

(No Model.)

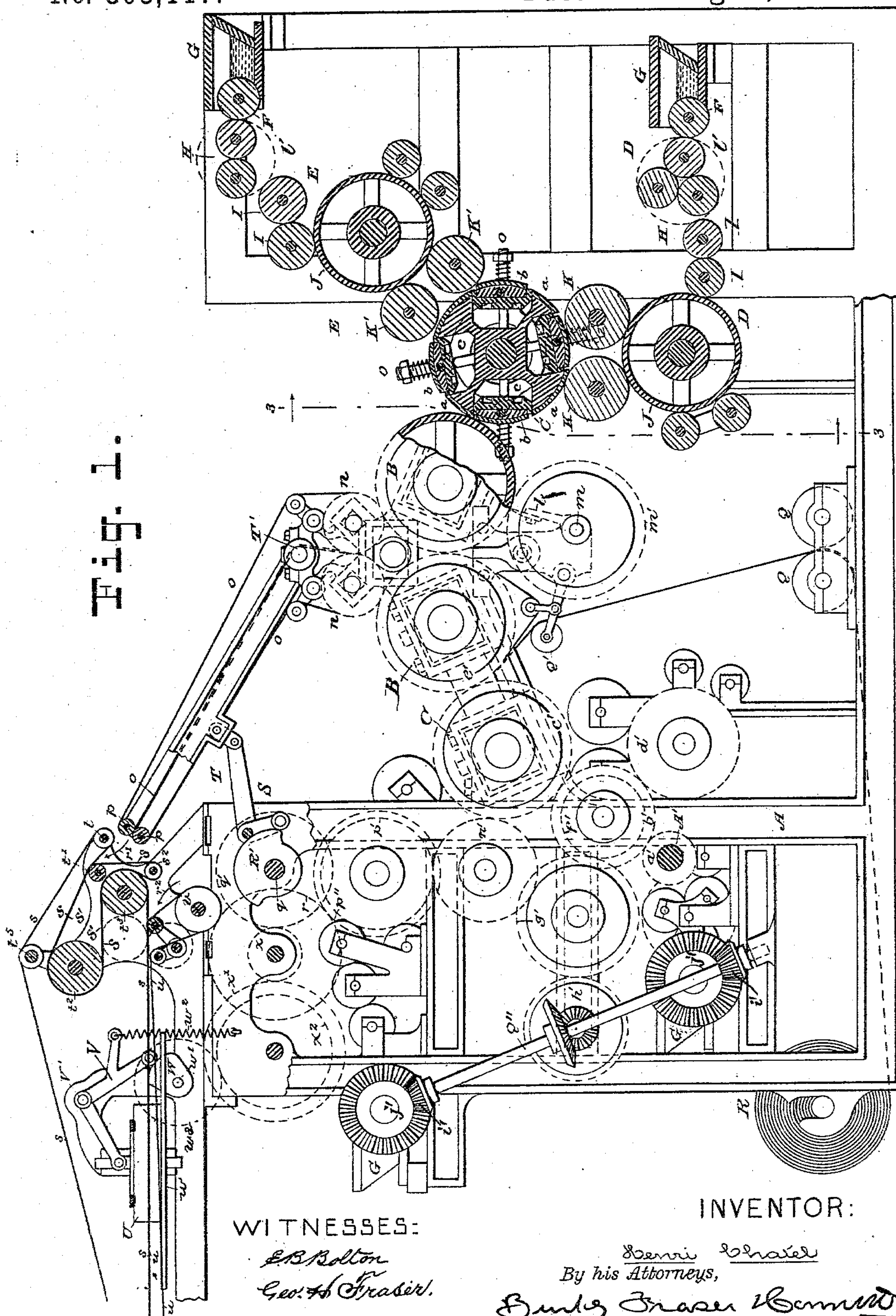
4 Sheets—Sheet 1.

H. CHATEL.

POLYCHROME PRINTING MACHINE.

No. 303,117.

Patented Aug. 5, 1884.



(No Model.)

4 Sheets—Sheet 2.

H. CHATEL.

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Patented Aug. 5, 1884.

Fig. 2.

WITNESSES:

E. B. Bolton

Geo. H. Fraser.

