

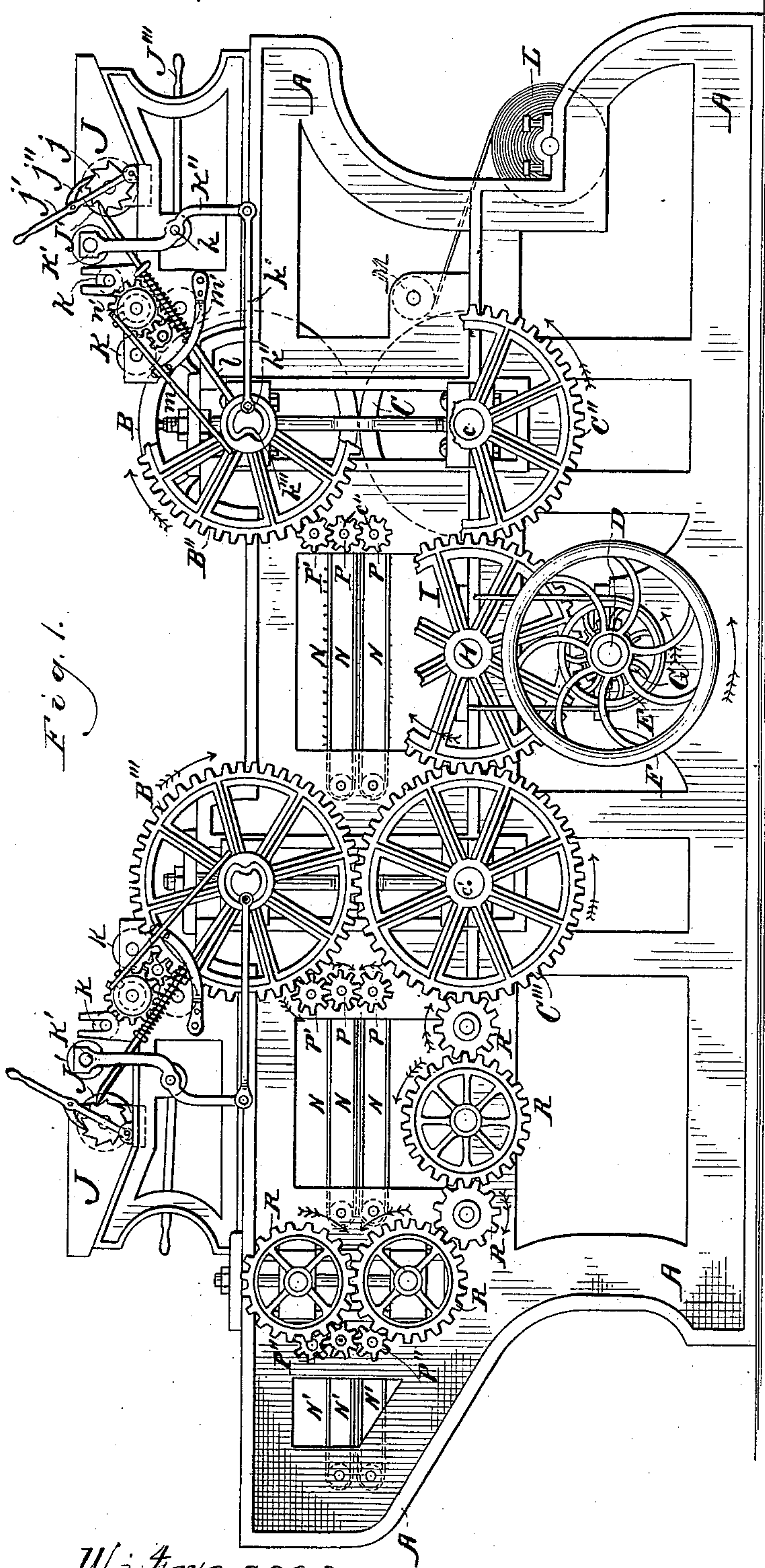
(No Model.)

3 Sheets—Sheet 1.

F. L. & S. G. GOSS.
CHROMATIC PRINTING MACHINE.

No. 333,214.

Patented Dec. 29, 1885.



Witnesses,

Ernst Frankfurter,
C. J. Kaufman, per *H. H. Warner*

Inventors,

Frederick L. Goss,
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(No Model.)

