

1,421,360.

Fig. 1.

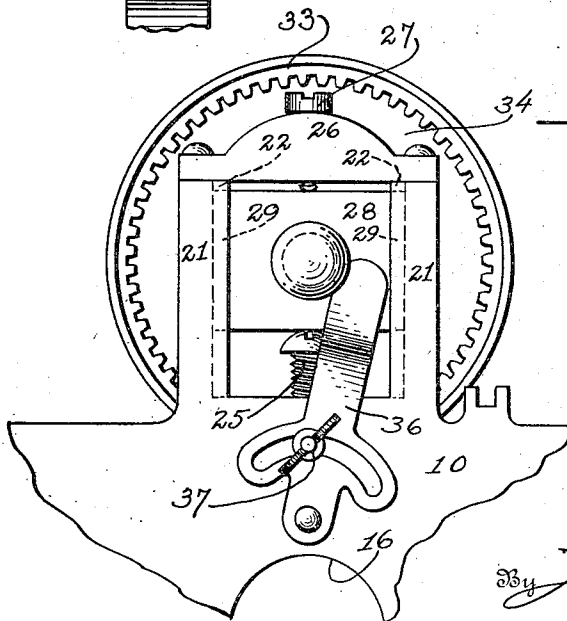


Fig. 2.

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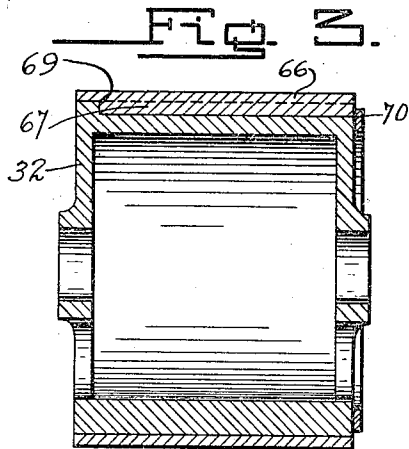
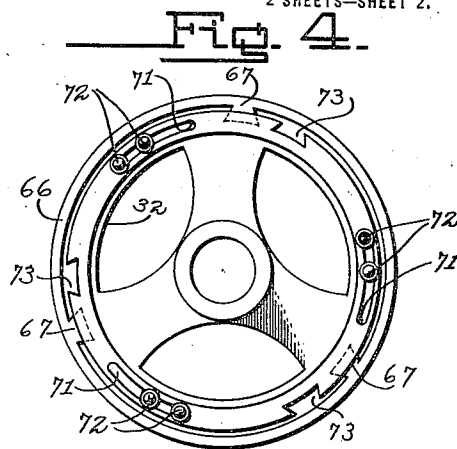
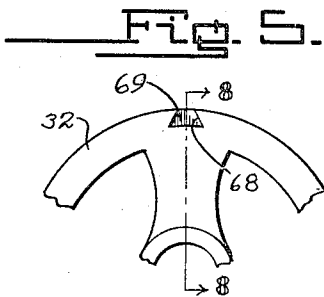
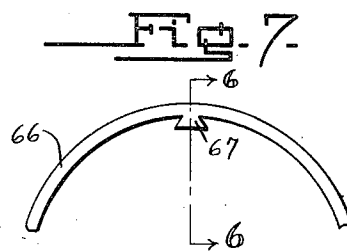
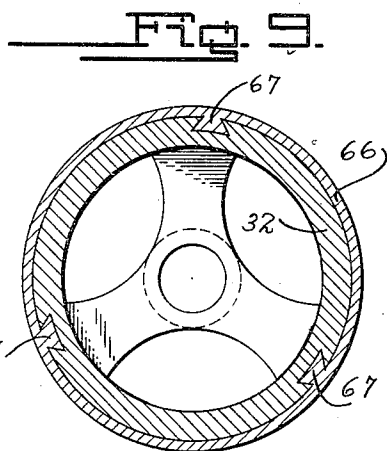
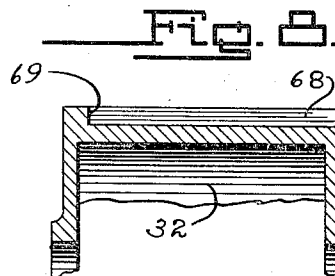
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H. V. BIERY.
 ROTARY PHOTOGRAVURE PRESS.
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

HARVEY V. BIERY, OF OKLAHOMA, OKLAHOMA.