INVENTOR:

Henri Chatel

By his Attorneys,

Burke Fraser & Bennett

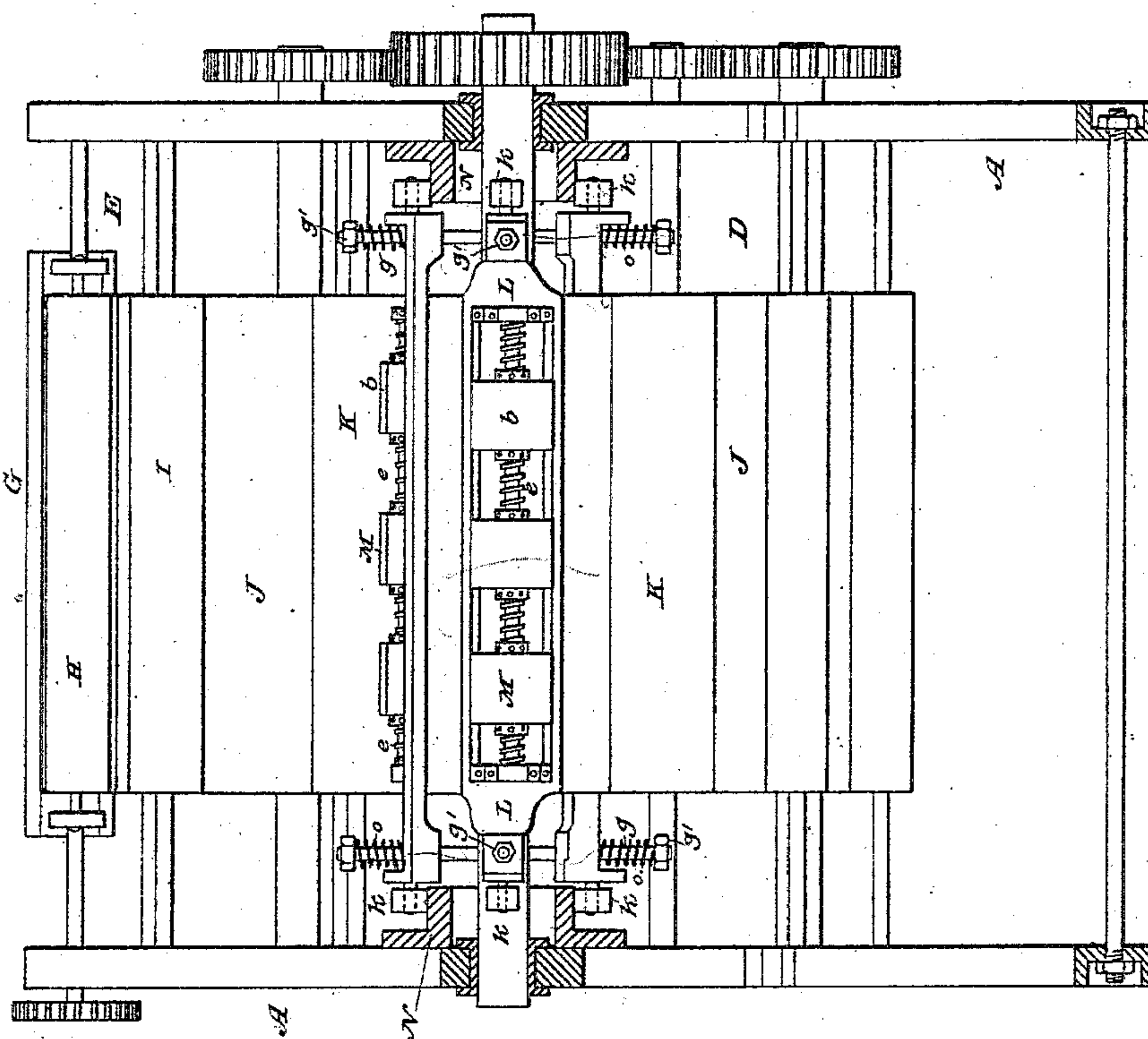
