Jan. 11, 1938. E. W. DEAN ET AL 2,104,854

PLATE CLAMP OPERATING DEVICE FOR PRINTING PRESSES

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Fig. 1.

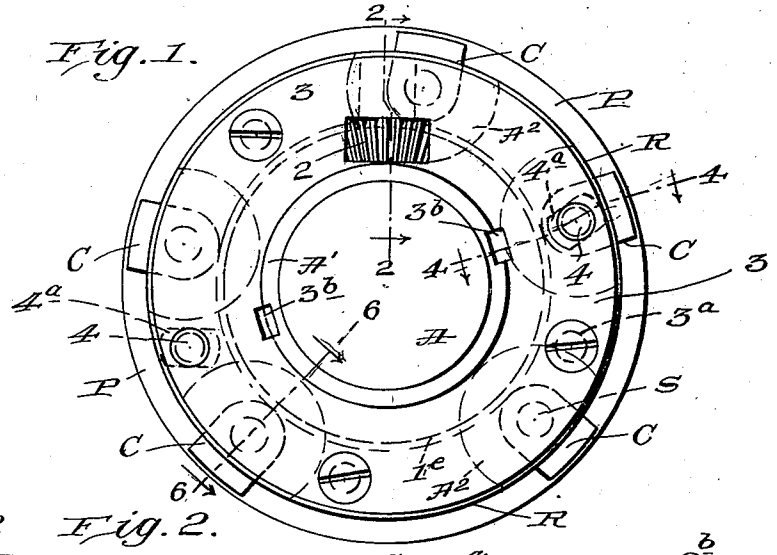
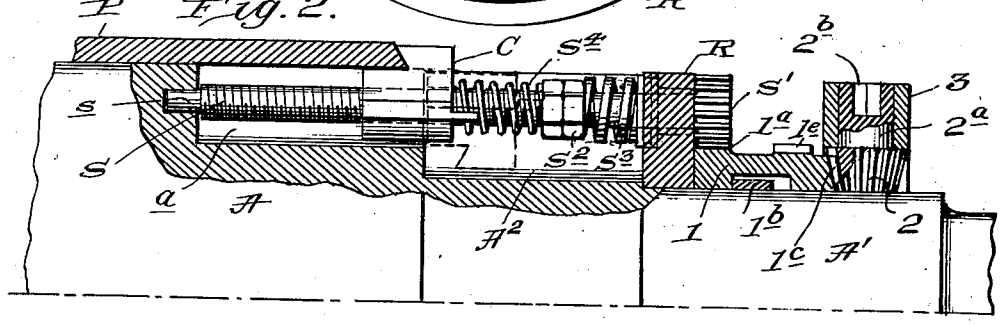


Fig. 2.



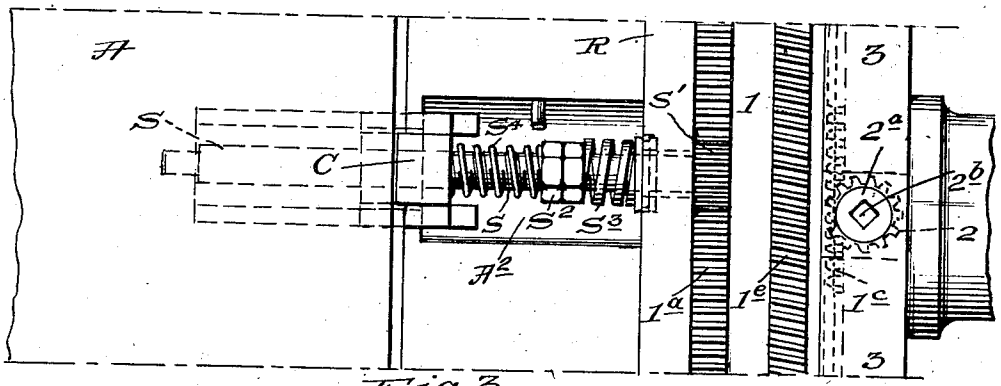


Fig. 3.