ROTARY PHOTOGRAVURE PRESS.

1,421,360.

Specification of Letters Patent.

Patented July 4, 1922.

Application filed April 2, 1919. Serial No. 286,948.

To all whom it may concern:

Be it known that I, HARVEY V. BIERY, a citizen of the United States, and a resident of Oklahoma, in the county of Oklahoma and State of Oklahoma, have invented certain new and useful Improvements in a Rotary Photogravure Press, of which the following is a specification.

The present invention relates to the art of printing, and has particular reference to an improvement in rotary photogravure presses.

Heretofore, in rotary photogravure presses a solid copper cylinder has been used upon which is printed, and then etched, any continuous tone negatives to be reproduced. The etchings are in intaglio and are very shallow, and the surface of the cylinder must be re-polished prior to the etching of the next piece of work. To do this, the copper cylinder or roll must be removed bodily from the press, an operation which is not only time consuming, but which also frequently results in injury to the cylinder. The cost of these copper cylinders, and the weight of copper in their construction and use, has led manufacturers to various attempts to overcome these defects. Copper sheets have been fastened to steel mandrels, but without success. A coating of copper has been deposited on the steel mandrel in an electrotyper's vat to the depth of about one-eighth of an inch. The last attempt, however, has been no better than the first, except as to the quantity of copper used, for the entire roll or cylinder has to be removed from the press for re-polishing.

One of the principal objects of the present invention is to overcome the above difficulties and disadvantages, and to that end the present invention provides a cylinder or plate which is adapted to be detachably secured to the mandrel, and the mandrel or body portion of the roll is peculiarly mounted in the frame of the press to admit of the ready removal of the cylinder or plate for the purpose of re-polishing, and when it is necessary to subject the plate to various treatments. It can be readily appreciated that a considerable saving of time can be effected by the use of this detachable plate or cylinder in preference to the taking down of the entire roll off the press, putting the roll into the polishing lathe where the surface is re-ground and polished for the next piece of work, then placing the entire roll into the sensitizing and transfer process, and

then transporting the entire roll to the etcher. These cylinders are heavy and cumbersome, and where work of art has to be done upon them a great waste of time is effected and many chances are taken in the operation of transporting the cylinders or rolls and in mounting the same in the various machines or devices required. In addition to this unnecessary work, the press itself is standing idle and this is a considerable item in non-productive labor.

By the use of the detachable cylinder or plate of this invention, the cylinders or plates may be prepared in a plant and in any desired number as are required for the work to be produced. The removable cylinder or plate also admits of the provision of a central art engraving plant where the cylinders are etched, and from which they may be shipped to all parts of the country to the users of the presses and the latter therefor do not have to maintain a staff of artists and highly skilled workmen to prepare the plates. By the use of the present invention, the press is used practically continuously as it only requires a few minutes time to interchange plates or cylinders, and the entire method of working the press is reduced to its simplest form, and in a more satisfactory and economical manner.

These detachable plates or cylinders may be made of any suitable material, such as copper, zinc, aluminum and the like, and may be used to produce rotary offset work, and lithographic work, or ordinary photogravure work.

The present invention also has for an object to overcome the necessity of removing the entire cylinder, and at the same time to overcome all of the disadvantages above enumerated; to provide a mandrel with a removable surface layer or shell of copper or other suitable substance, to provide quickly releasable means for retaining the shell or cylinder upon the mandrels; to provide an improved mounting for the mandrel; to provide a press upon which calico or fabric may be printed; to provide a press adapted for multi-color printing.

