(No Model.) 2 Sheets—Sheet 1.

F. TIQUET.

METHOD OF AND MACHINE FOR PRINTING IN COLORS.

No. 457,942. Patented Aug. 18, 1891.

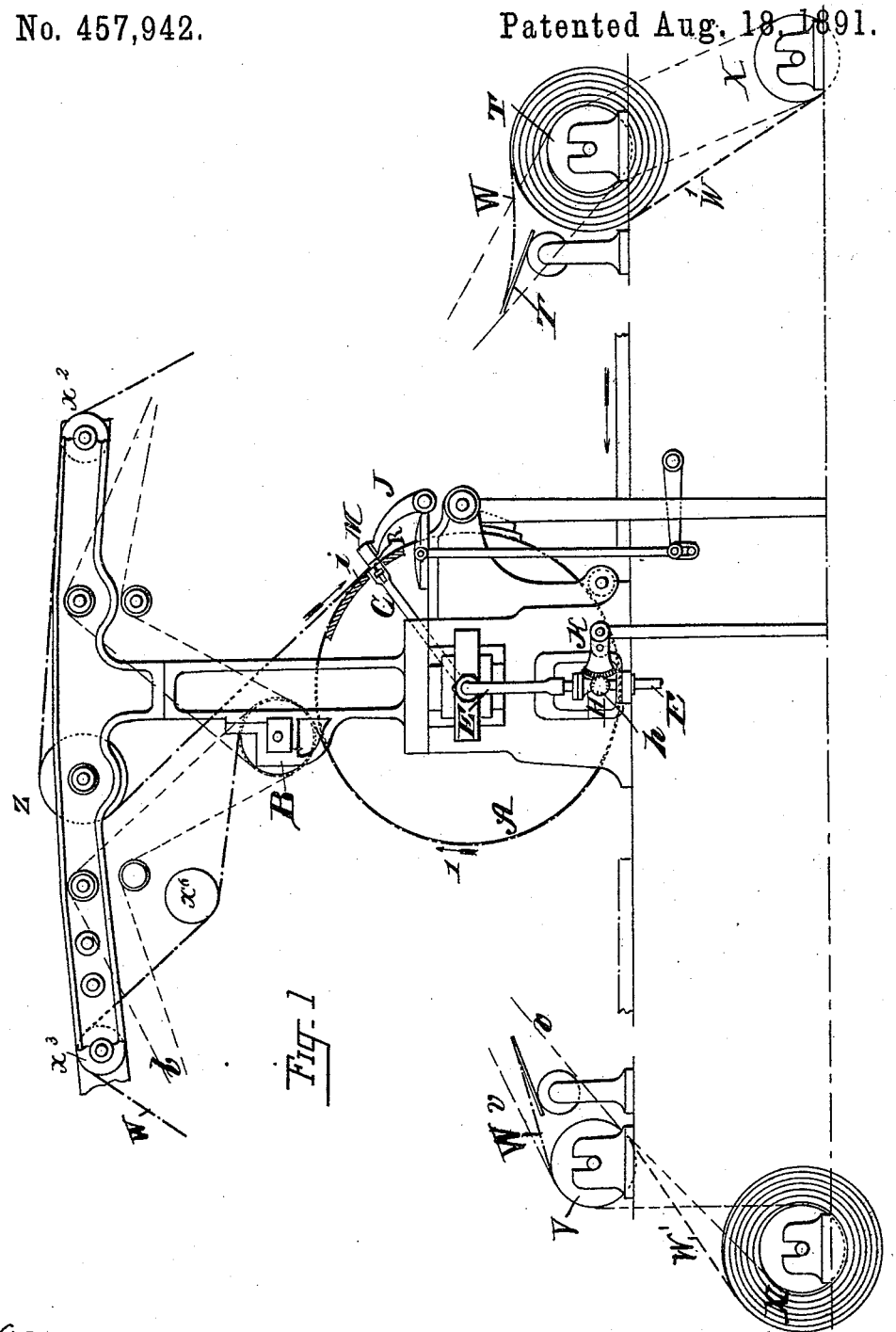

Fig. 1

Witnesses:
Henry L. Dieterich