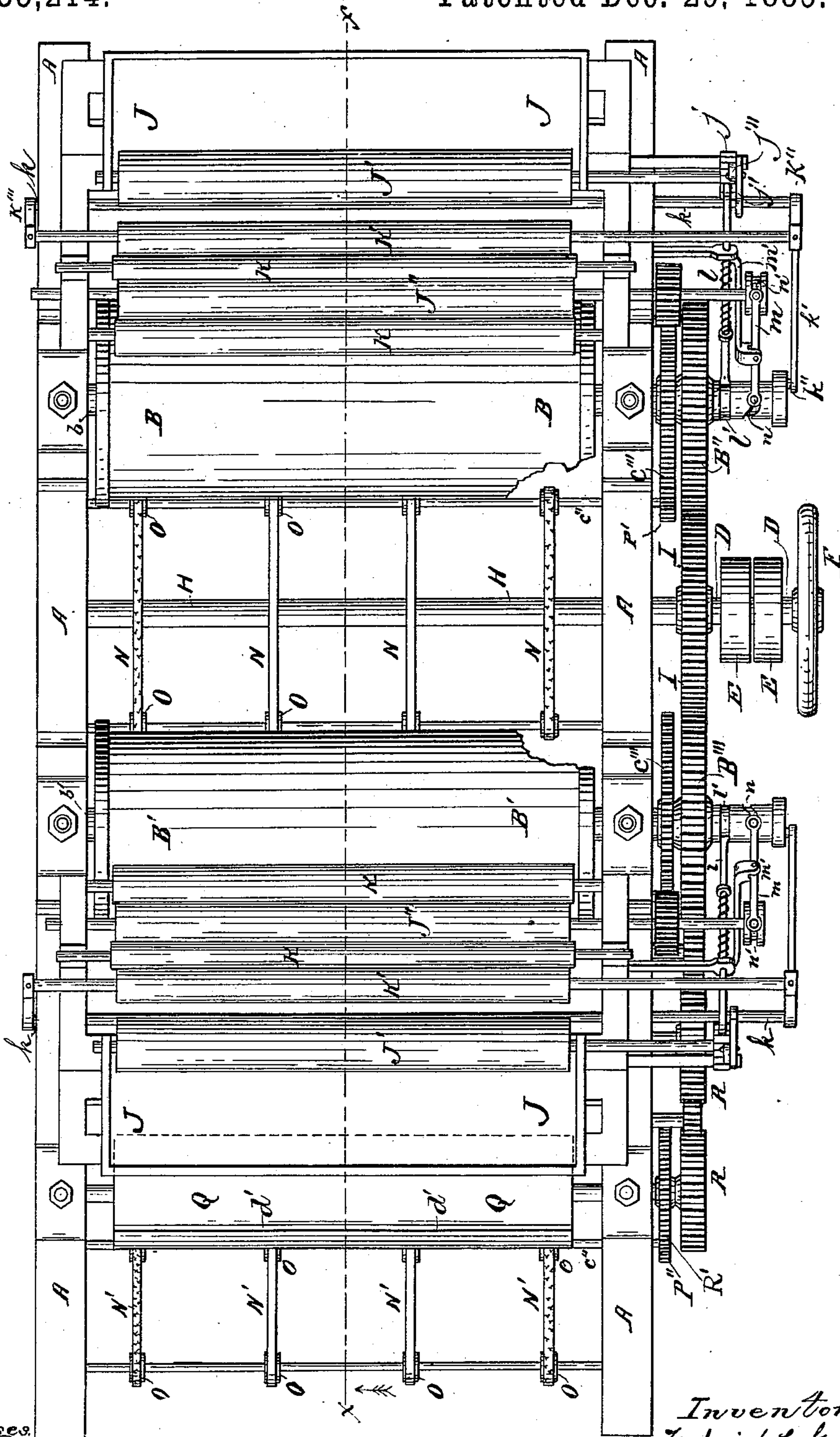
3 Sheets—Sheet 2.

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Fig. 2.



