

(No Model.)

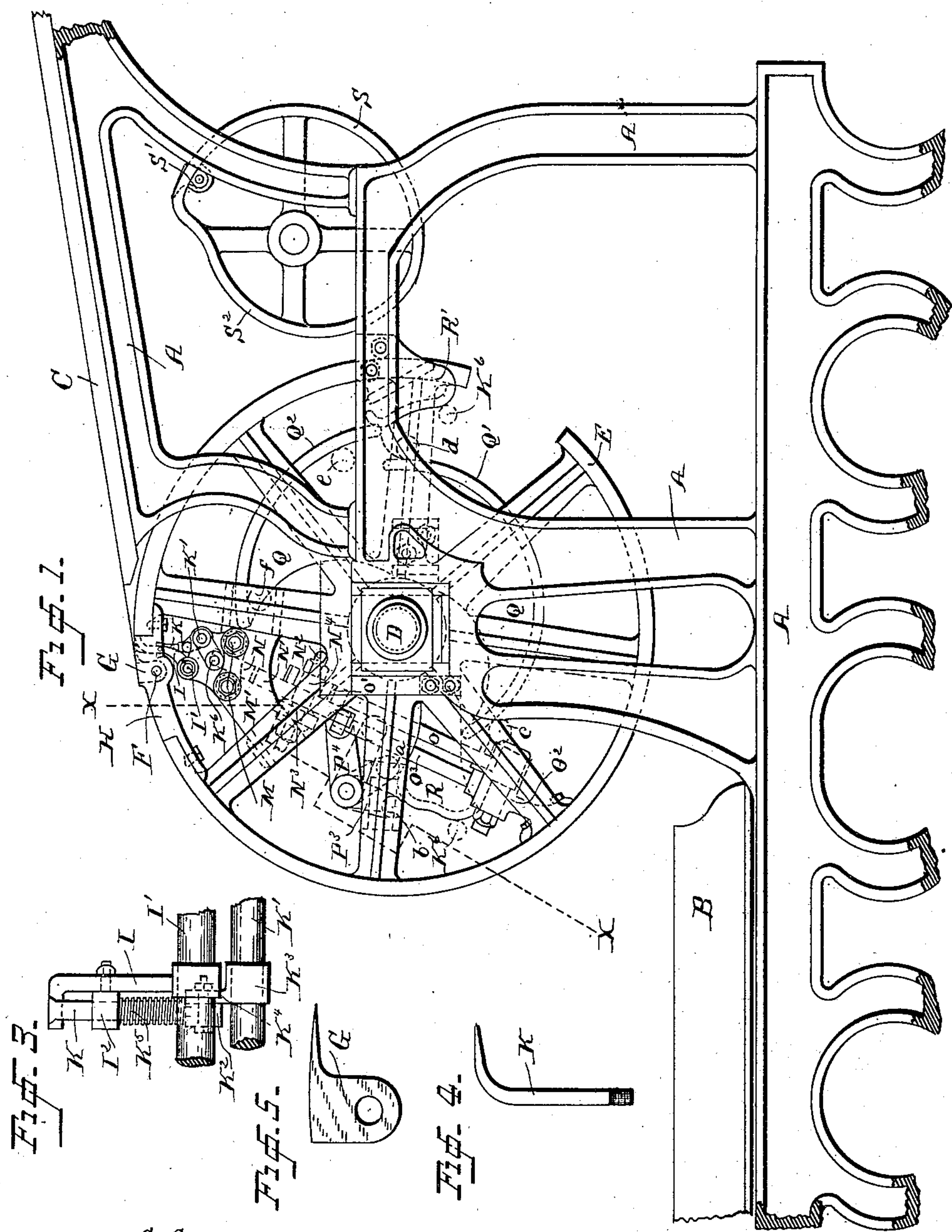
2 Sheets—Sheet 1.

W. WHEELER, Jr.

CHROMATIC PRINTING MACHINE.

No. 333,493.

Patented Dec. 29, 1885.