B. W. Sommers

Inventor:
Francois Tiquet
per: Henry Orth
Attorney

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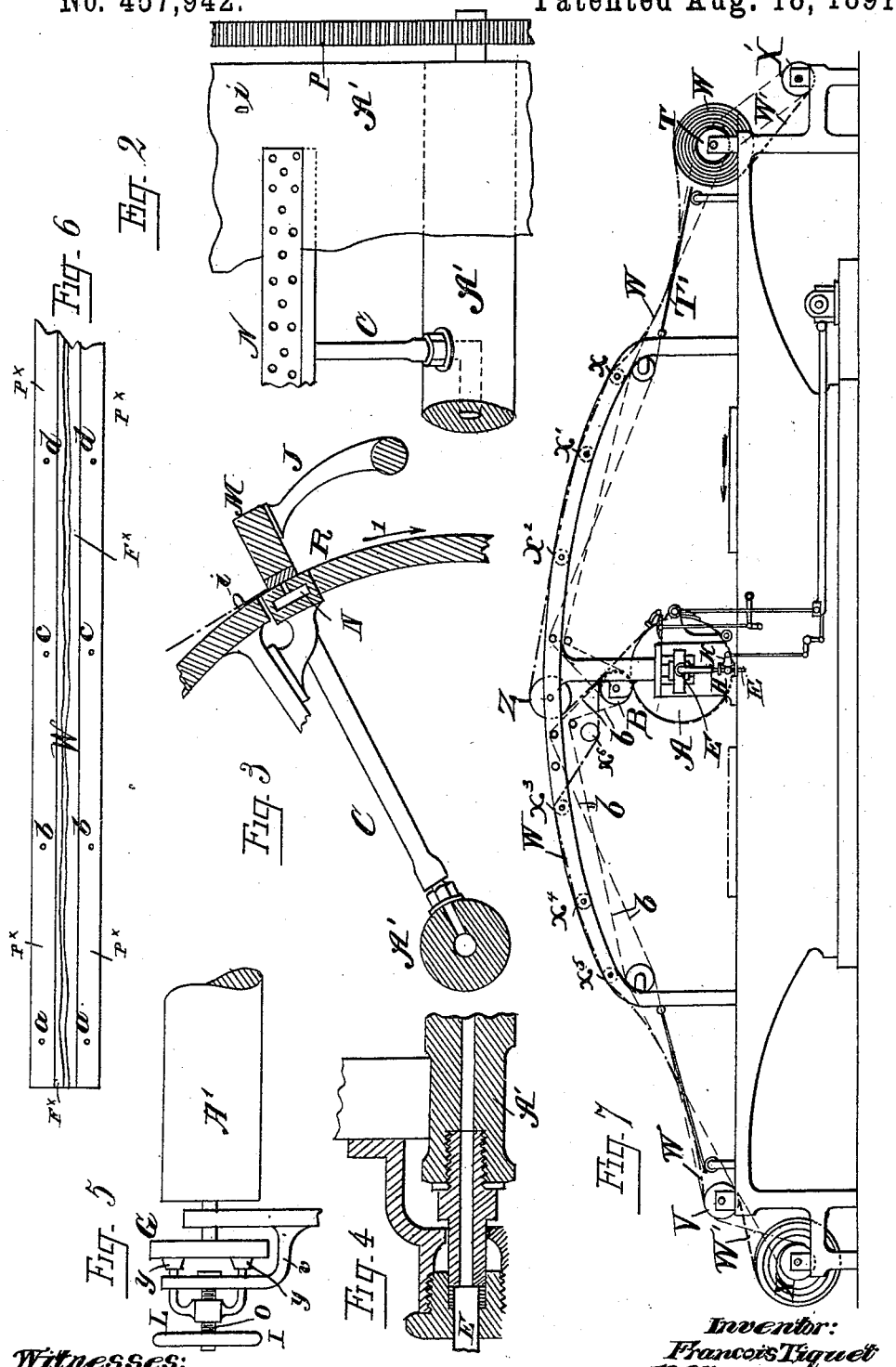

Witnesses:
Henry G. Dieterich
D. W. Sommers.

