

**No. 637,600.**

**Patented Nov. 21, 1899.**

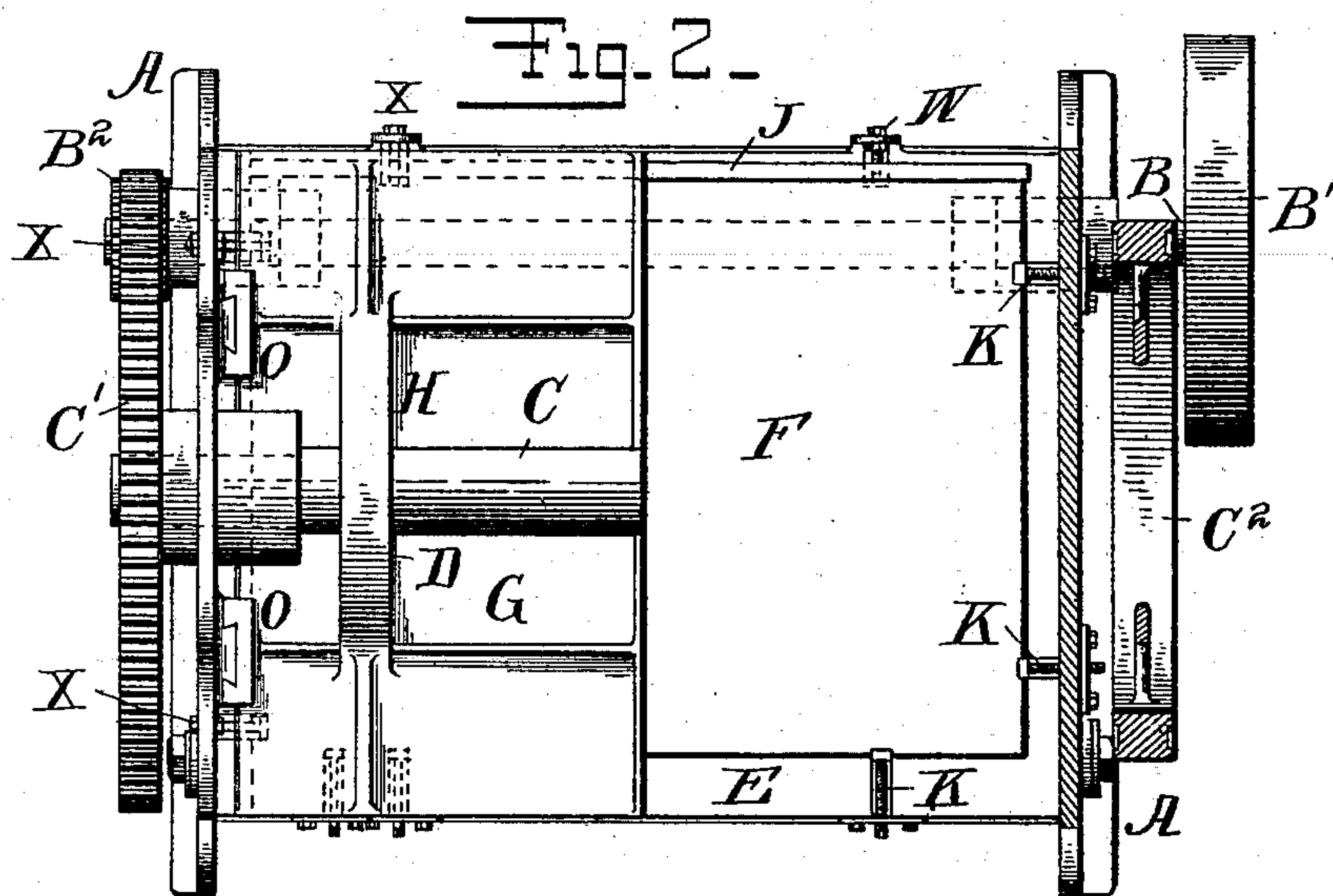