Witnesses
Wm. A. Jones,
J. H. Hooper

Inventor
William Wheeler Jr.
By J. H. Hooper
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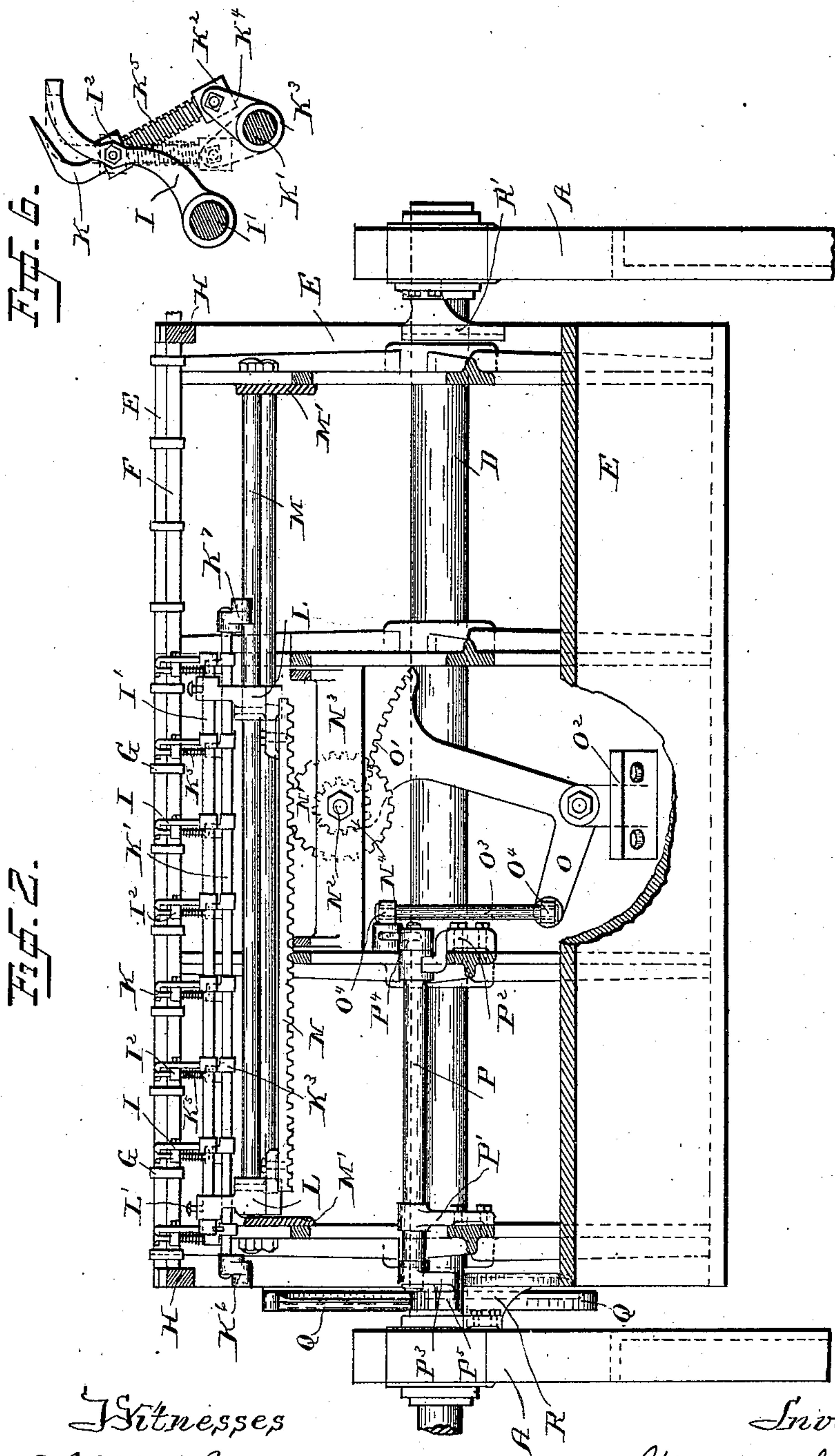


Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM WHEELER, JR., OF STONINGTON, CONNECTICUT.

CHROMATIC-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 333,493, dated December 29, 1885.

Application filed February 23, 1885. Serial No. 157,315. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WHEELER, Jr., a citizen of the United States, residing at Stonington, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Chromatic-Printing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to printing-presses, and has for its object to provide an attachment for cylinder-presses whereby two or more colors may be printed on the same sheet without removal from the cylinder and without stoppage of the machine, the attachment being applicable to rotating and stop cylinder presses of any make.

With these ends in view I have devised the simple and novel construction which I have illustrated as applied to an ordinary drum-cylinder press.

In the accompanying drawings, which form part of this specification, Figure 1 is a side elevation of a drum-cylinder press with my color attachment applied. Fig. 2 is a section on the line *xx* in Fig. 1, showing the operative parts in elevation; Fig. 3, a detail of an auxiliary gripper complete; Fig. 4, a side view of an auxiliary gripper-finger detached. Fig. 5 is a side view of one of the main grippers, and Fig. 6 a side view of one of the auxiliary grippers complete, the opened position being shown in full lines and the closed position in dotted lines.

