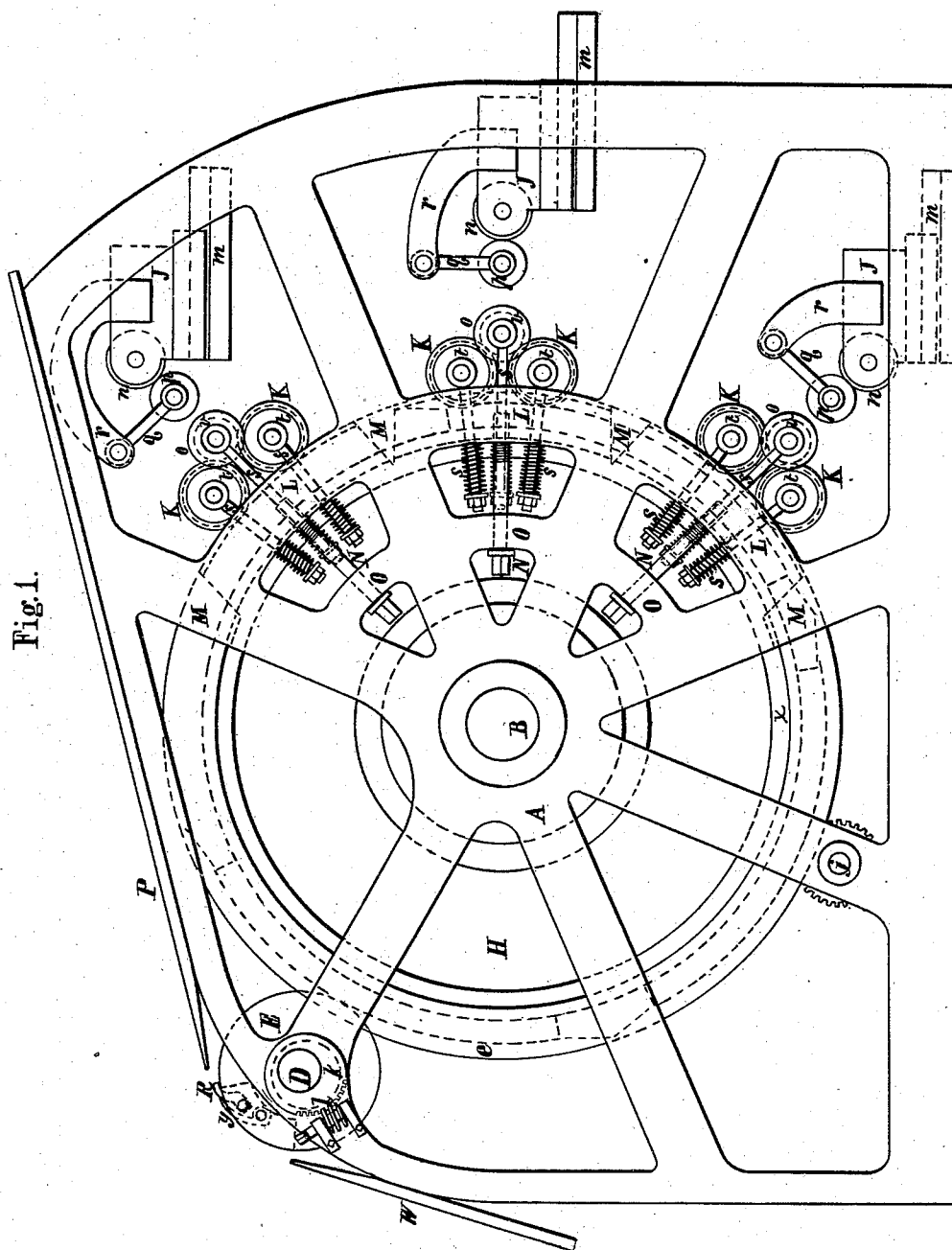


(No Model.)