Inventor:
François Tiquet
per. Henry Orth
Attorney.

UNITED STATES PATENT OFFICE.

FRANÇOIS TIQUET, OF PARIS, FRANCE.

METHOD OF AND MACHINE FOR PRINTING IN COLORS.

SPECIFICATION forming part of Letters Patent No. 457,942, dated August 18, 1891.

Application filed July 10, 1890. Serial No. 358,296. (No model.) Patented in France June 8, 1888, No. 191,093; in Belgium September 20, 1888, No. 83,325; in England October 11, 1888, No. 14,593; in Italy December 31, 1888, XLVIII, 24,345; in Spain January 10, 1889, No. 8,866, and in Austria-Hungary February 24, 1889, No. 39.

To all whom it may concern:

Be it known that I, FRANÇOIS TIQUET, a citizen of the French Republic, residing at Paris, in the French Republic, have invented certain new and useful Improvements in and relating to Methods of and Machines for Printing in Colors, (for which I have obtained Letters Patent in France, dated June 8, 1888, No. 191,093; in Belgium, dated September 20, 1888, No. 83,325; in Great Britain, dated October 11, 1888, No. 14,593; in Spain, dated January 10, 1889, No. 8,866; in Italy, dated December 31, 1888, No. 24,345, Vol. 48, and in Austria-Hungary, dated February 24, 1889, No. 39, Fol. 502;) 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The invention relates to the art of printing, and more especially to chromatic printing, and has for its object certain improvements in the means for obtaining impressions in different colors upon a continuous web of paper or other fibrous or textile material and to a mode of providing the continuous web with register-holes.

To these ends the invention consists in the means for printing in different colors upon a continuous web of material and in the mode of supporting the continuous web of fabric and adjusting the same on the printing-cylinder, as will now be fully described, reference being had to the accompanying drawings, in which—

Figures 1 and 7 are side elevations of so much of a chromatic-printing press as will be necessary to the full comprehension of my invention. Figs. 2, 3, 4, and 5 are detail views, and Fig. 6 shows a portion of a web of material provided with adjusting-holes.

The general construction of the framing and the reciprocating table or bed for the stone or plate, the inking or the inking and wiping devices, and the mechanism for imparting motion to said devices and to the impression or pressure cylinder are or may be substantially the same as in the chromatic printing-presses now in use, or they may be of any other desired or preferred construction.

The impression-cylinder A has a transverse opening or throat, in which is fitted a suction-box N, of substantially rectangular form in cross-section, the outer face of which is a segment of the circle described by the periphery of the cylinder and is so fitted in the transverse slot or throat as to leave the surface of the cylinder A substantially unbroken and smooth. The box N is closed at both ends and its outer wall is perforated, and said box is in perpetual communication with the hollow shaft A′ of the cylinder A by means of one or more radially-arranged tubes C, as shown in Fig. 3. The tubular shaft A′ of the cylinder is closed at one end and its other end is in communication with any suitable exhaust apparatus by means of a pipe E, which is provided with a three-way cock H. The plug of the three-way cock carries a pinion *h*, that is in gear with a toothed sector K, automatically operated from a driving element of the machine and a cam or cams or eccentric. M is a cross-bar whose under face has a cushion R, of rubber or felt or other like material, and is secured to a lever J, or a pair of such, said bar serving to press the web of paper onto the suction-box N at the proper time and immediately thereafter move out of contact with said web of material.