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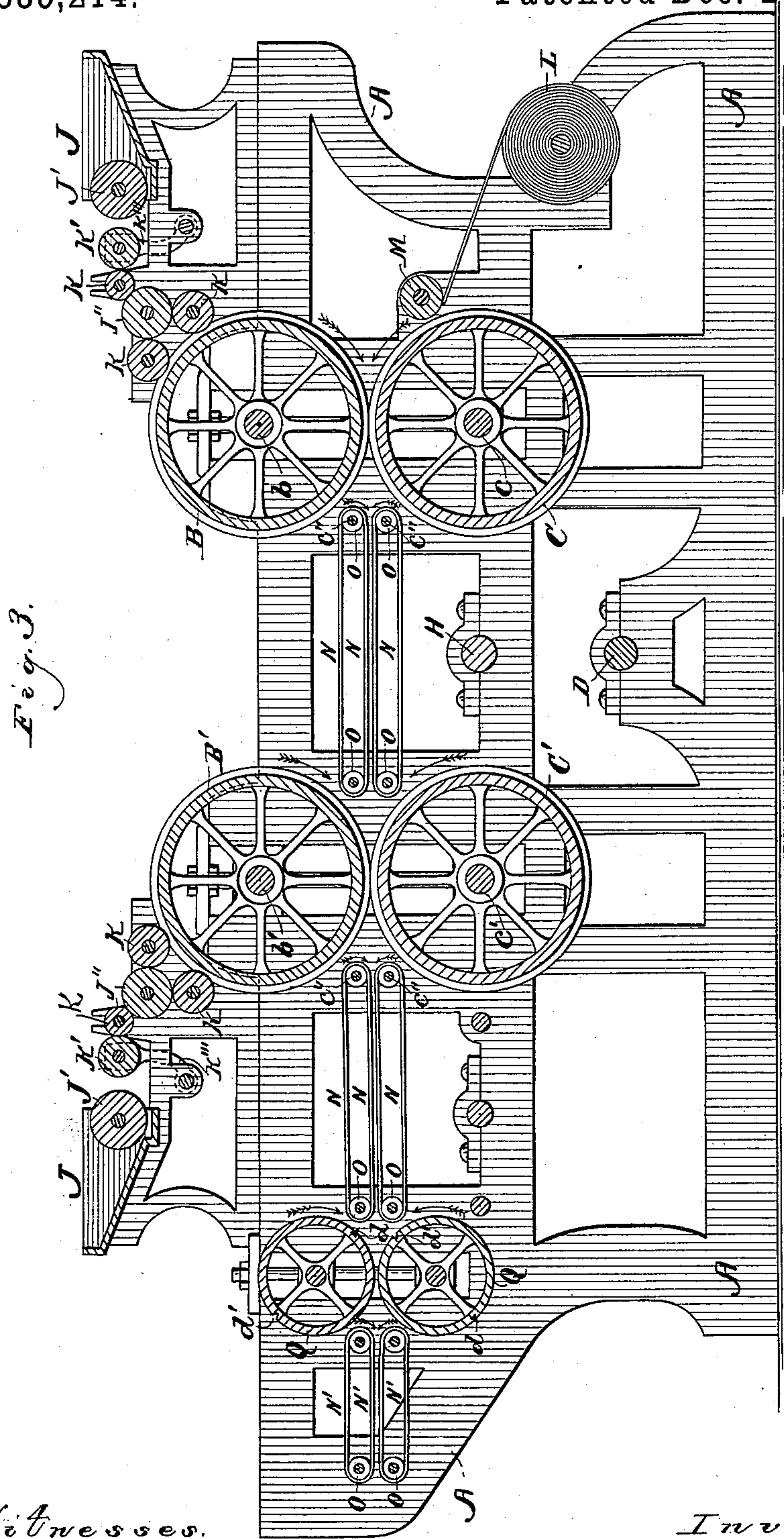
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3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

FREDERICK L. GOSS AND SAMUEL G. GOSS, OF ENGLEWOOD, ILLINOIS.

CHROMATIC-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 333,214, dated December 29, 1885.

Application filed January 5, 1883. Serial No. 81,031. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK L. GOSS and SAMUEL G. GOSS, citizens of the United States of America, and residing in Englewood, in the county of Cook and State of Illinois, have jointly invented certain new and useful Improvements in Chromatic-Printing Machines, of which the following, in connection with the accompanying drawings, is a specification.

Our invention relates particularly to the class of printing-presses to which the paper to receive the printed matter is fed automatically from a continuous web upon a reel, and provided on one surface during its passage through the press with colors impressed from one form upon the impression produced by a preceding form, proper register to that end of the cylinders carrying the forms being provided.

Machines for the foregoing purpose are known in the art of color-printing; but they entail in their use, owing to the manner of their construction, certain imperfections and disadvantages, which it is our object to overcome.

Our invention therefore consists in the particular construction of our machine, and in certain details of the same and combination of the parts forming it, all as hereinafter fully set forth and claimed.

In the drawings, Figure 1, Sheet 1, is a side elevation of a printing-press embodying our invention. Fig. 2, Sheet 2, is a top or plan view thereof. Fig. 3 is a section in the plane of the line *x x* of Fig. 2, viewed in the direction indicated by the arrow there shown.

