April 21, 1931. J. F. SPRINGSTEAD 1,802,038

PRINTING PRESS

Filed Nov. 18, 1927

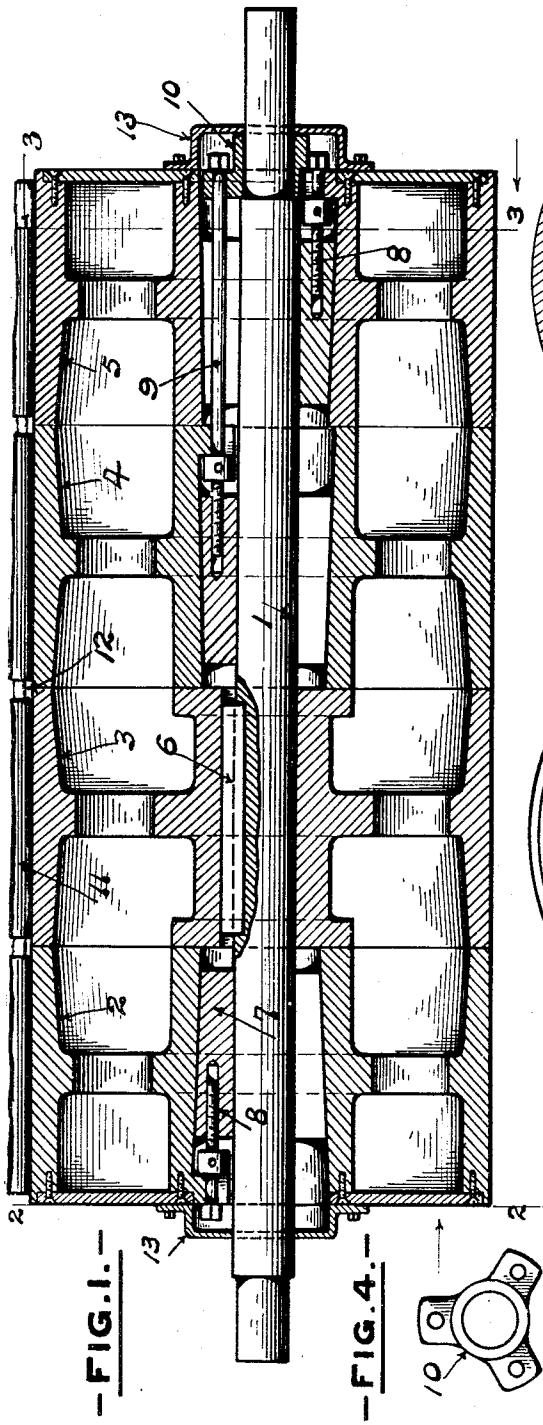


FIG. 1.

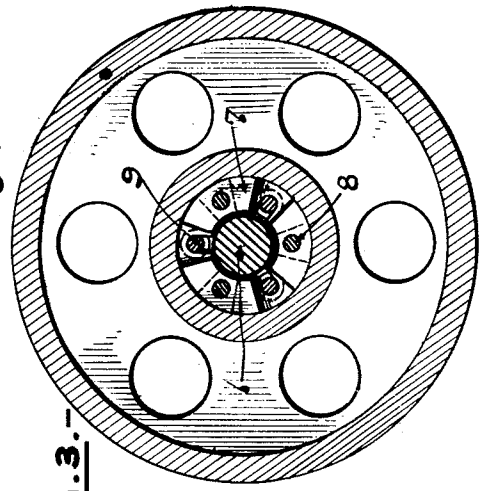


FIG. 3.

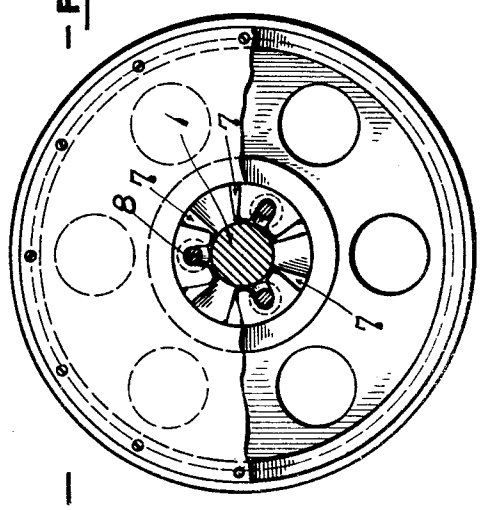


FIG. 2.

FIG. 4.

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UNITED STATES PATENT OFFICE

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PRINTING PRESS

Application filed November 18, 1927. Serial No. 234,144.

The invention relates to printing presses, and particularly to presses designed for that class of work known as rotary photogravure, and more particularly to such presses as are adapted to print in multi-color.