The above, and various other objects and advantages of this invention will be in part described, and in part understood, from the following detailed description of the preferred embodiment, the same being illustrated in the accompanying drawing, wherein—

Figure 1 is a longitudinal section through the printing roller and its mounting, showing the roller released and raised out of its normal position.

5 Figure 2 is a fragmentary side elevation of the printing roller and its mounting, showing the means for releasably supporting it.

10 Figure 3 is a longitudinal section through the printing roller.

Figure 4 is an end elevation of the same.

Figure 5 is a fragmentary end elevation of the mandrel or body part of the printing roll.

15 Figure 6 is a fragmentary longitudinal section of the plate, shell or cylinder adapted to be detachably mounted upon the mandrel.

Figure 7 is a fragmentary end view of the same.

20 Figure 8 is a fragmentary longitudinal section of the mandrel, showing one of the slots for locking the cylinder in place.

Figure 9 is a detail enlarged transverse section through one of the printing rolls constructed according to the present invention.

25 The plates 10 are provided with upstanding forked brackets, the arms 21 of which are longitudinally spaced apart, and the arms 21 at one side of the units or sections 30 have vertically extending grooves 22 in their inner faces adapted to receive lugs 23 projecting from the opposite ends of a movable bearing block 24 which is fitted between the arms 21. The lugs 23 are preferably cylindrical and constitute trunnions upon which the bearing blocks 24 may turn. An adjustable rest 25 is mounted between the arms 21, and is in the form of a screw threaded in the adjacent plates 10 and is adapted to 40 be raised to the desired height for supporting the bearing blocks 24. A cap piece 26 is secured across the upper end of the arms 24 and is adapted to retain the bearing blocks 24 within the brackets. A set screw 45 27 is threaded in the cap piece 26 and is adapted to bear at its inner end against the blocks 24 for holding the same from vibration.

At the opposite side of the unit or section 50 10, the forked bracket is provided therein with a vertically adjustable block 28 having lugs 29 adjacent the recesses in the adjacent fork arms 21, and the lugs 29 are of such length as to hold the block 28 from turning, and to guide the block in its vertical movement between the arms. The blocks 24 and 55 28 constitute bearing for a printing roller shaft made up of the two sections 30 and 31. The shaft section 30 is journaled in the block 24 and has suitably mounted thereon the mandrel or body portion 32 of a printing roll, and is provided at opposite sides of the block 24 with guide discs or collars 33, and outwardly of the collars 33 60 with spur gear wheels 34. The shaft sec-

tion 31 is relatively short, and is journaled in the block 28 and adapted to move longitudinally therein. The inner end of the shaft section 31 projects partway into the adjacent spur gear wheel 34 and is connected with a strip joint on the adjacent 70 end of the shaft section 30. The said adjacent gear wheel 34 and its guide disc 33 are connected together, and are adapted to slide longitudinally upon the shaft section 75 and over upon the shorter shaft section 31 to release the adjacent end of the long shaft section 30. The outer end of the shaft section 31 is peripherally grooved, and is adapted to receive therein the edge of a 80 latch plate 36 suitably pivoted against the adjacent side of the frame section 10, and held in adjusted position by a winged nut 37 carried by the frame and adapted to bind against the outer side of the latch plate 36. 85