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Fig. 4.

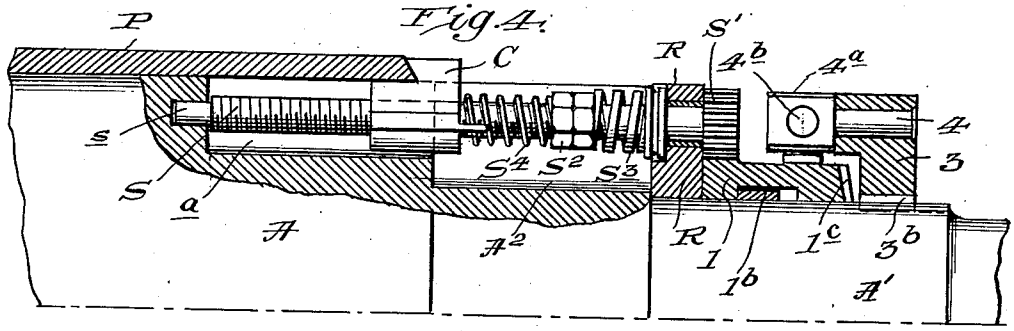


Fig. 5.

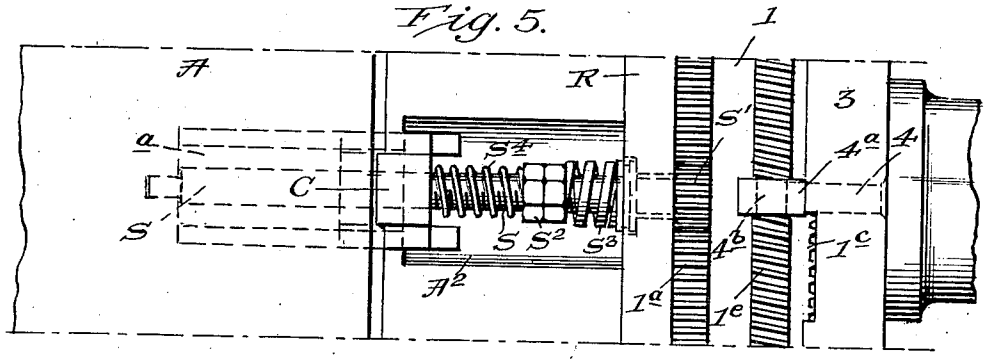


Fig. 7.

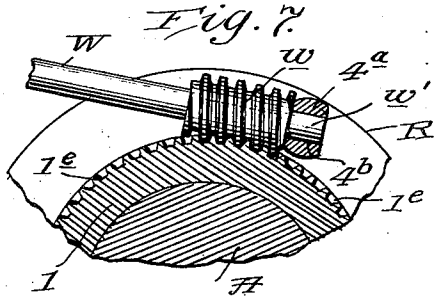
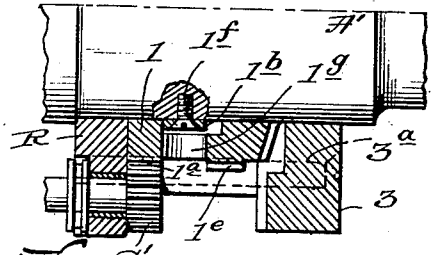


Fig. 6.



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PLATE CLAMP OPERATING DEVICE FOR PRINTING PRESSES

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Application June 8, 1936, Serial No. 84,234

11 Claims. (Cl. 101—378)

This invention relates to rotary cylinder printing presses and is a novel mechanism for simultaneously operating the clamps by which the plates are secured on the printing cylinder of such a press.