One of the principal objects of the invention is to provide a press which shall be equipped with a rotary photogravure printing cylinder comprising a plurality of sections rotatably adjustable with regard to each other, and also an improved form of impression cylinder adapted to operate in connection with such an adjustable printing cylinder. Further objects and advantages of the invention will be in part set forth in the following specification and in part will be obvious therefrom without being specifically pointed out, the same being realized and attained by means of the instrumentalities and combinations pointed out in the claims hereof.

In carrying out the art of rotary photogravure printing, the printing is done from the etched circumferential surface of a copper cylinder, which is inked by being passed during its rotation through an ink reservoir conveniently located with respect to said cylinder, the surplus ink being removed from the unetched surface by means of a doctor blade, which, however, permits the ink to remain in the etched portion of the surface of the cylinder. The paper which is to be printed is then passed between the printing cylinder and a co-acting impression cylinder of hard rubber or other suitable material, the ink thereby being transferred from the etched portion of the cylinder to the paper.

In preparing the printing cylinder, positive photographic films are prepared from negatives of the usual form, which positives are mounted on a plate of glass. In newspaper work, this glass form with its positive films thereon is usually the size of two pages of the paper. From this positive form a negative print is made on carbon tissue, the impression on which negative print is transferred to the surface of the printing cylinder and etched in thereon.

Rotary photogravure presses used in newspaper work are frequently made with cylinders of the requisite length to print four pages in width, and the diameter of the cylinder is frequently proportioned to print two pages at each revolution, a single cylinder thus being adapted to carry the design for eight pages. It is obvious therefore that the application of the carbon prints to the surface of the cylinder preparatory to etching in the design thereon, must be done accurately.

In practice the tissue prints are squeegeed on to the surface of the printing cylinder, being placed with the assistance of register marks which have previously been placed on the print and on the cylinder, the prints then being developed in contact with the cylinder, thus transferring the image which is then etched upon the surface of the cylinder.

The tissue print from which the cylinder is etched is frail, fragile and difficult of management, and on account of these qualities and of its size, it is often difficult to place it upon the cylinder in accurate register. Furthermore, in squeegeeing the print down into close contact with the cylinder surface, it is apt to be shifted or twisted circumferentially. While it is comparatively easy to hold the register accurately longitudinally of the cylinder, it is very difficult to maintain accurate register of the prints circumferentially and it happens at times that one side of the print will be shifted ahead or back of the other side. Where rotary photogravure is being printed in one color only, a slight inaccuracy in register is not very objectionable, but in multi-color work, where several impressions of different colors are being superimposed over each other, it is obvious that an extremely accurate register must be obtained and maintained.

While inaccuracy in locating the form on the cylinder, either longitudinally or circumferentially, can be corrected, it has been impossible by the use of means previously known in the art to correct inaccuracy due to a shifting or twisting of the form. The present invention provides simple and efficient means by which inaccuracies of this

kind can be neutralized and compensated for.

With the above-stated and other objects of the invention in view, the invention consists in the novel construction, arrangement and combination of various devices, elements and parts, as set forth in the claims hereof, one embodiment of the same being illustrated in the accompanying drawings and described in this specification.

In the accompanying drawings,

Fig. 1 is a longitudinal vertical section of a printing cylinder constructed according to my invention, showing above the same the portion of a co-operating impression cylinder which comes in contact with the printing cylinder, the upper portion of the impression cylinder being broken away for lack of space to show the same;

Fig. 2 is an end view of the printing cylinder, partly in section along the line 2—2 of Fig. 1, viewed in the direction of the arrow and partly broken away;

Fig. 3 is a section of the cylinder taken on the line 3—3 of Fig. 1 and looking in the direction of the arrow; and

Fig. 4 is a view of the support for the outside ends of the adjusting screws of one of the cylinder sections.

In carrying the invention into effect in the embodiment thereof which has been selected for illustration in the accompanying drawings and for description in this specification, and referring more particularly first to Fig. 1 of the drawings, it will be seen that a shaft 1 is provided, on which is carried a printing cylinder comprising several sections. In the particular form shown in the drawings, the cylinder is adapted to print eight pages during each revolution, being divided into four sections, numbered respectively 2, 3, 4 and 5, each one of which is one page in length and two pages in circumference.

One of these sections, as for instance section 3, as shown in the drawings, is fast on the shaft 1, being held against rotation by a key 6. The other sections are rotatably and adjustably held on the shaft 1 by means of the devices now to be described.

Considering first the rotatable section 2, which is on the left in Fig. 1, it will be seen that the cylinder is provided with a tapered bore, into which and between the periphery of which and the shaft 1 is fitted a three-part tapering bushing 7. This bushing is adjustable longitudinally with respect to the shaft 1 and the cylinder section 2 by means of screws 8, access to which is had by removing the cover 13. It will readily be seen that by the manipulation of these screws, the tapered bushing may be withdrawn sufficiently to permit the cylinder section 2 to be adjustably rotated on the shaft 1 with relation to the section 3, and that when the required adjustment has been effected, a suitable manipulation of the screws 8 will force the tapered bushing into a locking position, which will prevent rotation of the cylinder section 2 until the bushing 7 is again released. The cylinder section designated 5, shown at the right in Fig. 1, is similar to and is secured in a way entirely analogous to section 2, except that ways are provided between the three sections of the tapered bushing with which this section 5 rotates, to permit the passage of long screws 9.