An important feature of the present invention is the construction of the printing roll. The mandrel 32 thereof is preferably made from steel or the like and is adapted to receive upon its exterior surface a plate 90 or cylinder 66 which may be formed from copper, zinc, aluminum, or the like. This plate 66 is disclosed in the form of a cylinder adapted to fit upon the mandrel 32, and which may be detachably held thereto in 95 any suitable manner. In the present instance, the plate or cylinder 66 is provided at suitable points, and upon its inner surface, with longitudinally extending ribs 67 of preferably dovetail construction. The 100 exterior face of the mandrel 32 is provided with recesses or depressions 68 extending longitudinally thereof and which are of corresponding dovetail form. The slots or recesses 68 in the mandrel 32 are of less 105 length than the mandrel and terminate in spaced relation from one end thereof to form stop shoulders 69 against which the end of the adjacent rib 67 is adapted to abut for holding the cylinder or plate 66 110 from displacement from the adjacent end of the cylinder. The shell or cylinder 66 is held to the mandrel, from longitudinal movement with respect thereto away from the shoulder 69, by a latch 115 ring 70 which is fitted flat against one side of the mandrel 32 and provided at suitably spaced apart points with arcuate slots 71 through which combined retaining and clamping bolts 72 pass, the bolts being 120 threaded into the adjacent end of the mandrel. The heads of the bolts 72 are adapted to bear against washers surrounding the bolts and bind the latter against the exterior surface of the ring 70 to lock the same in 125 adjusted position. The ring 70 is provided in its peripheral edge with dovetail notches 73 adapted to aline with the recesses or slots 68 in the mandrel and admit the release of the cylinder or plate 66. The cylinders or 130

plates 66 may thus be easily and quickly removed and interchanged upon the mandrel 32 so that any desired etching may be quickly mounted upon the mandrel and without undue delay in the operation of the press.

The printing roll of each frame section is hingedly mounted in one side of its section, and the shaft section 30 of each printing roll may be swung up about its trunnion 23 and the printing roll supported upon suitable means. When in this position, the plate or cylinder 66 may be readily slipped upwardly from the free end of the printing roll after the locking ring 70 has been turned sufficiently to register the recesses or notches 73 therein with the bead 67 of the removable cylinder or plate. The cylinders or plates, which are relatively light, may be easily handled, easily interchanged, and may be easily transported from a central plant where artists and the proper facilities for imprinting and etching may be had.

It is of course understood that various changes and modifications may be made in the details of construction and design of the various parts of the above specifically described embodiment of this invention, the modifications and changes being restricted only by the scope of the following claims.

I claim:

1. In a rotary photogravure press, the combination with a frame, of a mandrel mounted for rotation in the frame and pivoted at one end therein, a printing cylinder removably mounted on the mandrel and adapted to be introduced upon and removed from the free end of the mandrel when swung upon said pivot, means for securing the mandrel at its free end in the frame, and means for retaining the cylinder upon the mandrel.

2. In a rotary photogravure press, the combination with a frame, of a mandrel rotatably mounted in the frame and pivoted thereto at one end, means for releasably holding the free end of the mandrel in the frame, a cylinder detachably mounted on the mandrel and adapted to be removed therefrom and positioned thereon over the free end of the mandrel when released, and means for interlocking the cylinder with the mandrel.

3. In a rotary photogravure press, the combination with a frame, of a mandrel rotatably mounted in the frame and pivoted at one end thereto and adapted to be swung upwardly out on the frame, a cylinder of material to be etched removably fitting over the mandrel, means for locking the cylinder from circumferential movement upon the mandrel, retaining means carried upon the free end of the mandrel adapted to engage the cylinder to hold the latter from longitudinal removal from the mandrel, and

means for detachably holding the said mandrel for rotation in the frame.

4. In a rotary photogravure press, the combination of a mandrel provided with longitudinal grooves in the periphery thereof terminating near one end of the mandrel and opening through the opposite end thereof, a cylinder of material to be etched removably fitting over the mandrel and provided on its inner face with longitudinally extending ribs adapted to engage in said recesses of the mandrel to lock the cylinder from circumferential movement about the mandrel, and a locking device of less diameter than the cylinder carried upon the end of the mandrel adapted to engage the ends of the ribs when the cylinder is fitted to the mandrel to hold the cylinder from longitudinal movement from the mandrel.

