Feb. 6, 1962 C. H. RINGE ET AL 3,019,729

UNDERSIDE LOCK UP DEVICE FOR PRINTING PLATES

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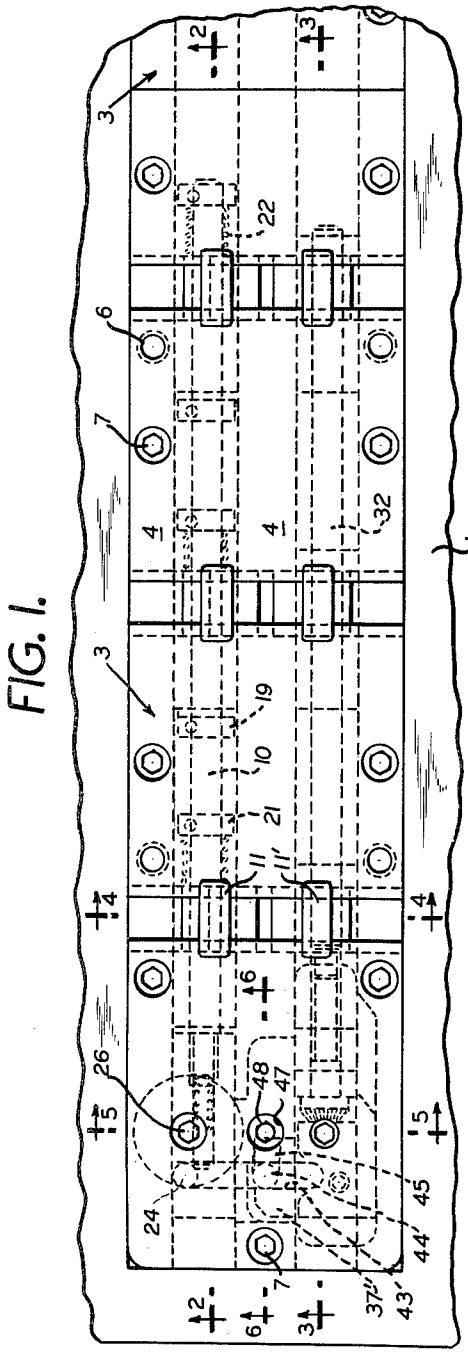


FIG. 1.

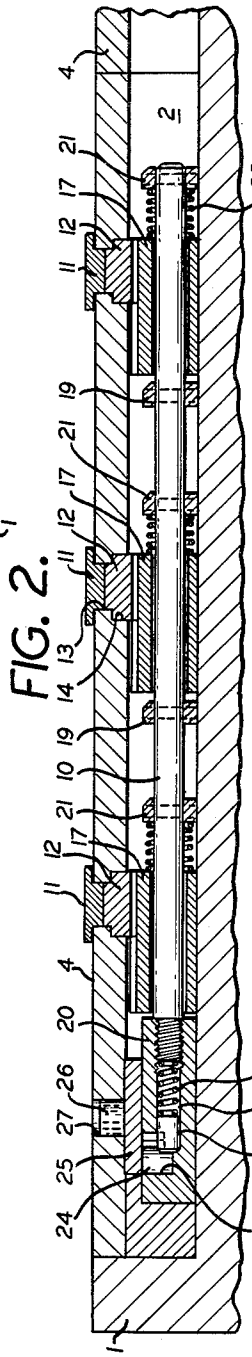


FIG. 2.

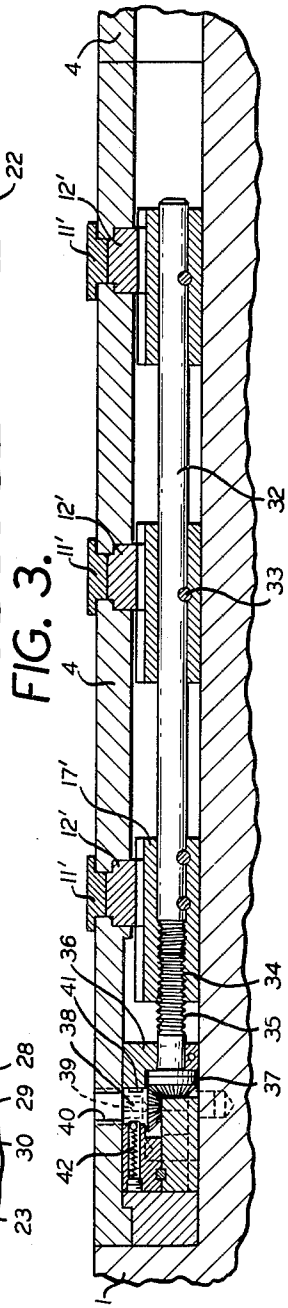


FIG. 3.