The invention is particularly designed for locking plates which practically surround the cylinder; and are placed in position by slipping them endwise on the cylinder, and removed by withdrawing them endwise off the cylinder. The particular clamps employed are of the type shown in Bechman Patent 1,052,206 of February 14, 1913, but the invention is not limited to such clamp; but the invention provides means whereby after the plates are on the cylinder all the clamps can be simultantously engaged with equal pressure; and also all the clamps can be simultaneously withdrawn to permit the removal of the plate; or the placing of a plate on the cylinder. Ordinarily there are from three to five clamps for the plate, and heretofore each clamp had to be operated separately. This of course required three to five separate operations, one for each clamp operating screw; and at least two different positionings of the cylinder in order that the operator could conveniently get at the clamp operating screws. In our invention all the clamp screws are operated simultaneously, and only one positioning of the cylinder is necessary to permit applying or retracting of the clamps.

We will explain the invention with reference to the accompanying drawings which illustrate a practical embodiment thereof, but we do not consider the invention limited to the specific construction shown, and refer to the claims for the essentials of the invention and novel features of construction and novel combinations of parts for which protection is desired.

In said drawings we have only shown the lock up end of the plate cylinder, and a portion of one of the plates on such cylinder; as the clamping devices for other plates form no part of the present invention, and may be the same as shown in the aforesaid Bechman patent when the invention is used in connection with cylinders carrying printing plates of the character referred to.

In said drawings:

Fig. 1 is an end view of a plate cylinder equipped with our novel clamp operating devices.

Fig. 2 is a longitudinal section on the line 2—2, Fig. 1, and showing the plate in locked position.

Fig. 3 is a top plan view of the parts shown in Fig. 2.

Fig. 4 is a sectional view on the line 4—4, Fig. 1, showing the plate in locked position.

Fig. 5 is a top plan view of Fig. 4.

Fig. 6 is a detail section on the line 6—6, Fig. 1.

Fig. 7 is a view illustrating the manner of operating the annular gear by worm-wrench.

The plate cylinder A may be of any desired construction. As shown it is adapted to carry hollow cylindric or tubular plates P, which can be slipped endwise onto, or off of, the cylinder. The end plate on the cylinder is adapted to be engaged by a plurality of plate clamps C, each of which is mounted on a screw S, the inner end *s* of which is journaled in a socket in the inner end of a recess *a* in the cylinder; and the outer end of the screw is journaled in a collar or ring R formed on or rigidly attached to the cylinder. By turning screw S the clamp C can be retracted, and turned over as indicated in Fig. 2 so that the plate P can be slipped endwise on or off the cylinder. When the plate is in position the clamps C are moved up against the edge of the plate and secure the same in place.

The parts thus far described are shown as substantially similar in construction and operation to the plate clamping devices shown in said Bechman patent, but in said patent each of the plate clamps was independently operable, and as there are three to five clamps employed on the end of each cylinder it required three to five separate operations and several positionings of the cylinder in order to enable the clamps to be applied or retracted.

In our present invention each screw S is provided on its outer end with a pinion S' which meshes with circumferential teeth 1*a* on an annular gear 1 which is rotatably mounted on a reduced end portion A' of the cylinder adjacent the ring R and is held closely adjacent the ring by means of a collar 1*b* securely pinned to the part A' of the cylinder and engaging an annular recess on the inside of the annular gear (see Fig. 6). The collar 1*b* can be secured by pins or screws 1*f*, to which access can be had through openings 1*g* in the annular gear 1.

The annular gear 1 is provided on its outer edge with beveled gear teeth 1*c*, which are adapted to mesh with a pinion 2 on a stub shaft 2*a* journaled in a ring 3, which may be keyed to the part A', as indicated at 3*b*. Ring 3 is also rigidly connected with the ring R by means of through bolts 3*a*, so that the rings R and 3 are practically integral and have no rotative movement on the reduced portion A' of the cylinder.

The stub shaft 2*a* is preferably provided with a socket 2*b*, angular in cross-section, and which is adapted to be engaged by a suitable wrench, not

shown, whereby the pinion 2 can be manually turned and thereby cause the annular gear 1 to turn on the part A', and, through its gear teeth 1a, simultaneously operate the pinions S' and rotate the several screw shafts S, thereby simultaneously moving the clamp C in or out.