Above the cylinder A and slightly to the left of its vertical diameter is mounted a roller B, and immediately above the same a roller Z. At the right end of the machine is the feed-roll T, upon which is wound the web of material to be printed, and at the left end of the machine is mounted a receiving-roll V, upon which the printed web is wound, a series of intermediate guide-rolls x x' x^2 x^3 x^4 x^5 being mounted in the framing above the impression-cylinder for guiding the web of material from the feed-roll T to the printing devices and from the latter to the receiving or winding roll V. The number of these intermediate guide-rolls between the printing roller or cylinder and the receiving or winding roller or cylinder may or will vary ac-

cording as the material printed upon requires more or less time to dry sufficiently so as to be wound on the roll V without wiping or transferring.

In printing on such materials as require considerable time to dry I preferable use a web of suitable paper or blanket W′ and cause the same to wind on the winding-roller V with the printed web of material. This paper web or blanket is wound on a roll X, mounted on the machine below and slightly in rear of the winding-roller V, as shown in Fig. 7. This peripheral speed of the printing-cylinder A and the rollers B, V, and X must be the same, and to attain this end the journal of the cylinder A carries a gear-wheel P in gear with a wheel on roller B, the gearing being so proportioned that the roller B will have the same peripheral speed as said cylinder, the roller V being driven by roller B, by means of suitable belting *b*, so as to drive said roller V not only at the same speed as the roller B, but also in the same direction.

Inasmuch as the peripheral speed of roller V varies as the web winds on the same, I provide a friction-brake, Fig. 5, for regulating the speed of said roller, which consists of a friction-disk G, rigidly secured to the journal of the winding-roller V. In a bracket *v*, secured to the main frame of the press, is formed a bearing for a brake-screw O, provided with a hand-wheel I, the screw O, working in a threaded bearing formed in a brake L, constructed in the form of a yoke, whose arms are guided in the bracket *v* and carry a brake-shoe *y* in frictional contact with the disk G. It will be readily seen that by applying the brake with greater or less force to the disk G the speed of rotation of the roller V can be regulated at pleasure.

The operation of printing on the web is as follows: The web of material is provided along its opposite edges with register-holes *a a b b c c d d*, &c., adapted to engage two register-points *i* on the printing-cylinder immediately behind the suction-box N relatively to the direction of motion of said cylinder. The distance between the register-holes *a a b b*, &c, is equal to one-half of the development of the cylinder A, so that equidistant spaces of the web will receive the impression, leaving equidistant blank spaces.

If fabrics are printed upon, the edges of the fabric F are preferably provided with a register-selvage consisting of a strip of paper $P^{\times}$, in which the register-holes *a a b b*, &c., that engage the register-points *i*, as above stated, are formed, said selvage strips being applied to the fabric by means of beeswax and caused to adhere thereto by passing the same between calendering-rolls. The register-holes are arranged in lines across the fabric at right angles to its motion, so as to properly engage the register-points.

In starting the operation of printing, the web of paper is carried to the printing-cylinder over the table T, thence over the guide-rolls $x\ x'\ x^2$ to the guide-roll Z, around said guide-roll over the feed-roll B, and the register-holes *a a* are engaged with the register-points by an attendant on each side of the machine, whose duty is to see that the web of material is in proper register and to correct any irregularities during the progress of the web of material to the printing-cylinder. At this moment the three-way cock is automatically operated to establish communication between the exhaust apparatus and the exhaust-box N through the pipes F E, the hollow shaft A′ of cylinder A, and the tubular radial pipe or pipes C, and simultaneously therewith the lever J decends and appresses the material to said exhaust-box, the suction causing said material to adhere firmly to the cylinder, the lever J immediately returning to its normal position, this operation being repeated whenever the exhaust-box reaches the proper position, or before an impression is made on the web. When the cylinder A has revolved sufficiently to bring the space between the register-holes *a a* into position for printing, the bed, with the stone, form, or plate, will have advanced sufficiently in its traversing movement to pass under the roller, and the said space between the holes *a* and *b* is printed in one color. At the same time the toothed sector K is operated to move the plug of the three-way valve or cock to cut off the communication between the suction-box and exhaust apparatus and establish a communication between said box and the atmosphere to release the web of paper. As the space printed is equal to one-half of the development of the cylinder A, as above stated, the space of the web of material between *b* and *c* will be blank, while the space between *c* and *d* will be printed, and so on. The web of material W passes under the feed-roll B, in contact with cylinder A, around said feed-roll to and over the guide-rolls $x^6\ x^3\ x^4\ x^5$ to the winding-roll V, the number of which may vary according to the length of time it is desired to expose the printed surface to the atmosphere or to a drying-atmosphere before winding it on roll V, and, if desired, the guide-rolls $x^3\ x^4\ x^5$, &c., or some of them, may be heated in any usual or well-known manner.