Similar letters indicate like parts in all the figures.

A indicates the frame-work; B, the bed; C, the feeder's table; D, the shaft; E, the cylinder; F, the main gripper-rod; and G, the usual grippers, which in the present instance I have termed "main grippers." These parts are all of ordinary construction.

As indicated in Figs. 1 and 2, the main gripper-rod and the grippers themselves lie in an open space, which extends across the periphery of the cylinder, the rod being journaled in arc-shaped pieces H, which are bolted to the cylinder.

The mechanism by which the main grippers are actuated forms no portion of my invention

and has been omitted in order not to confuse the drawings.

The auxiliary grippers consist, essentially, of rests I and gripper-fingers K, which are carried, respectively, by rods I' and K'. The rests are rigidly secured to rods I' in any suitable manner—as, for example, by being tapped on, or by set-screws. The shape of the rests is not of the essence of my invention. The preferable form, however, is shown in side elevation in Figs. 1 and 6 and in front elevation in Fig. 3.

I² is a sleeve, which is secured to the rest in such a manner as to be free to turn on the securing-bolt. The gripper-finger passes freely through this sleeve, and is screwed into or otherwise secured to a block, K², which is loosely bolted to a lug, K⁴, forming part of a collar, K³, which in turn is tapped or otherwise rigidly secured to rod K', the essential feature being a joint between rod K' and the gripper-finger, so that the latter will be pressed against or lifted away from the rest, depending on the direction in which rod K' is turned.

K⁵ is a spring surrounding the gripper-finger which bears against sleeve I² and block K² and acts to hold the gripper-finger to both its open and its closed positions, the latter being when it is pressed down upon the rest.

Rods I' and K' are supported in carriers L, rod I' being rigidly secured therein in any suitable manner—for example, by set-screws L', as shown—and rod K' being free to turn therein. The necessary movements to open and close these grippers are imparted through cranks K⁶ K⁷, located, respectively, at the left and right ends of rod K', (see Fig. 2,) as will be more fully explained.

Carriers L are supported by and are free to move backward and forward upon two guide rods, M, which are supported in plates M' at opposite ends of the cylinder. The plates are secured in position at the ends of the cylinder in any suitable manner, preferably by bolting to the arms of the cylinder.

The carriers may be actuated forward and backward in any suitable manner.

In the drawings I have shown a rack, N, bolted to the carriers. This rack is engaged by a gear, N', upon shaft N², journaled in plate N³, which is bolted or otherwise secured to the arms of the cylinder. Back of the gear,

en in Fig. 2, is a pinion, N^4 , which is engaged by a segment-gear, O' , upon a bell-crank lever, O , pivoted to a bracket, O^2 , which is bolted to the inside of the cylinder, as clearly shown in Fig. 1.

P is a rock-shaft journaled in brackets P' , bolted to the arms of the cylinder.

P^3 is a crank at the outer end of shaft P , and P^4 is a crank at its inner end.

O^3 is a rod, which is loosely held in eyes O^4 , and connects the end of the bell-crank lever with the outer end of the crank, the eyes also being loosely journaled, respectively, in the end of the bell-crank lever and outer end of the crank, thus leaving the pin free to move in the eyes and the eyes free to move in their bearings.

Movement is imparted to the rock-shaft by means of the engagement of roller P^5 , at the inner end of crank P^3 , with a cam, Q , which is bolted to the frame-work of the press outside of the cylinder and wholly independently thereof.

It will be observed in Fig. 1 that cam Q is provided with an arc-shaped flange, Q' , which, however, is eccentric to the cylinder-shaft, the general direction of the curve being outward, which acts while the crank-roller P^5 is passing over it to carry said roller from the position relatively to the cylinder, which is indicated by a , to the position indicated by b , these being the extremes of movement of the crank-roller P^5 .

It will be apparent that the vibrations of crank P^3 will be transmitted by the rock-shaft crank P^4 and through rod O^3 to the bell-crank lever, whose segment-gear, meshing with pinion, actuates the gear upon the same shaft, which in turn engages the rack bolted to the carriers, which are moved outward to the end of the cylinder.

As stated above, the relative positions of the crank-roller P^5 while the forward movement of the carriers is taking place is indicated by b ; but the actual positions of said roller at the beginning and the end of this movement are indicated, respectively, by c and d .

There is another arc-shaped flange upon cam Q , which is also eccentric to the shaft, but the direction of whose curve is inward, and which acts to return the crank-roller from the relative position indicated by b to that indicated by a .

