flexible printing films or sheets evenly against the sensitized cylindrical surface. Each face plate covers nearly one-half of the cylinder so that practically the entire sensitized surface can be printed at one time, thus enabling the simultaneous production of two large prints or a larger number of smaller prints. The flexible printing films or sheets extend across the concave faces of the face plates, each film or sheet being attached at opposite ends to suitable rollers or bars e^5 e^6 mounted on the illuminating chamber. One of the rollers, e^5 , for each film or sheet is preferably

spring-actuated so that it allows the film or sheet to give as required when the illuminating chamber is moved toward the cylinder, but holds it under sufficient tension to tightly embrace the cylinder. A supplemental film e^7 is shown in conjunction with the printing film or sheet e for producing desired effects, such, for instance, as blocking or screening the light from parts where a clear surface is required, in a well known manner. This supplemental film is mounted similarly to the printing film or sheet. If desired, one of the illuminating chambers can be used alone for making one or more prints on one-half of the cylinder, and in that case the other chamber serves as a back support or pressure device for the cylinder.

The cylinder carriage C is moved longitudinally to adjust the cylinder lengthwise relative to the illuminating chambers by suitable adjusting mechanism, such, for example, as two screw shafts F F' journaled on the central portion of the main frame and working in nuts f on the carriage. The screw shafts are connected by bevel gears f' and f^2 to a shaft f^3 which causes a corresponding motion of both screw shafts. The screw shaft F' is connected by a chain g and chain wheels, or by other suitable gearing, to the loose or driven member of a clutch G, the other, or driving member, of which is secured to a drive shaft H provided with a pulley h for a power-driven belt, or other means for driving it. This clutch G may be an electric clutch of any suitable construction which is adapted when energized by closing its operating circuit to cause the driven member to rotate and drive the adjusting screws F F' and to stop and arrest the motion of the screw shafts when the clutch circuit is opened.

The cylinder is turned for circumferentially adjusting the sensitized surface relative to the illuminating chambers, for instance, by the following mechanism: The cylinder rotating shaft D is connected by bevel gears I i to a shaft i' which is journaled in the carriage C and connected by bevel gears i^2 i^3 to a shaft K which is journaled in the lower portion of the main frame. The bevel gear I has a sliding connection with the shaft D to permit this shaft to slide in its bearing to engage and release the cylinder, as before explained, and the bevel gear i^2 is journaled in a bearing i^4 , Fig. 1, on the carriage C and is splined on the shaft K so that it will slide along the shaft when the carriage is adjusted longitudinally and thus enable the rotation of the cylinder in any position of the carriage. The shaft K is connected by gear wheels k k' , Fig. 3, or by other suitable gearing, to the loose or driven member of a clutch L, the other or driven member of which is secured to the drive shaft H. This clutch is

similar to the clutch G and operates similarly, through the described mechanism, to rotatably adjust the cylinder.

The means shown for moving the illuminating chamber E toward and from the cylinder consist of a pair of screws M secured to the ends of the chamber and having screwthreaded engagements with the hubs of bevel gears m which are suitably journaled on the front portion a' of the main frame. Each of these wheels is connected by a bevel gear m' , shaft m^2 and bevel gears m^3 to an operating shaft m^4 provided with a hand wheel m^5 for turning it. The other illuminating chamber is moved toward and from the cylinder by similar means consisting of screws N, bevel gears n n' , and shafts n^2 connected by bevel gears n^3 to a shaft n^4 . This shaft n^4 is connected by bevel gears n^5 to a cross shaft n^6 , and by bevel gears n^7 to the operating shaft m^4 so that both illuminating chambers are moved simultaneously and correspondingly by turning this shaft m^4 . Suitable mechanism of other construction for moving the illuminating chambers toward and from the cylinder could be employed.