The drawings show all the parts of a printing-press, including features known to be old, which, however, is considered necessary to render clear the operation of those which we believe to be new and constitute our invention as set forth in the claim, and the description necessarily refers to those parts and sets forth their co-operation.

A is the frame of the press, B and B' are type-cylinders, and C and C' are impression-cylinders.

In the drawings only two sets of cylinders are illustrated; but any number desired may be used, as hereinafter explained.

D is the driving-shaft, and E E are belt-pul-

leys thereon, one of which is a loose or idle pulley.

F is a fly-wheel.

G is a pinion on the shaft D.

H is a supplemental shaft, and I is an intermediate spur-wheel thereon.

B'' and B''' and C'' and C''' are spur-wheels on the shafts *b b'* and *c c'* of the cylinders B B' and C C', respectively. The cylinders B and B' should be mounted loosely on their shafts, or so as to permit them to be rotated or turned thereon to some extent, in order that they may be so set as to insure proper register, and means should also be employed for locking them temporarily in their proper positions when set; but as type-cylinders have heretofore been made adjustable on their shafts we have not shown any particular means for rendering them so, as any well-known or suitable means may be employed for that purpose, if deemed essential. The pinion G engages the wheel I, the wheel I engages the wheels C'' and C''', and the wheels C'' and C''' engage the wheels B'' and B''', respectively, and all of these wheels are thus rotated in the directions indicated by the arrows shown near each, respectively, in Fig. 1, and the type-cylinders and impression-cylinders are also thus rotated in the same direction as their respective drivers or wheels, and the latter are such in size or diameter as to be rotated with equal speed, or so that the type or form on the type-cylinders will be properly impressed by the impression-cylinders, and the cylinders B' and C', which may be termed the "second" set, move equally or in unison with the cylinders B and C, which may be termed the "first" set. The forms may be made up and applied to the type-cylinders in any well-known or suitable way.

J J are the ink-fountains, and J', J'', K, K', and K'', are the inking and transfer rollers. The transfer-rollers K' have spindles, which turn in arms K'' K''', rigidly attached to a shaft or rod, *k*, turning in suitable bearings forming a part of the frame of the press, and *k'* is a connecting arm or pitman one end of which is pivoted to the lower end of the arm K'', and the other end of which is provided with a thimble, *k''*, entering a cam-groove, *k'''*, in a block or plate rigidly attached to the shaft of the cylinder B. By this means the

transfer-roller K' is carried back and forth from the fountain-roller J' to the roller next succeeding the roller K' , and the ink, therefore, is not constantly taken from the ink-fountain, but only intermittently, or once during each rotation of the cylinders $B B'$. J'' is a hand-lever for moving the roller K' in the manner described when the thimble k'' is not in the groove k''' or not in connection with its driver. The axle of the roller J' has on one end a ratchet, j , and j' is a pivoted hand-lever provided with a pawl, j'' , engaging the said ratchet. By this means the roller J' may be rotated more or less by hand.

To rotate the roller J' intermittently and automatically, we employ a yielding pawl, l , one end of which rests on a cam, l' , and the other of which engages the ratchet j , the said pawl being supported in suitable bearings.

J'' is the vibrating roller. To vibrate this roller, we employ a lever, m , fulcrumed in a fixed arm, m' , the lower end of the lever being provided with a pin extending into a cam-groove, n , in the shaft of the type-cylinder B , and its upper end being likewise adapted to enter a cam-groove, n' , in the shaft of the roller J'' . The ink will thus be distributed, and when sectional ink-fountains are used with inks of different colors the colors will be blended.

The devices for inking the type-cylinders are to be duplicated, as shown, only one set of such devices being lettered, so as not to confuse the drawings. When the number of type-cylinders is increased, of course the number of inking devices will also be increased to correspond.

L is a web or roll of paper wound on a support having suitable bearings on the frame A , and M is a reel presser or holder for holding the web or strip of paper properly with relation to the impression-cylinder in the first set of cylinders.

$N N$ and N' are tapes, and $O O$ are tape wheels or pulleys. The outer or side tapes we make of endless metal bands, preferably of steel, and burred, as shown, or roughened to aid in more effectually carrying the paper through the press.