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FIG. 4.

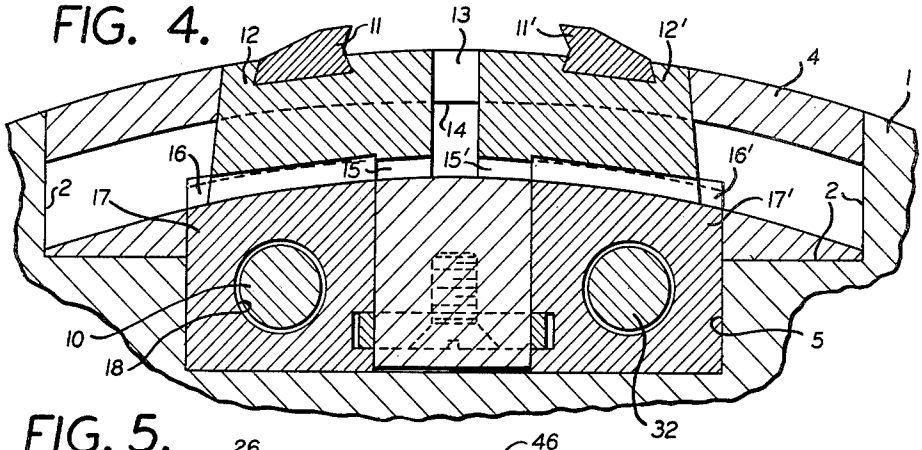


FIG. 5.

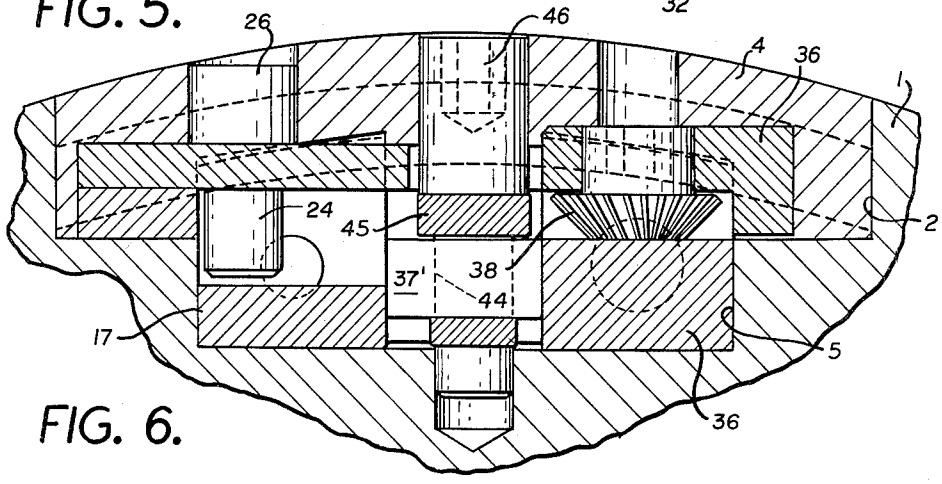
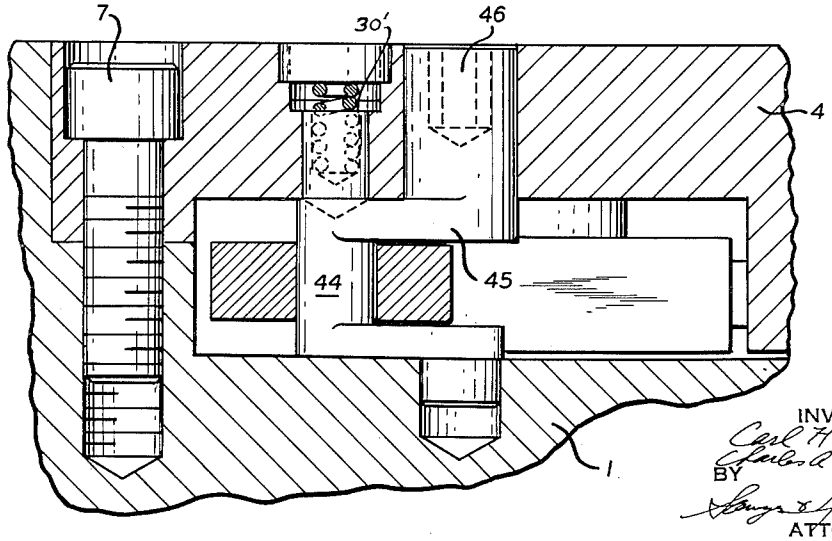


FIG. 6.