The parts of the screws S adjacent the pinions S' are not threaded, and the screws are permitted a slight longitudinal movement relative to the ring R. Each screw however is provided with locking and jam nuts S2 and between these nuts and the ring R are inserted stout helical springs S3. These springs are provided to equalize the pressure of clamps C against the plate P. When the annular gear 1 is operated as described to apply the clamps, the springs S3 will insure equal pressure of the different clamps against the adjacent end of the plate.

After the clamps have engaged with the plate by turning the pinion 2 as above described, it is desirable to apply more pressure to the clamps in order to hold the plate firmly. For this purpose the annular gear 1 is formed with a peripheral series of worm gear teeth 1e; and to ring 3 are attached one or more, preferably two, pins 4 each having a head 4a provided with a socket 4b for engagement with a stud w' on one end of a wrench W, which has a worm w adjacent the stud w'. After the clamps have been set up against the plate by operating the pinion 2 as above described, the operator takes wrench W and inserts its stud w' in the bore 4b of one of the pins 4 and swings the worm w into engagement with the worm gear teeth 1e (see Fig. 7), and then manually turns the worm thereby imparting a more forcible rotation to the annular gear 1, and through screws S increasing the compression of springs S3. The springs S3 are made stiff enough to securely hold the clamps against the plate, and these springs compensate for any variations which may occur at different points of contact between the several clamps and the plate. The wrenches W indicated in the drawings are not claimed herein; and their construction may be varied.

When a plate is to be applied the clamps are retracted by turning the annular gear 1 in the reverse direction so as to relieve the tension on the springs S3 and retract the clamp from the plate and gear of the recess. A spring S4 is placed on each screw S between the clamp nuts S2 and the clamp to cause enough friction between the nut threads of the clamp and the threads of screw S so that revolving of the screw will cause the clamp to revolve about one-half turn in the initial movement of locking the plate and also revolve a half turn when retracted to unlocking position, as indicated in dotted lines in Fig. 2. When properly retracted the clamps will turn to the position indicated in dotted lines in Fig. 2, the cylinder being provided at the outer end of the recesses A with pockets indicated at A2 in the drawings. Preferably we use means for tipping the plates such as shown and described in said Bechman patent, and it is therefore unnecessary to describe the same.

It will be seen that by our invention any number of plate clamps adapted to engage the end of a plate, can be simultaneously operated to engage the plate after it is placed on the cylinder; or can be simultaneously withdrawn to permit the plate to be removed. The construction described is efficient; but we do not consider our invention limited to the particular construction shown.

We claim:

1. In combination with a plate cylinder having a recess, a rotatable screw extending into said recess, a plate clamp threaded on said screw, a pinion on said screw, a gear member mounted on the plate cylinder and meshing with said pinion whereby the screw may be rotated to advance or retract the clamp, means whereby the said member may be manually rotated to project or retract the clamp, said screw being longitudinally movable, spring means adapted to force the screw inwardly, and means whereby after the clamp is engaged with the plate the gear member may be further forcibly rotated to cause the spring means to forcibly hold the clamp in engagement with the plate.

2. In combination with a plate cylinder having recesses for accommodation of plate clamps, screws extending into said recesses, plate clamps threaded on said screws and adapted to be moved thereby into or out of the recesses, pinions on the outer ends of the screws; and a member rotatably mounted on the cylinder shaft and having gear teeth engaging the pinions for simultaneously rotating the screws.

3. In combination with a plate cylinder having longitudinal recesses for accommodation of plate clamps, screws extending into said recesses; plate clamps threaded on said screws adapted to be projected thereby into or out of the recesses, pinions on the outer ends of the screws; a gear member rotatably mounted on the cylinder shaft and having teeth engaging the pinions for simultaneously rotating the screws, said member also having a second set of gear teeth and a pinion meshing with the second set of teeth, and adapted to be manually operated to turn the member.