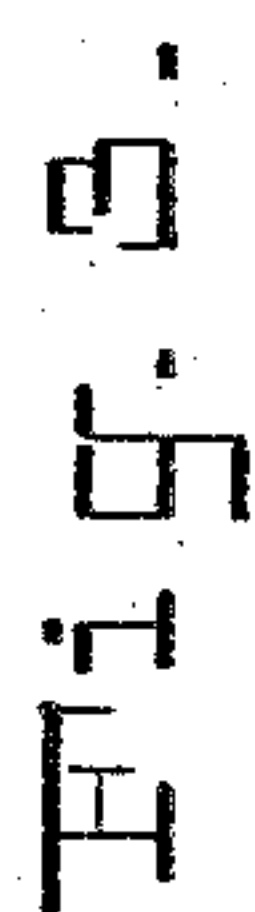
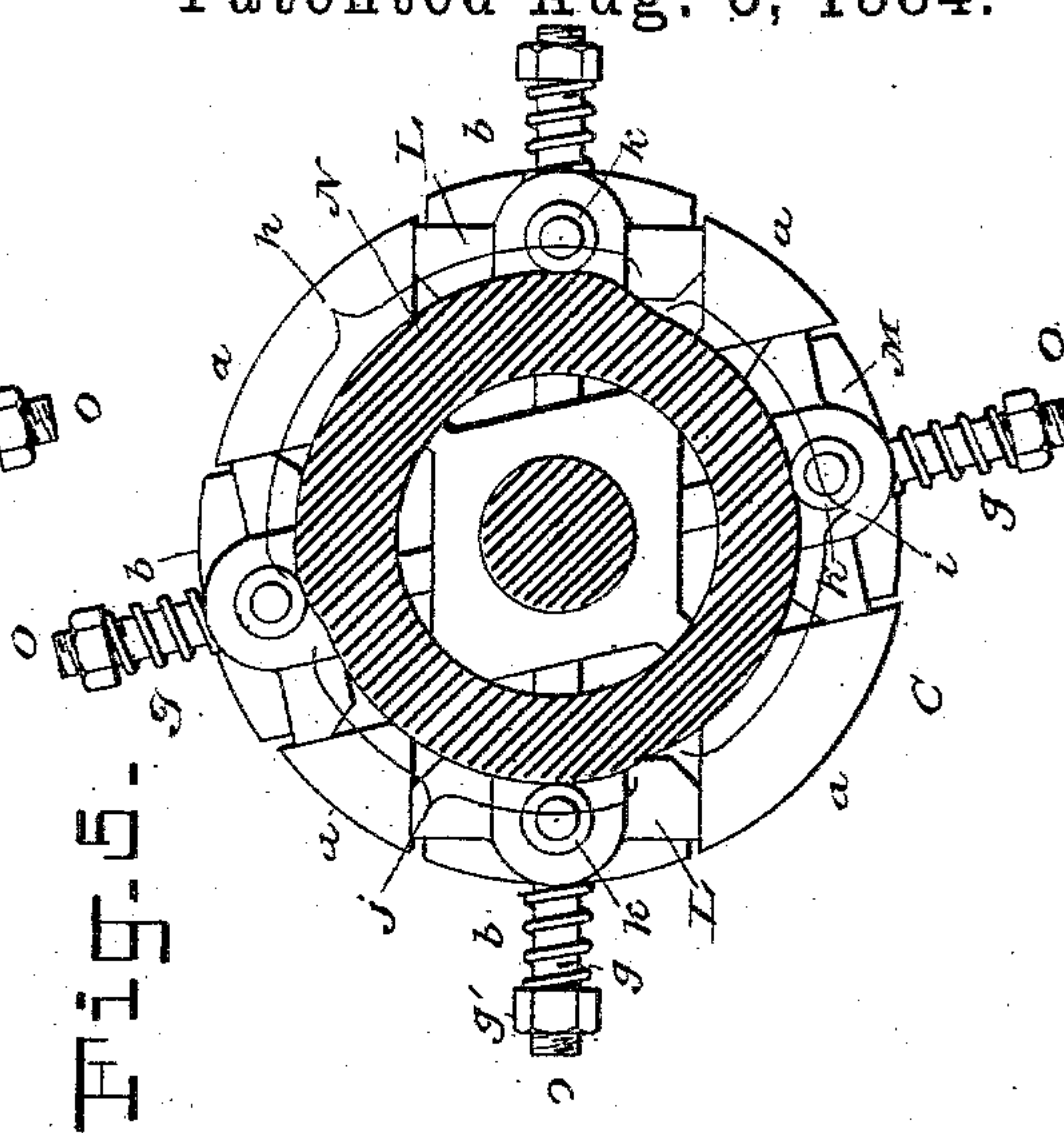