In order to prevent wiping or transferring in case the impressions are not sufficiently dry, I employ a roll X, on which is wound a web of paper W′, of the same width as the web of material being printed, and cause the same to wind on the winding-roller with the said web of paper W to take such transfer and prevent wiping.

After the web W or the webs W and W′ are wound on roller V they are removed from their bearings, as is also the empty roll T, the roll V taking the place of roll T and the latter roll that of roll V, the roll X being mounted in bearings at the feed end of the machine below roll V in case a web of paper W′ is employed, and a roll X′, containing such a web of paper W′, is mounted in the bearings of

roll X. By a proper adjustment of the web W on the cylinder A the spaces previously printed may now receive a second impression in a different color, or the blank spaces may now be printed, as desired, and as the web W unwinds from roll V the web W′ is wound on roll X. Thus in printing in the web without cutting up two rolls are used that serve alternately as feed and receiving rolls, in conjunction with which two auxiliary rolls X and X′ are required in making the first two impressions when a drying-web of paper or blanket W′ is employed—namely, a feed-roll X, containing the blanket W′, which after the first impression is transferred to the feed end of the machine to receive the web W′, wound with web W on roll V, a second roll, containing a blanket W′, being applied at the delivery end of the machine to wind with web W on roller T during the second impression, after which the said rolls X and X′ are alternately transferred from delivery to feed end, for the purposes set forth.

I am aware that suction has heretofore been resorted to to cause a web of material to adhere to the printing-cylinder, and I do not desire to claim the use of suction, broadly. Inasmuch as this is well known, I have deemed it unnecessary to show the suction apparatus.

Having now described my invention, what I claim is—

1. In a chromatic-printing press, the combination, with a reciprocating bed carrying the stone, form, or plate, and a revoluble printing-cylinder provided with suitable register-points and a suction-box N, extending across the face of the cylinder, of a lever J, co-operating with said suction-box to appress the material printed upon to said box, a delivery-roll on one side of the cylinder, a feed-roll above and in contact with said cylinder, a winding-roll on the opposite side of the cylinder, and suitable guide-rolls, substantially as and for the purposes specified.

2. In the art of printing textiles in the web, the mode of supporting the web of fabric and adjusting the same on the printing-cylinder, which consists in cementing to each of the opposite edges of the web of fabric a strip of paper having equidistant register-holes arranged to engage the register-points of a printing-cylinder, for the purposes specified.

3. In a chromatic-printing press, the combination, with a reciprocating bed carrying the stone, form, or plate, and a revoluble printing-cylinder provided with suitable register-points and with a suction-box N, extending across the face thereof, of the lever J, adapted to co-operate with said suction-box to appress the material printed upon to said box, a delivery-roll on one side of the cylinder, a feed-roll above and in contact with said cylinder, a winding-roll on the opposite side of the cylinder, and suitable guide-rolls, said feed and winding rolls being geared together and to the cylinder so as to revolve at the same peripheral speed, substantially as and for the purposes specified.

4. The combination, with the printing-cylinder A and the feed-roll B, of the winding-roll V, the friction-disk G on the journal of said roll, the yoke-brake L, the brake-screw O, operating in a screw-threaded bearing of the yoke-brake, and a support and guide for said screw and brake, substantially as and for the purposes specified.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of November, 1888.

FRANÇOIS TIQUET.

Witnesses:
EMILE LEVERQUE,
R. J. PRESTON.