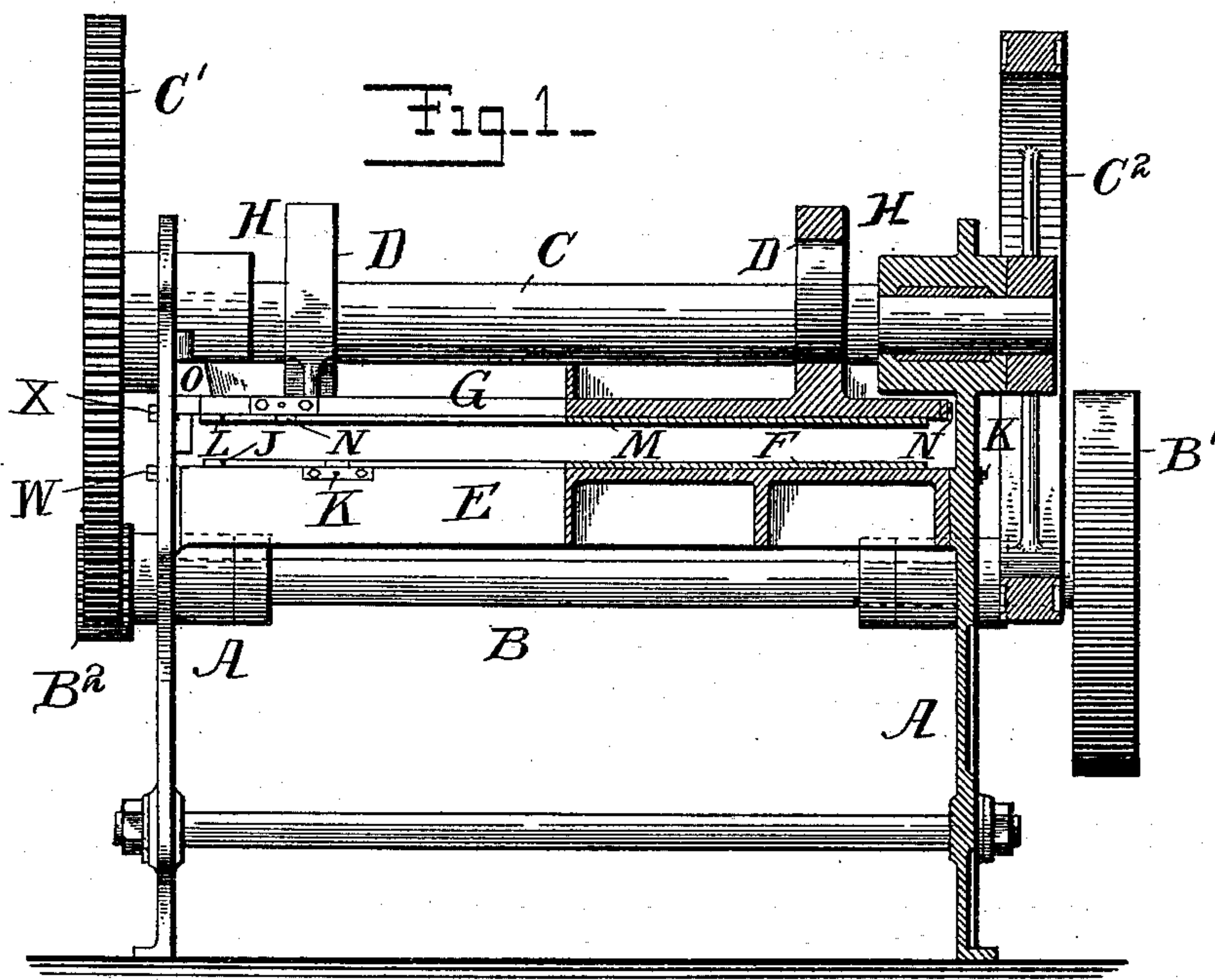
**E. HETT.**