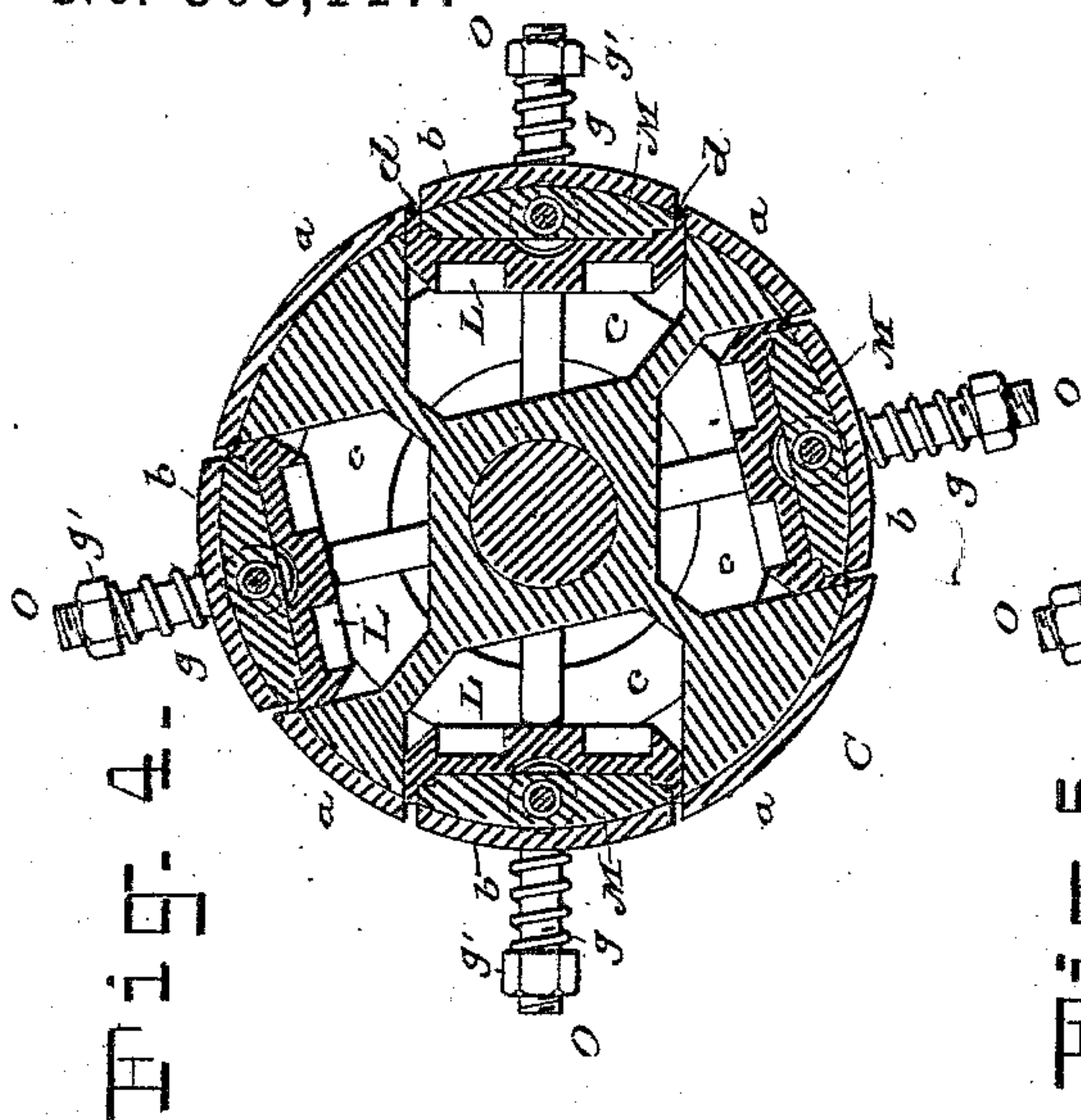
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4 Sheets—Sheet 3.