3 Sheets—Sheet 1.

T. B. DOOLEY.
Chromatic Printing Machine.
No. 235,606. Patented Dec. 14, 1880.

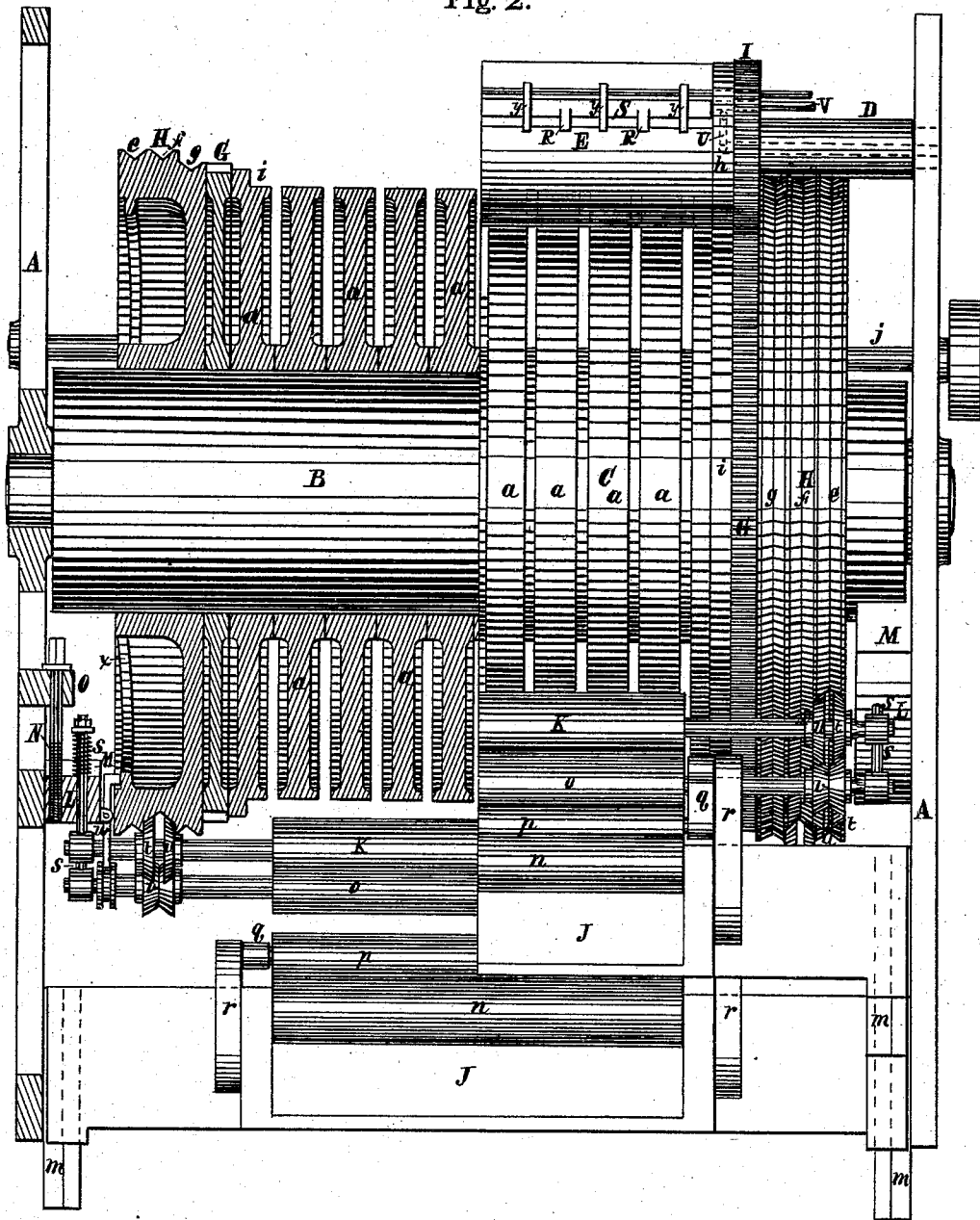


Attest;
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Inventor;
Thomas B. Dooley,
per Edw. Sumner, Atty.

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Fig. 2.



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No. 235,606.

Patented Dec. 14, 1880.

Fig. 3.

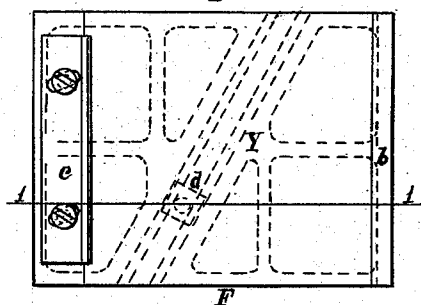


Fig. 4.

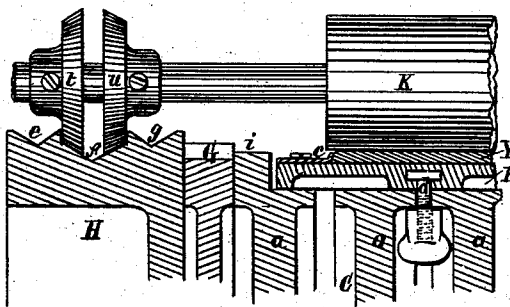


Fig. 5.