## METHOD OF LITHOGRAPHIC TRANSFERRING AND PRINTING.

(Application filed Sept. 26, 1899.)

(No Model.)

**2 Sheets—Sheet 1.**



**WITNESSES:**

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(No Model.)

2 Sheets—Sheet 2.

Fig. 3.

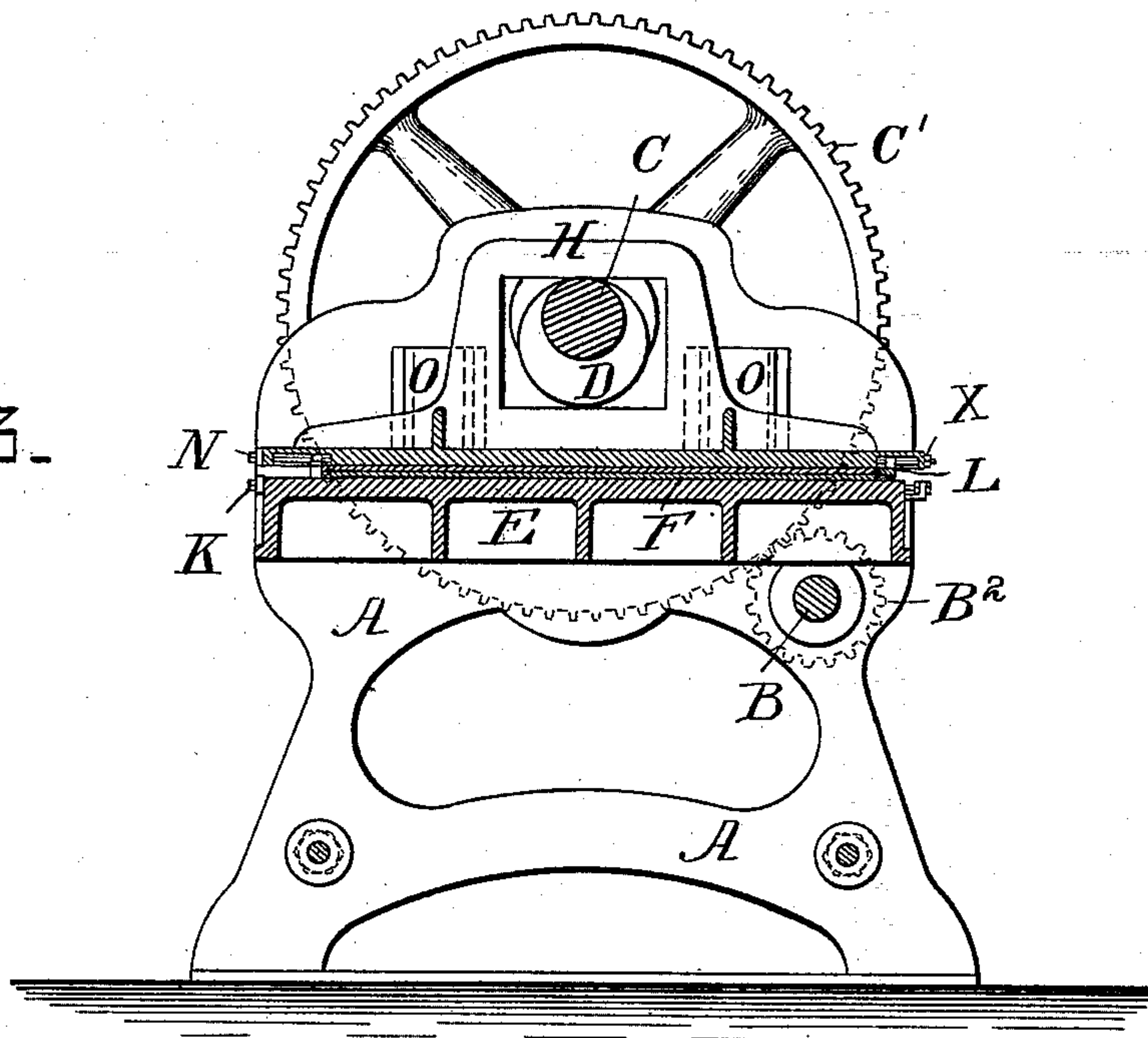
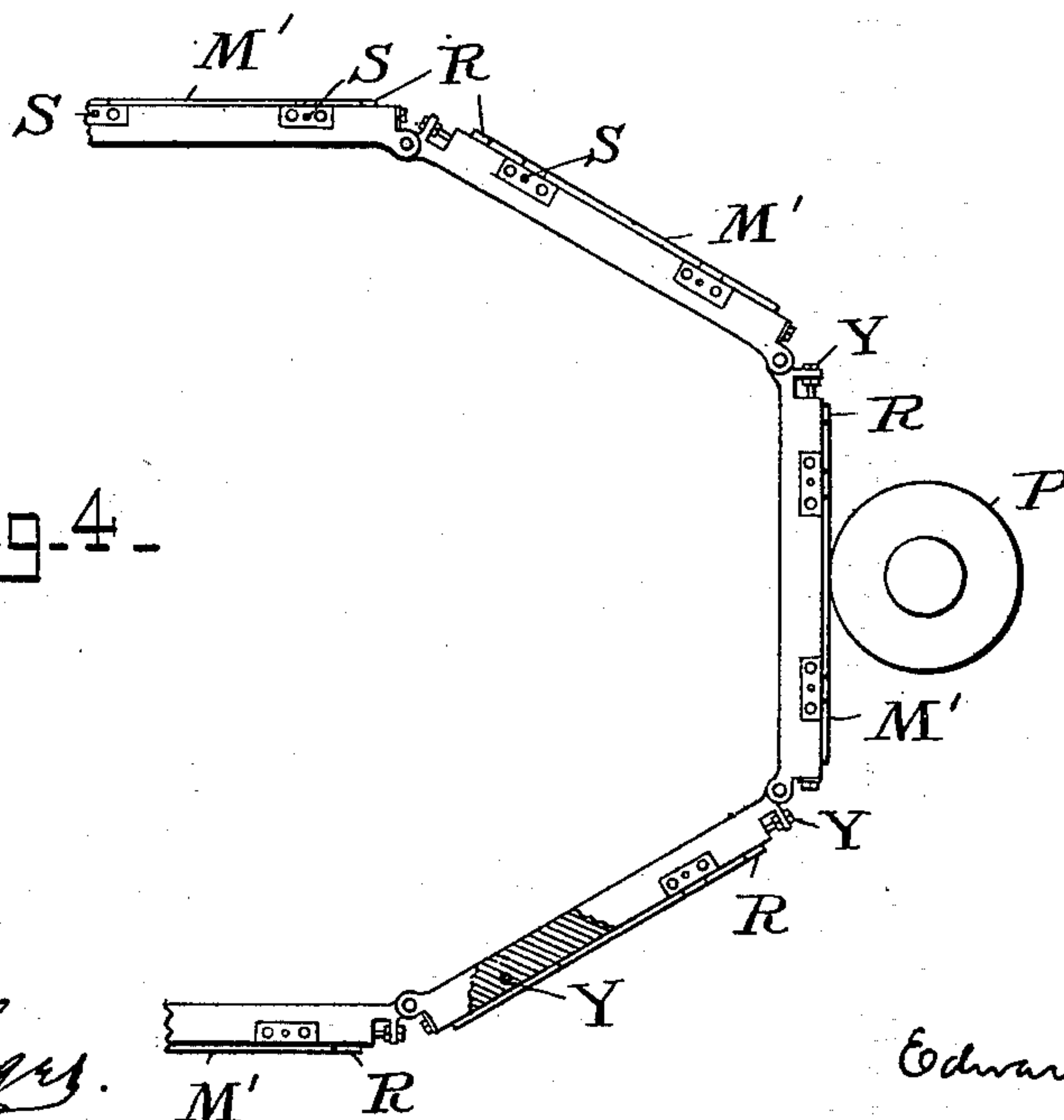