5. In a rotary photogravure press, the combination of a mandrel provided with a longitudinal groove in its periphery opening through one end of the mandrel and extending to a point in spaced relation from the opposite end thereof to form a stop shoulder, a cylinder of material to be etched adapted to be fitted on the mandrel and having an internal rib for engagement in said groove and being of less length than the cylinder to abut said shoulder of the mandrel and retain the cylinder in longitudinal register with the mandrel, and a rotatable locking device carried upon the end of the mandrel through which said groove opens, and having a notch therein corresponding to the form of the rib to admit the passage thereof into and from said groove, said locking device being adapted to be turned upon the mandrel to move the notch out of register with the rib and retain the latter in the groove.

6. In a rotary photogravure press, the combination of a mandrel provided with longitudinal grooves in its peripheral surface terminating in spaced relation from one end of the mandrel and opening through the opposite end of the mandrel, a cylinder of material to be etched removably fitting upon the mandrel and provided with longitudinal ribs upon its inner surface adapted to engage in said grooves and being of less length than the cylinder to engage the mandrel at the inner ends of the said grooves to retain the cylinder and the mandrel in longitudinal register, and a locking ring concentrically and slidably mounted upon the end of the mandrel through which the grooves open and having notches in its peripheral edge adapted to register with the grooves upon the turning of the ring, said ring being adapted to be turned to move the notches out of register with the grooves for locking the ribs in the grooves.

7. In a rotary photogravure press, the

combination of a mandrel provided with a longitudinal peripheral groove opening through one end of the mandrel and terminating short of the other end thereof to form a stop shoulder, a cylinder of material to be etched removably fitting upon the mandrel and having a longitudinally extending rib adapted to seat in said groove and being of less length than the cylinder and adapted to engage said shoulder to hold the cylinder and the mandrel in longitudinal alinement, a locking ring arranged concentrically upon the end of the mandrel through which the groove opens and provided with a notch in its peripheral edge adapted to register with the groove to admit the passage of the rib into and out of the groove, said locking ring being adapted to be turned to move the notch out of register with the groove and to retain the rib therein, and means for securing the locking ring in adjusted position.

8. In a rotary photogravure press, the combination of a mandrel having a peripheral longitudinal groove opening through one end of the mandrel and terminating in spaced relation from the other end thereof to form a stop shoulder, a cylinder of material to be etched adapted to slide longitudinally over the end of the mandrel through which said groove opens and having a longitudinal rib on its inner surface to enter the groove and engage said shoulder to hold the cylinder in longitudinal register with the mandrel, a locking ring arranged concentrically against the end of the mandrel through which said groove opens and provided with segmental slots therein, clamping screws carried by the mandrel and projecting through said slots and adapted to

be tightened against the ring for holding the same in circumferentially adjusted position, said locking ring having a peripheral notch therein corresponding to the shape of said groove to admit the introduction and removal of said longitudinal rib, the locking ring being adapted to be turned and secured in position with the notch out of register with the groove for engaging the exposed end of the rib and holding the cylinder to the mandrel.

9. In a rotary photogravure press, the combination of a frame, a pivoted bearing block in one side of the frame, a removable bearing in the opposite side of the frame, a shaft mounted in one end in said pivoted bearing block and adapted to engage said opposite bearing block, means for detachably holding the shaft to the opposite bearing block, a mandrel mounted on said shaft, said shaft being adapted to be released from the other bearing block and swung about the pivoted bearing block into a released position, and a cylinder adapted to be removably positioned upon said mandrel when the latter is released.

10. In a rotary photogravure press, the combination of a frame, a transverse shaft rotatably mounted in the frame, a pivoted bearing for one end of the shaft, releasable retaining means for the opposite end of the shaft to hold the latter in the frame, said releasable means being adapted to be disengaged from the shaft and the latter being adapted to be swung into a raised position, a mandrel mounted upon the shaft, and a cylinder detachably mounted on the mandrel and adapted to be removed therefrom when the shaft is swung into a raised position.

HARVEY V. BIERY.