The section of the printing cylinder which is designated 4 in the drawings, is located between sections 3 and 5. This also has a tapered bore and is mounted, not directly upon the shaft 1, but on a tapered three part bushing analogous to the bushing 7 above described. The construction and operation of this is entirely analogous to that which has been set forth with regard to the section 2 and the tapered bushing 7, the only difference being that the bushing which co-operates with section 4 is operated by long screws 9, as is clearly shown in the drawing. The outer ends of these long screws 9 are supported by a member 10, shown particularly in Fig. 4.

In connection with the improved printing cylinder described above, it is advisable to provide a modified form of impression cylinder, which constitutes a part of my invention.

This impression cylinder is shown at the top of Fig. 1, and is designated 11. When a printing cylinder having the divided construction which has been above described, is inked and the excess ink scraped off by the doctor blade, some of the ink would remain in the joints between the adjacent surfaces of the cylinder sections, and if the ordinary form of impression cylinder were used, lines would be printed on the paper in the margin spaces between the pages. To obviate this, the impression cylinder is cut away opposite each of the joints between the cylinder sections, as shown at 12 in Fig. 1. Thus the paper is not pressed against the printing cylinder along these lines and in consequence any ink remaining in the cracks between the sections of the printing cylinder will not be transferred to the paper.

The operation of my invention will, it is believed, be obvious from what has been above said with regard to its construction. It will be clear that, should the form be placed upon the cylinder in some slight misalignment, the same can be easily corrected by rotating the various cylinder sections backward or forward with relation to each other until the sections of the form for each page are brought to the required accuracy of register.

The advantages of my invention will be clear from what has been above said.

I do not limit myself to the particular details of construction set forth in the foregoing specification and illustrated in the ac-

companying drawings, as the same refer to and set forth only one embodiment of the invention, and it is obvious that the same may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is as follows:

1. In a rotary photogravure printing press, the combination with a printing cylinder comprising a shaft and a plurality of printing sections carried by said shaft, one of said sections being non-rotatably secured to said shaft and another of said sections being rotatably mounted on said shaft and adjustable with reference to the first-named section; of means adapted to adjustably secure said second-named section at any desired point on said shaft with reference to said first-named section and to be released so as to allow said second-named section to be circumferentially adjusted and then again secured: said means comprising a tapered bushing interposed between said shaft and the inner bearing surface of said second-named printing section, and a screw member adapted to operate said tapered bushing longitudinally of said shaft so as to either bind or release said rotatably-mounted printing section.

2. In a rotary photogravure printing press, the combination with a sectional printing cylinder as described in claim 1 hereof, of an impression cylinder adapted to bear upon said printing cylinder and provided with grooves corresponding to and continguous with the divisions between the sections of said printing cylinder, whereby paper led between said printing cylinder and said impression cylinder is not pressed against the printing cylinder at said section divisions.

3. In a rotary photogravure printing press, the combination with a printing cylinder comprising a shaft and a plurality of printing sections carried by said shaft mounted close together and having an unbroken periphery, rotatable on said shaft and independently adjustable with respect to each other and adapted to be secured in position on said shaft independently of each other; and means for permitting such adjustment and for securing said sections in position on said shaft independently of each other, adapted to be operated from the outside ends of the cylinder.

4. In a rotary photogravure printing press, the combination with a printing cylinder comprising a shaft and a plurality of printing sections carried by said shaft mounted close together and having an unbroken periphery, one of said sections being non-rotatably secured to said shaft and another of said sections being rotatably mounted on said shaft and adjustable with reference to said first-named section; of means for permitting such adjustment, comprising a tapered bushing on said shaft and locking screws adapted to be operated from the outside ends of the cylinder.

5. In a rotary photogravure printing press, the combination with a printing cylinder comprising a shaft and a plurality of printing sections carried by said shaft, one of said sections being rotatably and adjustably mounted on said shaft, and means adapted to secure said sections to said shaft; of an impression cylinder adapted to bear upon said printing cylinder and provided with grooves corresponding to and contiguous with the divisions between the sections of said printing cylinder, whereby paper led between said printing cylinder and said impression cylinder is not pressed against the printing cylinder at said section divisions.

6. In a rotary photogravure printing press, the combination with a printing cylinder comprising a shaft and a plurality of printing sections carried by said shaft mounted close together and having an unbroken periphery, one of said sections being non-rotatably secured to said shaft and another of said sections being rotatably mounted on said shaft and adjustable with reference to said first-named section; of means for permitting such adjustment and for securing said rotatable section in position on said shaft, extending within said cylinder and adapted to be operated from an outside end thereof.

In witness whereof I have hereunto signed my name this eleventh day of November, 1927.

JOHN F. SPRINGSTEAD.