In the use of the machine, the cylinder carriage is moved by its adjusting mechanism toward one end of the machine until it is withdrawn from between the illuminating chambers, the shaft D is moved to release the cylinder and the pivoted cylinder support c^3 is swung around to a crosswise position in the carriage. The cylinder is then placed in the pivoted support c^3 , and the latter is swung back parallel with the carriage C and is locked by moving the shaft D again into engagement with the cylinder journal. The cylinder is now adjusted so that the printing films or sheets stand opposite to those portions of the sensitized surface upon which the prints are to be made, and for this purpose the mechanisms for adjusting the cylinder circumferentially and lengthwise are resorted to as may be necessary. When the cylinder has been properly adjusted, the illuminating chambers are moved by the described mechanism to press the printing films or sheets against the sensitized cylindrical surface. The exposure is then made and the chambers with the printing films or sheets are withdrawn from the cylinder, the latter is removed from the machine and the sensitized surface is finished for printing in any suitable or well-known manner, or, when the prints are being made on one-half only of the cylinder, the cylinder can be suitably adjusted for printing in a corresponding position on the other half of the cylinder.

In order to operate the adjusting mechanisms so that the cylinder can be adjusted rapidly and with great precision, microm-

eter controllers O and P are provided. The controller O is connected by any suitable gearing o to the mechanism driven by the clutch G, and the other controller P is connected by suitable gearing p to the mechanism driven by the clutch L. These controllers are adapted to be set by hand to predetermine the adjustments of the cylinder and they operate automatically to open the operating circuits of the clutches G and L and stop the adjusting mechanisms driven thereby when the cylinder reaches the predetermined position, in the manner fully described in my copending application, Serial No. 619,560, filed April 7, 1911.

When several cylinders are to be provided with the same design for producing multi-color prints, the prints are readily made upon all the cylinders of the same set in exact register by adjusting the cylinders to corresponding positions by the described mechanisms controlled by the controllers O and P.

I claim as my invention:

1. The combination of a cylinder carriage, a cylinder support pivoted in said carriage, a cylinder provided with a sensitized surface and rotatably mounted on said support, an illuminating chamber adapted to press a printing film or sheet against the sensitized surface, and means for adjusting said carriage lengthwise relative to said chamber, substantially as set forth.

2. The combination of a cylinder carriage, a cylinder support pivoted in said carriage, a cylinder provided with a sensitized surface and rotatably and removably mounted on said support, an illuminating chamber, means for moving said chamber toward said cylinder to press a printing film or sheet against the sensitized surface, and means for adjusting said carriage lengthwise relative to said chamber, substantially as set forth.

3. The combination of a cylinder provided with a sensitized surface, illuminating chambers arranged at opposite sides of said cylinder, means for moving said chambers to press printing films or sheets against the sensitized surface, and means for changing the position of said cylinder lengthwise relative to said chambers, substantially as set forth.

4. The combination of a cylinder provided with a sensitized surface, illuminating chambers arranged at opposite sides of said cylinder, means for moving said chambers to press printing films or sheets against the sensitized surface, means for changing the position of said cylinder circumferentially, and means for changing the position of said cylinder lengthwise relative to said chambers, substantially as set forth.

5. The combination of a cylinder provided

with a sensitized surface, illuminating chambers arranged at opposite sides of said cylinder, means for moving said chambers toward said cylinder to press printing films or sheets against the sensitized surface, and means for changing the position of said cylinder lengthwise relative to said chambers, substantially as set forth.

6. The combination of a cylinder provided with a sensitized surface, illuminating chambers arranged at opposite sides of said cylinder, means for moving said chambers toward said cylinder to press printing films or sheets against the sensitized surface, means for changing the position of said cylinder circumferentially, and means for changing the position of said cylinder lengthwise relative to said chambers, substantially as set forth.

7. The combination of a cylinder provided with a sensitized surface, illuminating chambers movably mounted at opposite sides of said cylinder, means for simultaneously moving said chambers toward said cylinder

to press printing films or sheets against the sensitized surface, and means for changing the position of said cylinder relative to said chambers, substantially as set forth.

8. The combination with a cylinder provided with a sensitized surface, an illuminating chamber and means for moving said chamber to press a printing film or sheet against the sensitized surface, of a cylinder carriage, a support for said cylinder pivoted in said carriage, a shaft for turning said cylinder which is movable on said carriage to couple it to and uncouple it from said cylinder, said carriage being movable to change the position of said cylinder relative to said chamber, and mechanism for rotating said shaft, substantially as set forth.

Witness my hand, this 19th day of January, 1911.

WILLIAM C. HUEBNER.

Witnesses:

C. W. PARKER,
A. L. McGEE.