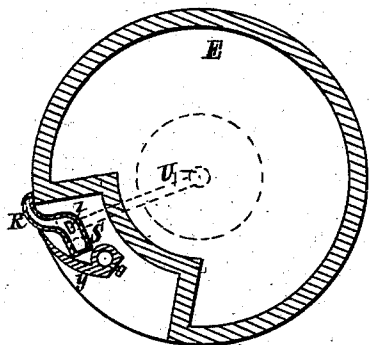


Fig. 6.

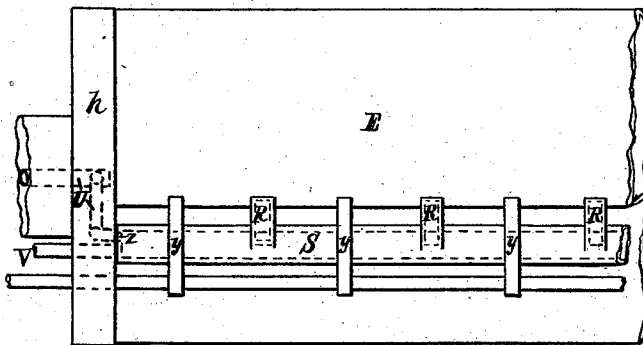
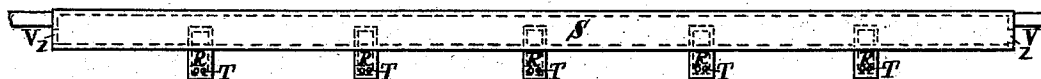


Fig. 7.



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UNITED STATES PATENT OFFICE.

THOMAS B. DOOLEY, OF CHELSEA, ASSIGNOR TO WILLIAM H. FORBES, OF BOSTON, MASSACHUSETTS.

CHROMATIC-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 235,606, dated December 14, 1880.

Application filed June 14, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS B. DOOLEY, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Printing-Presses, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a printing-press in which the impressions are given by the employment of two cylinders, and which is especially adapted for chromatic printing.

My invention consists in a press having two cylinders so constructed and combined that one (the larger cylinder) may bear several different printing-surfaces and also have a space, in addition to that occupied by or adapted to said printing-surfaces, equal to the space for one of said printing-surfaces, and the other (the smaller cylinder) adapted to bear the sheet to be printed, the two cylinders being so geared together that both will be in constant revolution while the press is in operation, and that while the larger cylinder makes one revolution the smaller cylinder will make as many revolutions as there are spaces for said printing-surfaces, together with the space containing no printing-surface, on the larger cylinder, the purpose being to have one and the same sheet receive an impression from each of the said printing-surfaces, and also that the sheet may be discharged from and another sheet taken on the smaller cylinder, while the space on the larger cylinder having no printing-surface is passing the smaller cylinder.

My invention also consists in several sets of inking-rollers, one set for each of said printing-surfaces, in combination with said larger cylinder, each set being so located and operated as to ink one of the printing-surfaces and be raised from the other printing-surfaces, pulleys on the shafts of the inking-rollers being beveled or V-shaped to fit ways or guides on the larger cylinder, and adjustable, so as to regulate the pressure of the rollers on the printing-surfaces.

My invention further consists in nippers or fingers pivoted to the smaller cylinder in suit-

able position to be pressed onto the edge of a sheet, these nippers or fingers being hollow, and having suitably-disposed openings where they come in contact with the sheet, so that a partial vacuum may be formed therein, and thus when the nippers are raised the pressure of the external air may be utilized for lifting the edge of the sheet for delivery from the cylinder.

In the drawings, three sheets, Figure 1 is a side elevation of a printing-press embodying my invention. Fig. 2 is a plan view of the same, the feed-table and other parts being removed to show a central horizontal section of one-half of the larger cylinder. Fig. 3 is a plan view of form-block and plate. Fig. 4 is a section taken on line 1 1 in Fig. 3; also shows a part of an inking-roller, one bevel or V-shaped pulley, and a section of part of the larger cylinder. Fig. 5 is a transverse section of the smaller cylinder, and Fig. 6 a plan view of part of same cylinder, to show the construction and arrangement of the nippers and fingers for holding and discharging the sheet. Fig. 7 is a view of the hollow fingers and bar removed from the cylinder, and in a position reversed from that in Fig. 6.