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(No Model.)

4 Sheets—Sheet 4.

H. CHATEL.

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Fig. 6.

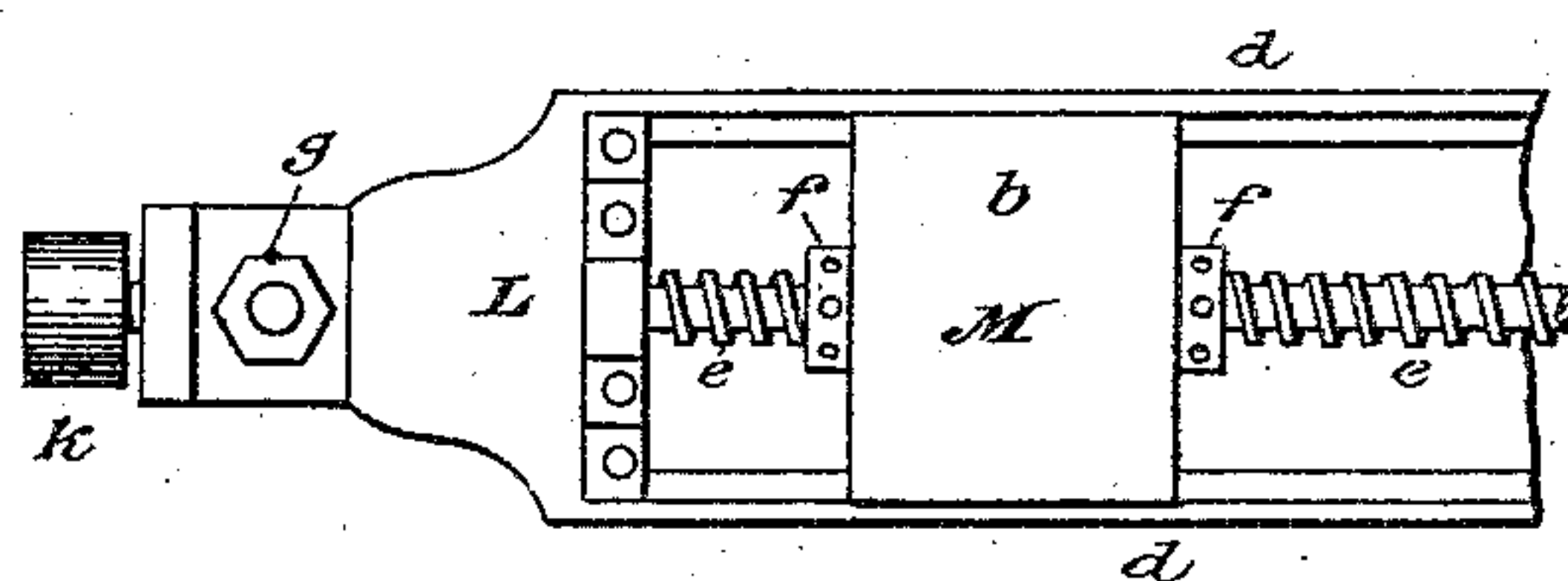
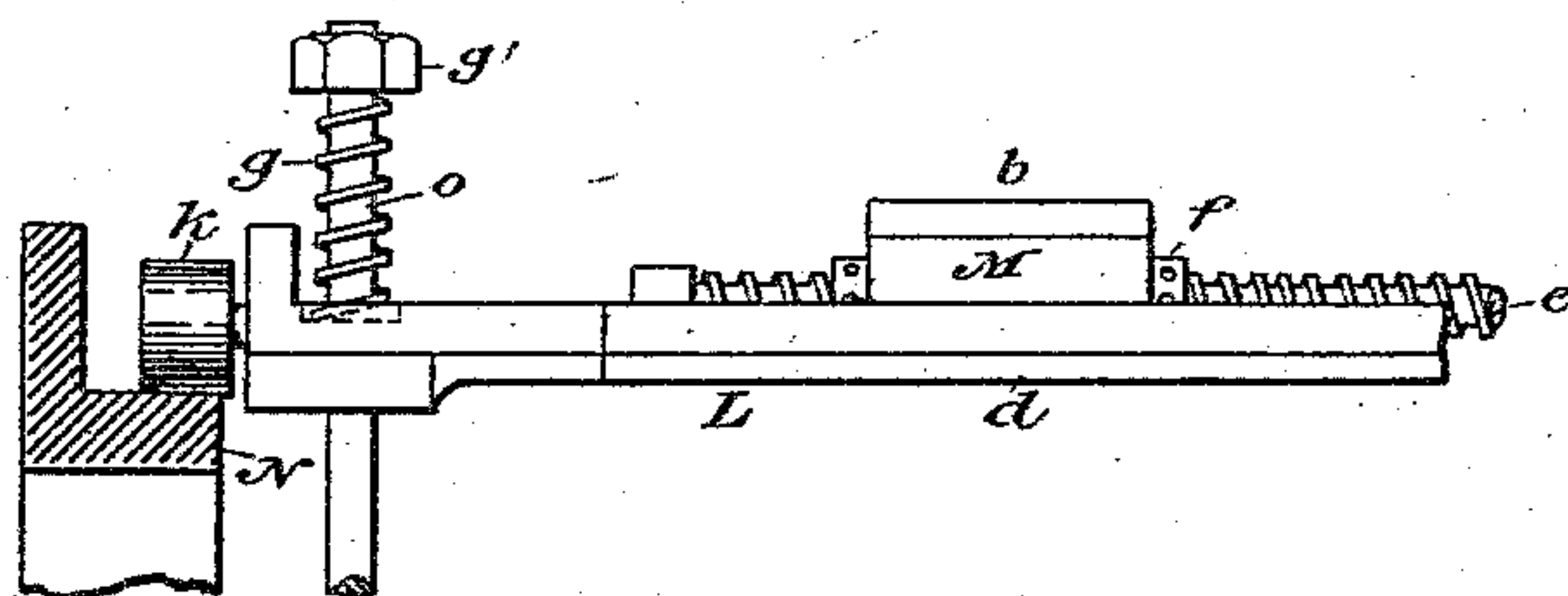