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UNDERSIDE LOCK UP DEVICE FOR PRINTING PLATES

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12 Claims. (Cl. 101—378)

This invention relates to plate clamping mechanism for printing machines.

More particularly, the invention is concerned with underneath plate lock up devices for so-called magazine presses (as distinguished from newspaper presses) in which the printing plates are somewhat thinner, accurate positioning is of great importance and extreme speed in locking and unlocking the plate is not as important.

It is an object of the invention to provide an improved plate clamping mechanism in which all clamping devices for the edge of a plate are operated simultaneously.

Another object is to provide a locking mechanism in which the locking action is quick and certain.

A further object is to provide a mechanism which is compact and requires only a relatively narrow and shallow groove in the cylinder body, thus avoiding weakening of the cylinder.

A mechanism embodying the invention in a preferred form will now be described with reference to the accompanying drawing, and the features forming the invention will then be pointed out in the appended claims.

In the drawing:

FIG. 1 is a plan view of a locking mechanism embodying the invention in a preferred form;

FIGS. 2 and 3 are axial sections taken on the lines 2—2 and 3—3, respectively, of FIG. 1;

FIGS. 4 and 5 are enlarged cross sections taken on the lines 4—4 and 5—5, respectively, of FIG. 1, and the parts, as shown in FIG. 5, being in the locked up position (cranks 25, 45 being rotated through substantially 180°, rather than in the unlocked position of FIG. 1); and

FIG. 6 is a detail enlarged section taken on the lines 6—6 of FIG. 1.

Referring now to the drawing, there is indicated at 1 a portion of a printing cylinder equipped with the locking mechanism of the invention, the cylinder having a groove 2 which accommodates the locking mechanism indicated generally at 3. This mechanism comprises a body 4 which has a cylindrical surface continuing or completing the surface of the cylinder 1 generally and which fits in the groove 2. As shown in FIGS. 4 and 5, the groove 2 is formed with a deeper central portion 5, for accommodating the parts as hereafter described.

In a typical installation using, for example, a cylinder of about 11 inch diameter, the groove in general may be only about ⅞ inch deep and the deeper central part only about 1⅜ depth. The over-all width of the clamping unit in the embodiment illustrated is only 3¼ inches, so that it is apparent that an exceptionally compact construction has been provided and that weakening of the cylinder by grooving to accommodate the clamping mechanism has been held to a minimum.

The clamping mechanism body 4 is held in position by locating dowels 6 and bolts 7 along its edges and by further bolts 7 and is grooved and cut as later described to accommodate the parts. Each clamping mechanism comprises a device for clamping and registering one edge of the plate and a device for resiliently clamping another edge of a plate. The spring mechanism for locking up one edge of the plate is shown in FIGS. 1 and 2 and comprises an axially slidable rod 10 for operating a plurality of plate clamping hooks 11 (in the case illustrated, there are three such hooks) which are carried on circumferentially movable blocks 12 mounted in circumferential slots 13, the walls of which are undercut as at 14 to form shoulders for holding down the members 12. On the bottom of each member 12 there is formed a helical gear tooth 15 having a pitch of about 30° to an axial plane, which tooth engages in a helical gear segment 16 of similar pitch formed on the top of an axially movable member 17, which accommodates rod 10 by means of a bore 18. Collars 19 fixed to the rod 10 at intervals and an end member 20 into which the end of the rod 10 is screwed as shown in FIG. 2, are provided for pushing the member 17 in one direction (to the right in FIG. 2) for unlocking the plate, and collars 21 also fixed to the rod 10 serve as abutments for applying clamping pressure to the members 17, through springs 22 for locking up the plate.

Rod 10 is actuated by means of block 20 in which one of its ends is fixed as mentioned above, and which block is formed with a transverse groove or slot 23 receiving a crank pin 24 which with the groove 23 forms a Scotch-yoke mechanism. Pin 24 is carried on a disc 25 which is rotatably mounted by means of hub 26 fitting in a bore 27 in the member 4. Hub 26 has means, such as the hexagonal socket shown, to accommodate a wrench by means of which disc 25 may be turned so that eccentric pin 24 operating in slot 23 moves the member 20 and rod 10 attached thereto axially. In line with member 10, the member 20 has a bore 28 accommodating a spring and plunger detent mechanism 29, 30. In the locked up position of FIG. 1, plunger 30 holds the pin 24 back in the position shown, while in the unlocked up position (slightly more than 180° counter clockwise in FIG. 1), the detent also holds pin 24 in the position. Detent plunger 30 will not move past the position shown in FIG. 2 since the bore 28 accommodating it extends only part way into the slot 23.