The figures on Sheet 3 are drawn on a larger scale than those on Sheets 1 and 2.

The sides A A, together with braces or girts, (not shown,) are of such construction as to form a suitable frame-work for supporting the bearings for the shaft B of the larger cylinder C, and those for the shaft D of the smaller cylinder E, and other parts of the machine. The shaft B may be large, as shown, to be amply strong and inflexible, and may be hollow that it may not be too heavy.

The cylinder C, for bearing the plates or printing-surfaces, is constructed by building it up of the several sections or short cylinders *a*, the hubs of which are suitably fixed on the shaft B, and may be brought into close contact, as shown. The rims of these sections are of such width and form as to leave spaces, as many as are required, forming a circumferential and recessed grooves for receiving and holding screws or bolts, as shown in Figs. 3 and 4, which may be adjusted therein in the positions required.

The printing-surface for each impression may be made up of several small plates. One, Y, is shown in Figs. 3 and 4. The plate is secured to a form-block, F, by being clamped by a bar, *b*, fixed to the form-block, and a movable and adjustable bar, *c*, fastened by screws to the form-block, the bars and plate having beveled edges, as shown. The form-block F is secured to the cylinder by one or more screws or bolts *d*, held in a recessed groove in the form-block and in one of the grooves in the cylinder.

Outside of the cylinder C, formed of the several sections *a*, at each end thereof, is a gear, G, also suitably fixed on the shaft B. Outside of the gears G, and fixed on the shaft B, are pulleys or drums H, bearing the ways or guides *e e*, *f f*, and *g g* for the pulleys on the shafts of the inking-rollers.

The cylinder E has a surface for the sheet to be printed, and a recessed portion for the nipper mechanism. It also has an unbroken cylindrical portion, *h*, to bear on an unbroken cylindrical portion, *i*, on the larger cylinder, which parts of the two cylinders, being brought close together, gage the working distance to give the exact pressure required. At each end of the cylinder E is a gear, I, to mesh into one of the gears G. Thus both cylinders may be driven in a uniform and continuous manner by pinions on a shaft, *j*, meshing into the gears G.

One end of the shaft D is in a bearing or box, *k*, which, being fitted to turn about another center than that of the shaft, may be partially revolved to carry that end of the shaft, and hence the cylinder E, away from the cylinder C when needed for any purpose, as to prevent an impression being made. This motion of the bearing or box *k* may be made by means of a worm and worm-gear or segment, *l*.

The press shown is adapted for giving three different impressions on the same sheet, which impressions may be of three different colors. The cylinder E makes one revolution for each impression, and one additional revolution for discharging the sheet and receiving another sheet. The cylinder E is therefore one-fourth of the circumference of the cylinder C, and makes four revolutions while the cylinder C makes one revolution. There are, then, on the larger cylinder three printing-surfaces or spaces for such surfaces at suitable intervals, and an additional space corresponding to the surface of the smaller cylinder, in which is to be no printing-surface.

When three different colors are used there should be three ink-fountains and three sets of inking and distributing rollers arranged at suitable intervals, as shown. Each of the ink-fountains J is supported on ways *m*, so that it may be readily slid into or out of working position, and has the usual ink-roller *n*. For each of the three sets of inking-rollers K, which lay the ink on the printing-surfaces, there is a distributing-roller, *o*, and a swinging roller, *p*.

Of course, there may be as many inking and distributing rollers in a set as are desirable. Each swinging roller *p* carries the ink from a fountain-roller, *n*, to a distributing-roller, *o*, having the bearings of its shaft in swinging arms *q*, pivoted to stands *r*, fixed to an ink-fountain or its support or carriage. Only two—the upper and middle—sets of inking-rollers are shown in Fig. 2.

The shafts of the inking and distributing rollers are held in bearings fixed to rods *s*, which slide in blocks L, there being springs on the rods *s* acting between nuts on said rods and the blocks L to press the inking-rollers to the surfaces to be inked and the distributing to the inking rollers. The blocks L are held between guide-pieces M, fastened to the sides or frame A, and may be slid to carry the inking-rollers to or from the cylinder C, being further held by screws N passing through projections O on the frame and screwing into the blocks L, as shown.