The actual positions of the roller during its backward movement are indicated by f , it being of course understood that cam Q is stationary, while the cylinder and the parts secured thereto are in continual rotation. It will be seen that while the relative movement of the crank roller from a to b (actual movement from c to d) is taking place the roller is riding upon the outer side of flange Q' , the outward curve of which is just sufficient to impart a movement to the rock-shaft, which is transmitted through the intermediate mechanism, will move the segment-gear O' toward the pinion in Fig. 2, thus rotating the pinion and its engagement with the rack, which moves

the carriers, and with them the auxiliary grippers, to the right of the cylinder. When the crank-roller has reached the end of flange Q' , it passes between the ends of the two flanges and rides upon the inner side of flange Q^2 , the inward curve of which is just sufficient to impart a movement to the rock-shaft, which is transmitted through the intermediate mechanism to return the segment-gear, carriers, auxiliary grippers, &c., to the position shown in Fig. 2. While the crank-roller is passing from the actual position indicated by d to that indicated by e , its relative position is stationary; but while passing from the point indicated by e to that indicated by f , it relatively changes from the position indicated by b to the original position, indicated by a , at which time the parts will have all returned to the positions indicated in Figs. 1 and 2 of the drawings.

I have shown the cam as provided with flanges, one of which is curved outward and the other inward, as I deem that the preferable construction. It should be understood, however, that the special style of cam is not of the essence of my invention, as a cam provided with a groove for the roller to travel in would accomplish exactly the same result.

The opening and closing movements are imparted to the auxiliary grippers as follows: K^6 K^7 are cranks located, respectively, at the left and right ends of the gripper-finger rod K^5 . R and R' are cams bolted to the frame-work of the machine, respectively, at the left and right ends thereof. These cams are located at or near the journal-boxes of the cylinder-shaft, and are external to the arms of the cylinder, although in fact within the cylinder, as clearly shown in Fig. 2. Starting with the parts in the position shown before the forward movement of the carriers with the auxiliary grippers begins, crank K^6 comes in contact with cam R , which throws the auxiliary grippers to their opened position, as shown in full lines in Fig. 6, in which position they are maintained by the action of spring K^5 until just before the return movement begins, at which instant crank K^7 comes in contact with cam R' , which acts to close the grippers, in which position they are maintained by the spring until the return movement is finished, and they are again opened by cam R . It will be seen that spring K^5 has a double action—that is, it swings past a center, and when upon one side of the center acts to hold the gripper open, and when upon the other side to hold it closed. S is the reel for removing the printed sheets, being provided with grippers S' , similar to the main grippers upon the cylinder. These grippers are actuated in any suitable manner, and form no part of my present invention. The reel is so timed as to make two revolutions to each revolution of the cylinder, and in order not to interfere with the transfer of the sheets one side is made less full than the other, as indicated at S^2 .

As stated above, the object of my invention

is to provide an attachment applicable to ordinary presses which is adapted to print in two or more colors—in other words, to produce chromatic printing by transferring the sheet upon the cylinder.

I have illustrated my invention as applied to a press adapted to print in three colors. The cylinder is made wide enough to accommodate three sheets side by side. The main grippers extend the full length of the cylinder, as usual, but the auxiliary grippers only extend two thirds of the length of the cylinder. The reel in a press for three colors only requires to be one-third the length of the cylinder, and is of course at the farther side, as seen in Fig. 1. The form upon the bed is divided into as many parts as there are colors to be printed. The nearest part, when viewed as in Fig. 1, being printed first and so on, the sheet being transferred to the second part, and then to the third, after which it is removed by the reel.

The operation is as follows: The sheets are fed in at the end of the table toward the front in Fig. 1. At the edge of the table they are seized by the main grippers and held while being carried around by the cylinders, the bed moving forward and the impression of the first color being made in the usual manner. Turning now to Fig. 2, while the first impression is being made the auxiliary grippers move from the position in which they are shown over to the right of the machine, and are also thrown to their open position, as shown in Fig. 6. It is of course understood that the main grippers open and close with each revolution of the cylinder. The mechanism for operating them has not been shown, as it is not of my invention. The movement of the auxiliary grippers is so timed that they close upon the sheet before the main grippers open, so that when released by the main grippers the sheet is firmly held by the auxiliary grippers. The return movement of the auxiliary grippers now takes place which carries the first sheet over to the middle of the cylinder, the transfer being made however without the sheet leaving the cylinder, but simply passing over its face toward the back, as seen in Fig. 1. As soon as the auxiliary gripper with the first sheet have reached the position shown in Fig. 2, the second sheet is fed in, and the main grippers close upon both the first and second sheets. At the next instant the auxiliary grippers are opened and again commence their forward movement. While the second revolution of the cylinder is taking place the first color is printed upon the second sheet, and the second color upon the first sheet. The auxiliary grippers now close upon both the first and second sheets, the main grippers open, and the auxiliary grippers, carrying both the first and second sheets, return to their normal position, as in Fig. 1. The third sheet is now fed in, and the main grippers close upon all three sheets. The third revolution of the cylinder prints the third color upon the first sheet, the second