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRI CHATEL, OF PARIS, FRANCE, ASSIGNOR TO THE SOCIÉTÉ ANONYME D'IMPRESSIONS SIMULTANÉES EN PLUSIEURS COULEURS, OF SAME PLACE.

POLYCHROME-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 303,117, dated August 5, 1884.

Application filed April 5, 1884. (No model.) Patented in France February 23, 1882, No. 147,524, and June 27, 1882, No. 149,791.

To all whom it may concern:

Be it known that I, HENRI CHATEL, a citizen of the French Republic, residing in Paris, France, have invented certain new and useful Improvements in Polychrome-Printing Machines, of which the following is a specification.

The object of this invention is to print in two or more colors at the same impression.

In addition to the general printing-surface of the form, one or more movable printing-surfaces are applied, in connection with mechanism for causing them to sink below the general surface while the latter is being inked, to rise above the general surface in order to be inked with ink of a different color from that applied to the general surface, and finally to assume a level with the general surface during the printing or impressing of the paper. The movable portions of the printing-surface are preferably stereotype or electrotypes plates, and they are mounted in recesses in the printing-form in such manner as to be guided accurately in their up or down motion and firmly held to the proper level while the impression is being taken.

The invention is equally applicable to the flat forms used in reciprocating presses or to the cylindrical forms used in cylinder-presses, whether the latter have a continuous rotative or an oscillatory movement.

The accompanying drawings show my invention in its preferred form as applied to a rotary cylinder-press for printing both sides of the paper simultaneously from a continuous roll.

Figure 1 is a side elevation of my machine, the right-hand portion of which is in vertical section. Fig. 2 is a plan. Fig. 3 is a vertical section cut along the line 3 3 in Figs. 1 and 2. Fig. 4 is a transverse section of the printing or form cylinder. Fig. 5 is an end elevation of this cylinder, its shaft and annular cam being in section. Fig. 6 is a plan of one end of one of the movable plates or sections of the printing-cylinder, and Fig. 7 is a side elevation thereof.

This improved printing-machine consists, in general, of two distinct printing apparatus for printing the opposite sides of the paper, both being substantially alike in construction, and

driven in unison from the same source of power. The strip of paper from the roll enters at the bottom, and, after being printed on both sides and cut into sheets, it emerges at the top of the machine, whence it is carried away by the sheet-delivering mechanism.

In Fig. 1 the left-hand printing apparatus is shown in elevation and the right-hand apparatus is shown in section. As both are substantially identical, but one need be described.

Referring principally to Figs. 1 and 2, but incidentally also to the other figures, let A A designate the general frame of the machine, B B the two impression-cylinders, and C C the two printing or form cylinders. Each of the two printing apparatus consist of one impression-cylinder, B, one printing-cylinder, C, and two inking apparatus, one for one color—black, for instance—and the other for some other color. This is when two colors only are to be printed.