Each inking-roller K has near each end of its shaft a pulley, beveled or V-shaped, and made up of two parts, *t* and *u*, arranged as shown. These parts may be set at any suitable distance from each other, being held on the shaft by set-screws or other suitable device. Each pair of ways or guides *e e*, *f f*, and *g g* is adapted for a set of inking-rollers, and each set of the pulleys *t u* is so fixed on the shafts of the inking-rollers as to run on the appropriate ways or guides and fit thereon. Now, by setting the parts *t* and *u* of the pulleys nearer to or farther from each other, the inking-roller on the same shaft may be allowed to press with greater or less force on the surface to be inked, and as the inking-roll wears or shrinks it may be brought to bear on such surface. The pulleys *v* on the shafts of the distributing-rollers *o* are grooved in V shape, so that they will always fit the pulleys *t u*, as shown. Each pair of ways or guides *e e*, *f f*, and *g g* extends around the cylinder in the form of a cam of such shape that each set of inking-rollers will be allowed to bear on one printing-surface, but be raised above all the other printing-surfaces.

The distributing-rollers *o* may be vibrated endwise by means of levers *w*, acting on flanges fixed on the shafts of the rollers, and moved by cams *x* on the side of the cylinder, as shown in case of one lever in Fig. 2, the shafts sliding endwise in the pulleys *v*.

The sheets to be printed are taken onto the cylinder E from the feed-board P, a sheet being nipped near its edge by the nippers *y*, and fingers R pressing the same to the cylinder. The nippers *y* are of ordinary construction, and may be operated by well-known devices. The fingers R are of novel construction, and operate in a novel way, as follows: The fingers R are hollow, and also the bar S, to which they are joined, the interior of the fingers opening into the interior of the bar. There are small openings T in the fingers at their under side, or that toward the sheet on which they press. One or each end of the bar S has an opening or

port, *z*, leading to a passage, *U*, in an end of the cylinder, which extends outward through and to the end of the shaft *D*. At the outer end of such passage is connected, by any well-known device, (not shown in the drawings,) an exhaust air pump or fan. When the sheet is taken on the cylinder the fingers *R* press the same to the cylinder, the bar *S* being swung in its bearings *V* by mechanism similar to that which operates the shaft on which are the nippers *y*; but when the sheet is to be discharged from the cylinder, the fingers *R* being raised, as are also the nippers *y*, the sheet holds to the fingers *R*, since at that time a partial vacuum is created within the hollow fingers and bar. This raising the edge of the sheet is sufficient to allow it to pass onto the delivery-board *W*. Air is thereupon let or forced into the bar *S* and fingers *R* by suitable action of the fan, pump, or valves, and the sheet no longer holds to the fingers *R*. At this stage the fingers *R* are swung still farther away from the sheet, so as not to obstruct its passage, and the sheet, by the motion given to it by the revolving cylinder, will be thrown onto the delivery-board *W*.

I claim as my invention—

1. In a press for chromatic printing, the combination of the following elements, namely: two cylinders for giving the impressions—one (the larger cylinder) adapted to bear several different printing-surfaces and to have a space, in addition to that occupied by or adapted to said printing-surfaces, equal to the space for one of said printing-surfaces, the other (the smaller cylinder) adapted to bear the sheet to be printed—the two cylinders so geared together that while the larger cylinder makes one revolution the smaller cylinder makes as many revolutions as there are said printing-surfaces, and also an additional revolution corresponding to the space on the larger cylinder having no printing-surface, and also as many sets of inking-rollers as there are said printing-surfaces, located and operated so that each set of inking-rollers may deliver ink onto one of the said printing-surfaces and be raised above or pressed away from the other printing-surfaces, all constructed and arranged substantially as and for the purpose hereinbefore set forth.

2. In a printing-press, a cylinder for bearing the printing-surfaces made up of several sections or short cylinders, so as to form circumferential recessed grooves for holding screws or bolts for clamping the form blocks or plates on the cylinder, substantially as hereinbefore described.

3. An inking-roller having on its shaft pulleys, beveled or *V*-shaped, each pulley being of two parts adjustable on said shaft, in combination with the cylinder having beveled or *V*-shaped ways or guides for said pulleys, substantially as and for the purpose hereinbefore set forth.

4. In a printing-press, one or more nippers or fingers pivoted to the cylinder, so as to assist in removing the sheet from said cylinder in the manner specified, each nipper or finger being hollow, so that a partial vacuum may be created therein, and having openings where it comes in contact with the sheet, substantially as hereinbefore described.

THOMAS B. DOOLEY.

Witnesses:

EDW. DUMMER,
W. H. FORBES.