Fig. 4.



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# UNITED STATES PATENT OFFICE.

EDWARD HETT, OF NEW YORK, N. Y.

## METHOD OF LITHOGRAPHIC TRANSFERRING AND PRINTING.

SPECIFICATION forming part of Letters Patent No. 637,600, dated November 21, 1899.

Original application filed December 23, 1898, Serial No. 700,143. Divided and this application filed September 26, 1899. Serial No. 731,743. (No specimens.)

*To all whom it may concern:*

Be it known that I, EDWARD HETT, a citizen of the United States, and a resident of New York, (New Dorp,) in the county of Richmond and State of New York, have invented an Improved Method of Lithographic Transferring and Printing, of which the following is a specification.

The present invention relates to the operations of transferring and printing, more especially in lithography; and it has for its object to more economically and reliably and accurately perform those operations and by those operations to attain a perfect register in multicolor-printing work.

It consists of the method herein set out and hereinafter claimed.

The accompanying drawings, which form a part hereof, illustrate steps of my improved method.

Figure 1 is an end view of the transfer-press, partly in section. Fig. 2 is a top view of the same, also partly in section. Fig. 3 is a side view in section. Fig. 4 represents diagrammatically a portion of a printing-press in side view, partly sectional.

The improvement in the art consists in preparing a series of basic surfaces, one for each color, to be separately printed by applying the design for that color to a setting-up plate or other suitable surface, bringing each basic surface into a definite relation with reference to a certain mechanical guide or guides in the transfer-press in such way that the design upon it shall have the same position with reference to said mechanical guide or guides that every other design of the series in the operation of transfer has, establishing whole-surface contact under pressure between each basic surface and a suitable printing-surface, the printing-surfaces being held, each one of them, in the same position with reference to the aforesaid mechanical guide or guides while transferring to it as every other printing-surface of the series, whereby the designs are communicated from the basic surfaces to the printing-surfaces in accurate and related positions, suitably developing the surfaces into printing-surfaces of the character desired for the several colors to be separately printed, mounting the printing-surfaces in series in a printing-press in position accurately

fixed each with respect to every other and all with respect to the impression surface or surfaces, and printing from the said printing-surfaces in series, whereby register may be continuously and automatically attained.

Referring to Figs. 1, 2, and 3, A is the frame of a transfer-press. B is the power-shaft. It has a pulley B' at one end and a small gear-wheel B<sup>2</sup> at the other. C is the cam-shaft. It has a large gear-wheel C' at one end, meshing with the small gear-wheel B<sup>2</sup> on the power-shaft B, and a fly-wheel C<sup>2</sup> at the other end to steady the motion, and two cams D D. Solidly mounted on the frame of the machine is the bed E, which in the form of the machine shown in the drawings and which I prefer is adapted to receive setting-up plates F, as hereinafter described. G is the movable upper frame or bed, which moves up and down on vertical slideways O in the main frame of the machine and is adapted to receive a lithographic surface and to carry it face downward, as hereinafter described. In the drawings the printing-surfaces and setting-up plates are represented as flat. They might, however, so far as my general invention is concerned, be rounded more or less or otherwise shaped, so long as they remain capable of whole-surface contact with each other. In this case the one would be the reverse of the other, and the beds of the transfer-press would be correspondingly shaped. The upper frame G has two cam boxes or arms H H, encircling the cams D D, as shown. The rotation of the cams reciprocates the frame G vertically toward and from the bed E. The bed E has fixed mechanical guides J at one side and one end, forming a corner, into which fits accurately one corner of the setting-up plate F, thus bringing the design upon the basic surface into a definite relation with reference to the aforesaid mechanical guides. This mechanical guide J may be composed of two parts, as shown, each capable of preliminary adjustment by means of the devices W, by which they are then held fixed in place throughout the carrying out of my process, although this adjustment is not necessary. The device W consists of a screw-threaded bolt passing loosely through the frame of the bed E and working in a correspondingly-screw-threaded hole in a depend-