4. In combination with a plate cylinder having recesses for accommodation of plate clamps, screws extending into said recesses, plate clamps threaded on said screws and adapted to be moved thereby into or out of the recesses, pinions on the outer ends of the screws; a gear member rotatably mounted on the cylinder shaft and having gear teeth engaging the pinions for simultaneously rotating the screws, and a removable manually operable worm adapted to be engaged with teeth on said member to forcibly rotate it.

5. In combination with a plate cylinder having longitudinal recesses for accommodation of plate clamps, screws extending into said recesses; plate clamps threaded on said screws adapted to be projected thereby into or out of the recesses, pinions on the outer ends of the screws; a gear member rotatably mounted on the cylinder shaft and having annular gear teeth engaging the pinions for simultaneously rotating the screws, and also having gear teeth on one end, a pinion meshing with the teeth adapted to be manually operated, and a removable manually operable worm adapted to be engaged with teeth on said member to forcibly rotate it.

6. In combination with a plate cylinder having recesses for accommodation of plate clamps, screws extending into said recesses, plate clamps threaded on said screws and adapted to be moved thereby into or out of the recesses, pinions on the outer ends of the screws; a gear member rotatably mounted on the cylinder shaft and having gear teeth engaging the pinions to simultaneously rotate the screws, spring means on the screws for projecting the latter inwardly, and means whereby after the clamps have been engaged the gear member may be further forcibly rotated so as to

cause the springs to more closely bind the clamps against the plate.

7. In combination with a plate cylinder having a series of clamp guiding recesses adjacent one end, a collar at the outer ends of the recesses, screws having their inner ends journaled in the recesses and their outer ends in said collar, pinions on said screws, an annulus rotatably mounted on the cylinder shaft adjacent the collar, a ring mounted on the cylinder shaft, said annulus having gear teeth meshing with said pinions, and other gear teeth adjacent the ring, and a pinion on said ring meshing with the latter teeth, and whereby the annulus may be turned.

8. In combination with devices set forth in claim 7, nuts on the screws and springs interposed between the collar and nuts adapted to be compressed by excess rotation of the screws after the clamps have been engaged with the plate.

9. In combination with a plate cylinder having recesses for accommodation of plate clamps, screws extending into said recesses, plate clamps threaded on said screws and adapted to be moved thereby into or out of the recesses, pinions on the outer ends of the screws; a gear member rotatably mounted on the cylinder shaft and having annular gear teeth engaging the pinions for simultaneously rotating the screws, nuts on the screws, springs interposed between the collar and nuts on the screws and adapted to be compressed by excess rotation of the screws after the clamps have been engaged with the plate, and means whereby after the clamps have been engaged the gear member may be further forcibly rotated so as to cause the springs to more closely bind the clamp against the plate, said means including a third set of gear teeth on said member adapted to be engaged by a removable manually operable worm.

10. In combination with a plate cylinder having a series of clamp guiding slots adjacent one end, recesses at the outer ends of the slots, a collar at the outer ends of the recesses; longitudinally movable screws having their inner ends journaled in the recesses and their outer ends in said collar, pinions on said screws, an annulus rotatably mounted on the cylinder shaft adjacent the collar, a ring exterior to the annulus fixedly mounted on the cylinder shaft, said annulus having one series of gear teeth meshing with said pinion, a second set of gear teeth adjacent the ring, and a third set of gear teeth on its outer edge, a pinion mounted on the ring and meshing with the gear teeth on the edge of the annulus, whereby the annulus may be turned, and an eye bolt mounted on the ring, and adapted to hold a manually operable worm wrench in engagement with the second set of teeth on said annulus.

11. In combination with devices as set forth in claim 10, nuts on the screws, and springs interposed between the collar and the nuts and adapted to be compressed by excess rotation of the screws after the clamps have been engaged with the plate.

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