color upon the second sheet, and the first color upon the third sheet, the auxiliary grippers acting as before. After the third revolution the reel removes the first sheet, the second sheet receives the third color, the third sheet receives the second color, and a fourth sheet is fed in and receives its first color. The operation would be the same were four, five, or any other number of colors to be printed upon the sheets, a fresh sheet would be fed in at each revolution of the cylinder, each sheet upon the cylinder would be transferred the proper distance forward, and the last sheet after receiving the final color would be removed by the reel, as already fully described. The length of cylinder required depends of course upon the width of the sheets to be printed. Owing to the fact that the sheets do not leave the cylinder when the transfers are made, and that the auxiliary grippers close upon the sheets before the main grippers release their hold, it will be seen that the possibility of the sheets failing to register is wholly done away with. They register as a matter of course, and perfect accuracy is certain unless the parts are thrown out of adjustment.

It should be understood that I do not limit myself to the exact construction shown and described, as it is obvious that the details may be varied within reasonable limits without departing from the spirit of my invention.

I claim—

1. The combination, with the cylinder and ordinary grippers of a printing-press, of auxiliary grippers, carriers therefor, mechanism—for example, a cam, rock-shaft, bell-crank lever, and gearing—for moving the carriers backward and forward at predetermined times, and mechanism—for example, cranks and cams—for opening and closing the auxiliary grippers at predetermined times, substantially as and for the purpose set forth.

2. The combination, with the cylinder and grippers of a printing-press, of auxiliary grippers, carriers therefor, and mechanism—for example a cam, rock-shaft, bell-crank lever, and gearing—for moving the carriers backward and forward at predetermined times.

3. In a printing-press, auxiliary grippers consisting of rests secured to a rod which is rigidly secured to carriers, and gripper-fingers secured to a rod which is free to turn in the carriers, in combination with mechanism—as cranks at the ends of the rod, and stationary cams engaged by the cranks—whereby the grippers are caused to open and close at predetermined times.

4. Rests I, secured to rigid rod I', in combination with fingers K, held in sleeves I², and pivoted at their lower ends to lugs projecting from a loose shaft, and springs K⁵ upon the finger-shanks, whereby when thrown past the center the fingers are held to either their open or closed positions.

5. Rod I', having rests I, with pivoted sleeves I², secured thereto, in combination with

rod K', having sleeves with projecting lugs, and gripper-fingers K, held in said sleeves and pivoted to the sliding blocks.

6. The auxiliary grippers, carriers, and rack, in combination with fixed cam Q, and intermediate mechanism—as a rock-shaft having a crank at each end, connecting-rod, bell-crank lever, and gearing—whereby the carriers with the auxiliary grippers are caused to move backward and forward during each revolution of the cylinder.

7. Cam Q, having outwardly-curved flange Q' and inwardly-curved flange Q², rock-shaft P, having a crank which engages the cam, and at its opposite end a crank with an eye for one end of the connecting-rod, in combination with a bell-crank lever having at one end an eye for the other end of the connecting-rod, and at its other end a segment-gear which imparts through intermediate gearing backward and forward movement to the carriers and auxiliary grippers.

8. The cylinder-plates M', and rods M, secured therein, in combination with the auxiliary grippers, carriers therefor, which move on the rods, and mechanism—as the rock-shaft having cranks, bell-crank lever, and gearing, and a stationary cam—whereby the carriers

are moved backward and forward at predetermined times.

9. The cylinder, and rods M, secured thereto, in combination with the carriers supported on said rods, the gripper-rods I' and K', supported in the carriers, and stationary cams at opposite ends of the cylinder, which are engaged by cranks upon rod K' to open and close the grippers at predetermined times.

10. In a printing-press, the combination, with the cylinder and the main grippers, of auxiliary grippers, which seize the sheet before it is released by the main grippers, and when it is released carry it forward a predetermined distance before the main grippers again close upon it.

11. In a printing-press, the combination, with the cylinder, the main grippers, and the auxiliary grippers, of a reel for removing the sheets, which is provided with a reduced portion, S², substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM WHEELER, JR.

Witnesses:

JOSEPH S. G. COBB,
JOSEPH H. MONROE.