ing lug or projection from the piece J. An outside nut fixed to the bolt is the means of turning the bolt, so that the piece J may be screwed in or out and so adjusted in position, and an inside nut is the means of jamming or fixing the bolt, and so the piece J, in the adjusted position. This is clearly shown in Fig. 2 of the drawings. The bed E also has screw forcing and holding devices K, taking against the remaining side and end of the setting-up plate and forcing it accurately and snugly up into the corner formed by the mechanical guide J and holding it reliably there. The device K consists of a screw-threaded bolt loosely mounted in the frame of the bed E, but so that it can have no longitudinal motion in same. It has a squared outer end outside of the frame by which it can be turned. Inside of the frame it carries a traveling screw-threaded nut, which projects upwardly and takes against the side of the setting-up plate. These devices K are unscrewed whenever a setting-up plate F is to be taken out. The upper frame or bed G has on its under face and on one end and one side thereof a corresponding fixed angle piece or guide L, similar to the guide J, (and which, like the guide J, may consist of two parts preliminarily adjusted and then held fixed by the devices X throughout the carrying out of my process,) into which mechanical guide L accurately fits one corner of the flat printing-surface M, face downward. The frame or bed G also has at the other end and side of the under face screw forcing and holding devices N, similar to the devices K, to take against the remaining side and end of the flat printing-surface M and to force it accurately and snugly into the corner formed by the guide L and to hold it there. In operation, in the case of the particular transfer-press shown in the drawings, the driving of the power-shaft B brings the upper bed G down directly toward the lower bed E, and the color basic surface (being the setting-up plate F, with its transfers for that color upon it) and printing-surface M are so mounted upon the two beds as that this movement brings them (the basic surface and the printing-surface) into whole-surface contact with each other and under proper and sufficient pressure to accomplish the transferring desired, and the printing-surfaces are brought successively all of them into the same position at the moment of transferring with reference to the mechanical guide J. The amount of pressure may be controlled and regulated by slipping one or more paper or metal sheets or rubber blankets under the setting-up plate on the lower bed. The pressure may be applied more than once, if desired or necessary, by continuing the operation of the press, and the pressure may be gradually increased by slipping one or more thin paper or metal or rubber sheets in under or on top of the setting-up plate after the first compression. This gradual increase of pressure gives important results, and I prefer that

method in practice. The transfers should leave the basic surface and cling to the printing-surface after and as the result of the first compression. The printing-surface is then developed into the character of printing-surface desired in any usual way—as, for example, by soaking off and washing off the transfer-paper, leaving the ink of the transfers, then etching, rolling up, &c.—and, if desired, before soaking off the transfer-paper more pressure, such as rolling pressure or scraping pressure, may be applied to the printing-surface in other machines as in any ordinary transfer-press. A whole series of printing-surfaces having received transfers from a corresponding series of basic surfaces, each according to the method set out above and all in identical position with reference to the same or equivalent mechanical guide or guides J and the said surfaces having been suitably developed into printing-surfaces of the character desired, they are now ready for use in combination in the second or printing step of my improved process.

Fig. 4 shows diagrammatically parts of one form of printing-press that will illustrate and carry out the invention. Here P represents the impression-surface, which is positively driven with the printing-surfaces in any suitable way, as by connecting-gearing. M' M' are the series of printing-surfaces that have been treated as heretofore described. They are mounted and carried on the several forms or supports T T, which in the machine of the drawings are linked together into an endless chain. Each of these forms or supporting parts T has a fixed angle-piece or placing or stop piece R, constituting at one end and one side of each support T a guide against which the printing-surface can be forced and held, (each stop-piece being preferably composed of two separate parts forming the angle, like J or L in Figs. 2 and 3,) and each part T has forcing and holding devices S to force the printing-surface M' snugly and reliably into its place or position against the placing-piece or stop-piece R and to hold it there. The placing or stop pieces R are themselves capable of preliminary adjustment, as shown, as by means of the screw bolts and nuts Y, which are on one side and one end of each part T, and the entire series of these placing or adjusting pieces R are originally, when the press is first set up and used, experimentally adjusted with respect to each other and to the impression-surface until the entire series of printing-surfaces (previously treated as above) that they adjust and control are accurately fixed each with respect to every other and all with respect to the impression-surface and so register exactly in the printing each with every other. The placing or adjusting pieces R may then become fixed and do operatively become fixed in the further carrying out of my invention, for they will only require readjustment to compensate for wear, &c. The drawings show flat printing-surfaces, which for the pur-



poses of the present invention is the form I prefer. The setting-up plates and the beds and supports are of course in such case correspondingly flat, as shown. The printing-surfaces might be rounded, so as to permit of the supporting parts T forming a true drum or cylinder, in which case the beds of the transfer-press would be correspondingly shaped and the setting-up plates also. In such case the setting-up plates and the printing-surfaces would have to be substantial enough not to buckle when forced by the clamping devices K, N, or S against the angular stop devices J, L, or R.