$P P$ are pinions on the shafts $c'' c''$ of the pulleys $O O$ which are nearest to the type-cylinders, and $P' P'$ are supplemental pinions engaging the drivers $c''' c'''$ next to the wheels B'' and B''' and the lower pinions, $P P$, respectively, as shown. The tapes $N N$ may be termed the "feeding-tapes," it being understood that the web of paper after passing between the type-cylinder and impression-cylinder constituting the first set of cylinders, and being there impressed or printed upon, passes to and between the first set of tapes, and is by them fed or carried to the second set of cylinders, where a second impression or imprint is made upon the paper, which then in like manner passes to and between the second set of tapes, and is by them fed or carried toward the rear end of the press.

It will be perceived that the function of the supplemental pinions $P' P'$ is to cause the tapes to move in such a direction as to carry the paper from the front of the press rearward, the tapes being actuated through the pinions $P P$.

When knives or cutters are employed for severing the web of paper into sheets, as hereinafter described, the rear set of tapes may be termed the "delivery-tapes;" but if knives or cutters are not used there the tapes $N' N'$ may be said to be the "delivery-tapes," as will hereinafter more fully appear.

In the drawings we have not shown the paper as extending to the tapes, as it is not necessary, and would, if shown as passing through the press, cover parts which are better represented.

$Q Q$ are rotary knives or cutters, and $R R$ is a series of wheels or gearing for rotating the said knives. The first wheel or gear in this series is engaged and driven by the wheel C'' , as shown.

$P'' P''$ are pinions on the shafts of the forward pairs or sets of pulleys for moving the tapes $N' N'$, and these pinions are driven by the engagement of the uppermost one with a wheel, R' , on the shaft of the uppermost cutter, Q , as shown in Fig. 2, their direction of rotation being such as to deliver the sheets out at the back of the press, or to flies, which may be employed as usual to lay the sheets upon a receiving-table. In the example shown the cutter-cylinders are much smaller in diameter than the type-cylinders, and each cutter-cylinder carries a cutter, $d d$, and is grooved, as shown, at $d' d'$, to receive the cutter on its fellow, so that the paper will be cut twice during each rotation of the cutter-cylinders. By this means a number of forms or duplicate forms may be locked on each type-cylinder, and each printed part will be severed by the cutters and delivered as if fed in separate sheets.

It is intended in the proportions of cutter-cylinders to type-cylinders shown to adapt the latter to receive four forms; but this number may be varied by employing parts having different proportions, and also by removing one of the cutter blades or knives. The cutters may be adapted to either completely sever the paper or only to perforate it, and in either case we deem it best to run the tapes $N' N'$ a little faster than the other tapes, or so as to pull the sheets away from the knives as soon as the paper is severed by them.

The operation of this press is as follows: For example, to produce one style of color-work, we secure in position the forms, which may be tint-blocks, engraved blocks, or type, either stereotyped or electrotyped, and formed to fit upon the cylinders $B B'$, the forms for producing the first coloring or impression printed on the paper being locked on the cylinder B , and the others upon the cylinder B' . The ink-fountains are properly prepared by being furnished with ink according to the nature of the work to be done, and

the inking-rollers are supplied with ink fed from the fountains. The paper is carried underneath the reel or presser M and arranged between the cylinders B and C. It is also carried between the tapes N N, also between the cutter-cylinders and tapes N' N', when cutters are employed. Under ordinary circumstances, and when ordinarily thick or stiff paper is used, the paper will follow this course after the press is started, being drawn along by the cylinders and tapes, and once started will continue to be properly fed. By this means printed sheets each having thereon one or more colors, and having matter printed on the tints or colors, and all the coloring and matter required to produce a finished or completed job, will be produced by passing only once through the press, it being understood that the number of type-cylinders, impression-cylinders, and inking apparatus, as well as the feeding-tapes, may be greater than shown. It is evident, however, that if only the number shown be employed the capacity for work in more than one color is very great, for the sheets may be produced rapidly. For example, the forms on the first type-cylinder may represent one of the steps in the work, and those on the second the second step, and so on, according to the number of steps to be taken. The forms may also be duplicated.

The cutters, when used, as will be understood, will either sever the paper or puncture it so that it may be severed or torn across by the tapes N' N'.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is--

The combination, in a printing-press, of form-cylinders and impression-cylinders having equal diameters, and supported to revolve in suitable bearings in the frame of the press, one vertically above the other in pairs horizontally in line with each other, sets of carrying-bands supported between each two vertical pairs of cylinders independently of the said cylinders, and having members of each set formed of endless metal bands burred on their outer surfaces, gearing, substantially as described, operating to actuate the cylinders synchronously, and intermediate connecting-gear, substantially as described, between the cylinders and bands and cylinders and inking mechanism, the whole being constructed and arranged to operate in the manner set forth.

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