Referring to the right-hand portion of Fig. 1, the lower inking apparatus, lettered D, is for black ink, and the upper apparatus, lettered E, is for some colored ink. Each of these apparatus consists of an ink-reservoir, G, a doctor-roll, F, transfer-rolls H, conveying-rolls I I, distributing-cylinder J, and inking-rollers for inking the form, those of the lower system being lettered K K and those of the upper system being lettered K' K'. The printing-cylinder C is made with certain fixed printing-surfaces, *a a*, for printing, say, with black ink, and between these are certain other movable printing-surfaces, *b b*, for printing in colored ink. The cylinder is formed with one, two, three, or more cavities, *c c*, of which four are shown. These have parallel walls, and in them are arranged plates L L, which fit between the walls, and have raised ribs or flanges *d d* along their sides. Over each plate L extends a screw, *e*, and over this screw fit one or more printing blocks or plates, M, which are confined between the flanges *d d*, and are adjusted and clamped in place by nuts *f f* on the screw *e*. At each end of the plate L is a roller, *k*, pressed against the periphery of a ring-shaped cam, N, (shown best in Fig. 5,) by a spring, *g*, adjusted by a nut, *g'*, screwing on a rod, O. The rods O O are fixed in the cylinder at its ends, and pass through holes

in the end of the plates L L, thus guiding the latter. There are two cams, N—one at each end of the cylinder C—and both fixed to the frame A, as shown in Fig. 3. Each of these 5 cams has three distinct divisions, *h*, *i*, and *j*, of different radii, and as the rollers ride from one onto another with the rotation of the cylinder, the plates L L rise and fall relatively to the general surface of the cylinder. The 10 division *h* has the greatest radius, the division *i* the smallest, and the division *j* an intermediate radius. Each plate L, after each impression, encounters the division *h*, and is moved outward, so that its printing-surface *b* projects 15 beyond the surface *a* sufficiently to come in contact with the colored inking-rolls K' K', and receive its coating of colored ink, these rolls being sufficiently removed from the surface *a* of the cylinder to avoid their inking 20 that surface. Then, as the cylinder revolves, the plate L leaves the raised portion *h* of the cam, and its rollers run onto the portion *i* of smallest radius, whereupon the plate is drawn in until its printing-surface *b* is within the 25 printing-surface *a* of the cylinder; and as the latter reaches the inking-rolls K K, which are in contact with it, it receives its coating of black ink therefrom, and the sunken surface *b* avoids being coated therewith. Further, when the 30 rollers of the plate L reach the portion *j* of the cam, the plate is protruded until the printing-surfaces *a* and *b* are both on the same level, whereupon they are brought in contact with the paper and apply the impression thereto. 35 The paper comes from a roll, R, passes beneath the machine to the middle, where it passes between rollers Q Q, thence upward over a roller, Q', around the impression-cylinder B of the left-hand printing apparatus, 40 whereby it is printed on one side; thence around the impression-cylinder of the other printing apparatus, whereby its other side is printed, and thence to the delivery apparatus. Before being printed the second time, and 45 while on the second impression-cylinder, the web of paper is cut by a serrated blade, *l*, on a revolving shaft, *m*, and partially severed. As the web passes from the second impression-cylinder B it is carried between two 50 rollers, *n n*, and is thence conducted between two revolving tapes, *o o*, up an inclined frame, T, which is pivoted at T', and its free end is intermittently lifted and dropped by a lever, S, the lower arm of which is acted on 55 by a cam, R', on a shaft *q*. When elevated, as shown in Fig. 1, the end of this frame stands opposite the entrance *r'* between two tapes of the final delivery mechanism and when the frame is dropped its end stands opposite the lower entrance, *r''*, in this mechanism. 60 With the proportions shown there is one sheet printed to each revolution of the cylinders B and C, and the sheets are partially separated by the serrated blade *l*. When the 65 frame T first lifts, the advancing edge of a sheet emerges from between its rollers *p p*, and is drawn into the entrance *r'* and caught