The character of my improved method of obtaining accurate register will be clear from the above description. Heretofore such register has been obtained experimentally and in the printing-press solely and by devices and manipulation there provided, the transferring to the printing-surfaces being no part of the operation of obtaining register. By my improved method of obtaining accurate register in the printing by beginning the process with the transferring and by simultaneous whole-surface contact in the transferring I reach important and valuable results, not only in economy of time, labor, and machinery, but also in accuracy and perfection of result, rendering multicolor-printing and multicolor-presses, and especially multicolor lithographic printing and presses, more practicable and available than heretofore.

It is evident that many variations of the mechanism shown might be made without departing from my invention. In the machine of the drawings the two beds of the transfer-press approach each other in a line at right angles to the planes of their contacting faces; but that is not essential so long as when they do contact it is a whole-surface contact and so long as the two beds are connected so as always reliably to contact in the same relative position sidewise and endwise with respect to each other. Again, the mechanical guides J, L, and R need not be continuous pieces or strips so long as they reliably place or stop or guide the basic surface or printing-surface in two directions angularly related to each other—that is to say, so long as they constitute such stops or guiding devices against which the basic surface or the printing-surface (as the case may be) can be forced and clamped and held. Again, the form and character of the clamping devices K, N, and S may be greatly varied, as well as the form and character of the angle-piece-adjusting or stop-adjusting devices W, X, and Y. Moreover, the printing-surfaces to which the transfers have been made, as described, might, as by deep etching, routing, or otherwise, be developed or made into relief or intaglio, as distinguished from planographic, printing surfaces, or some of the series might be so developed. For printing with such relief-printing surfaces no dampening devices would be needed in the printing-press. Obviously the

invention would not be affected or avoided by such application or use of it, and of course the type of transfer-press and of printing-press employed might be greatly varied without departing from my invention.

My improved apparatus set forth herein is not claimed in this application, but is made the subject of my application filed December 23, 1898, Serial No. 700,143, of which this is a divisional application.

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

1. The improvement in the art of multicolor-printing which consists in preparing a series of basic surfaces one for each color to be separately printed by applying the design for that color to a setting-up plate or other suitable surface, bringing each basic surface into a definite relation with reference to a certain mechanical guide or guides in such way that the design upon it shall have the same position with reference to said mechanical guide or guides that every other design of the series has, establishing whole-surface contact under pressure between each basic surface and a suitable printing-surface, the printing-surfaces being held, each one of them, in the same position with reference to the aforesaid mechanical guide or guides as every other printing-surface of the series, whereby the designs are communicated from the basic surfaces to the printing-surfaces in accurate and related positions, suitably developing such surfaces into printing-surfaces of the character desired for the several colors to be separately printed, mounting said printing-surfaces in series in a printing-press in positions accurately fixed each with respect to every other and all with respect to the impression surface or surfaces, and printing from said printing-surfaces in series, whereby register may be continuously and automatically attained, substantially as set forth.

2. The improvement in the art of multicolor lithographic printing which consists in preparing a series of basic surfaces one for each color to be separately printed by applying the design for that color to a setting-up plate or other suitable surface, bringing each basic surface into a definite relation with reference to a certain mechanical guide or guides in such way that the design upon it shall have the same position with reference to said mechanical guide or guides that every other design of the series has, establishing whole-surface contact under pressure between each basic surface and a suitable lithographic surface, the lithographic surfaces being held, each one of them, in the same position with reference to the aforesaid mechanical guide or guides as every other lithographic surface of the series, whereby the designs are communicated from the basic surfaces to the lithographic surfaces in accurate and related positions, suitably developing such surfaces into lithographic-printing surfaces for the several colors to be separately printed, mounting said



lithographic-printing surfaces in series in a  
printing-press in positions accurately fixed  
each with respect to every other and all with  
respect to the impression surface or surfaces,  
5 and printing from said printing-surfaces in  
series, whereby register may be continuously  
and automatically attained, substantially as  
set forth.

In testimony whereof I have signed my  
name to this specification in the presence of 10  
two subscribing witnesses.

EDWARD HETT.

Witnesses:

GEO. W. MILLS, Jr.,  
EDWIN SEGER.