between the tapes *s* and *s'*, which carry it around rollers *t* and *t'* and deliver it at the lower entrance, *r''*. When almost the entire 70 sheet has thus entered at *r'*, the frame T will drop, thus separating this sheet from the succeeding one, and entering the latter at *r''*. As the latter sheet enters at *r''* the advance edge of the former sheet emerges from between the 75 tapes *s* and *s'* and joins it, and the two sheets enter together between the tapes *s* and *u*, by which they are carried to the left, and when the entire second sheet has been thus fed in the frame T again lifts. When the two sheets 80 reach the proper position, a rack, U, standing above them, descends and presses them down, freeing them from the tapes *u u*, and delivering them either on a pile of sheets on a table or on an endless apron, as desired. The 85 rack U slides in vertical guides, and is operated by a lever, V, fulcrumed on a shaft, V', and the end of its lower arm bearing a roller, which is acted on by a cam, W, on a shaft, *w'*, in order to press down the rack, a spring, *w''*, 90 being provided to lift it. This particular sheet-delivery mechanism is well suited to my press, but forms no part of my present invention, and any other known and suitable delivering mechanism may be substituted for it. 95

I will now describe the gearing used to drive the several parts in proper time.

A' is the power-shaft, which bears a pinion, *a'*, which imparts motion to a gear, *b'*, which meshes with a gear, *c'*, fixed on the shaft of the 100 left-hand printing-cylinder C. The gear *b'* also meshes with a gear, *d'*, on the shaft of the left-hand distributing-cylinder D. The gear *c'* imparts motion to a gear, *e'*, fixed on the shaft of the left-hand cylinder B, and this in 105 turn drives a series of gears fixed, respectively, on the shaft of the right-hand cylinders B C J J, transfer-rolls H H, and doctors F F. The shaft *m* is driven by a gear, *m'*, meshing with the gear on the shaft of the cylinder B. 110

To the gear *b'* is fixed a gear, *f'*, (shown in dotted lines in Fig. 1,) which imparts motion to a gear, *g'*, and this in turn to a gear, *h'*, to which is fixed a bevel-gear, which drives an oblique shaft, Q'', which has fixed to its opposite 115 ends bevel-gears *i'*, which drive gears *j'*, fixed on the shafts of the respective doctor-rolls F F. On their opposite ends these shafts bear pinions *k'*, which mesh with gears *l'*, which rotate the rollers H H, as shown at the right 120 in Fig. 2. The cam-shafts *q* and *w'* are driven from the gear *c'* by a series of gears, *n'*, *p'*, *p''*, *r*, *x*, *x'*, *x''*, and *w''*, and *q'*. The gears are so proportioned that the cams R' and W make one revolution to two revolutions of the print- 125 ing-cylinders.

Any other suitable arrangement of gearing may be substituted for that shown.

Whenever it is desired to print in more than two colors, an additional cam, N, will be re- 130 quired for each additional color, and the rollers *k k* of the plates L L will be arranged in different planes, so as to roll upon the different cams, each rolling upon the cam corre-

sponding to the special color to be printed by the printing-surface *b*, carried by its plate *L*. In this case the printing-surfaces carried by one plate, *L*, may, for instance, print red, while those of another plate may print blue, and those of still another plate may print green, all at one operation.

I claim as my invention—

1. In a press for polychromatic printing, the combination, with the general printing-surface having an invariable level, and with its inking apparatus, of one or more printing-surfaces which are movable relatively to said surface to levels above and below the same, an inking apparatus for said movable surface adapted to ink the same when projected beyond the general surface, and with mechanism, substantially as described, for raising said movable printing-surface while it is being inked, for depressing said surface while the general printing-surface is being inked, and for bringing it to the same level with the general surface while the paper is being printed, substantially as set forth.

2. In a printing-press, the printing-cylinder *C*, having immovable printing-surfaces *a* and movable printing-surfaces *b*, the latter

mounted on a plate or plates, *L*, having rollers *k k*, adapted to roll on a fixed cam, *N*, with inking apparatus *D* for said surfaces *a*, and inking apparatus *E*, the rollers of which clear said surfaces and ink the surfaces *b* when the latter are protruded beyond the surfaces *a*, all combined and arranged to operate substantially as set forth.

3. The combination, with impression-cylinder *B* and inking apparatus *D* and *E*, of polychrome-printing cylinder *C*, having fixed printing-surfaces *a*, for printing in one color, and movable printing-surfaces *b*, for printing in another color, a plate or plates, *L*, bearing the surfaces *b*, rollers *k k* on said plates *L*, springs *g g*, pressing said plates toward the axis of the cylinder, and annular stationary cams *NN*, on which said rollers travel, having divisions *h, i*, and *j* of different radius, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRI CHATEL.

Witnesses:

JOSEPH CURET,
AMAND RITTER.