The mechanism just described serves to hold one end of a plate with a pressure determined by the characteristics of the springs 22, which pressure will be the same from clamp to clamp along the edge of the plate, even though there may be slight variations in the positioning of the plate sockets which receive the clamps, and provides for locking and releasing a plate by a single half-turn or so of the member 26 by means of a wrench.

The rigid locking mechanism, as shown in FIG. 3, comprises a number of clamps or hooks 11', 12' mounted and moved similarly to the elements 11 and 12 previously described and having similar helical teeth 15' engaging helical teeth 16' formed on blocks 17'. The blocks 17', instead of being spring operated as in the construction previously described, are fixed to an axially movable operating rod 32 as by means of dowels 33, so as to move as a unit therewith. The end member 17' has a threaded bore 34 in alignment with the member 32, which bore receives a screw 35 rotatably carried in a sliding block 36 and fitted with a bevel gear 37 which meshes with a radial bevel gear 38 rotatably mounted in the member 36 and having a socket 39 for receiving a wrench, access to which is provided by a bore 40 in the member 4. The shank of gear 38 may be provided with depressions 41 at intervals around the circumference which cooperate with a ball detent 42 so as to furnish an audible indication of the angle through which the bevel gear is turned and holds this gear in adjusted position. As will be apparent, by turning the bevel gear 38, bevel gear 37 and screw 35 attached to it will also be turned, thus adjusting the distance of rod 32 and all the elements 17' which are fixed to it from the member 36. In this way, a plate edge may be accurately registered, using for this purpose any of the usual gauge marks, stops or other available techniques, which in themselves are well known.

Member 36 may be moved bodily in the axial direction

by means of a Scotch-yoke construction similar to that previously described. Member 36 is formed at one side with an extension 37' in which is a transverse slot 43 receiving a crank pin 44 carried on arm 45 which is fastened to stud shaft 46 carried in a bore 47 in the member 4 and formed with means such as the hexagonal socket 48 for receiving a wrench.

As will be apparent, access to the adjusting mechanism for rod 32 can be had only when the rod operating member 36 is in its plate clamping or locked up position, as the movement of member 36 for releasing the plate moves the socket 39 out from under the bore 40. This insures that the adjustment for register will be made in the proper position. A spring detent 30' (FIG. 6) serves to hold the crank member 45 in its plate locking position.

It will also be noted that the mechanism of the present invention provides for true circumferential movement of the hooks 11, 11' concentrically about the cylinder axis. Since there is no radial component for movement of these hooks, shallower recesses and thinner plates may be used than in constructions having a chordwise movement of the clamping hooks or a movement on a relatively short radius about a center eccentric to the cylinder. The meshing gear teeth, and particularly the gear teeth 15', 16' for the rigidly clamped plate edge, are preferably also formed as helical tooth segments having a pitch circle or cylinder concentric about the cylinder axis and an involute tooth profile is preferred, permitting the fitting of these elements with minimum backlash without alteration of the tooth profiles. In the design shown by way of illustration, backlash is readily eliminated by machining or otherwise adjusting the lower surface of block 17', thus regulating the extent of meshing of the gear teeth segments to any degree of precision which may be required.

What is claimed is:

1. In a magazine press printing cylinder, a plate clamping mechanism comprising a hook for engaging a recess in the plate, supporting and guiding means mounting the hook for arcuate movement concentrically about the cylinder axis, and operating mechanism for moving the said hook between plate clamping and plate releasing positions comprising an axially movable operating member with cooperating meshing gear tooth segments formed on the hook and operating member respectively and being helical tooth segments having a pitch cylinder also substantially concentric with the cylinder axis.

2. In a magazine press printing cylinder, a plate clamping mechanism comprising a hook for engaging a recess in the plate, supporting and guiding means mounting the hook for arcuate movement concentrically about the cylinder axis, and operating mechanism for moving the said hook between plate clamping and plate releasing positions comprising an axially movable operating member with cooperating meshing gear tooth segments formed on the hook and operating member respectively and being helical tooth segments having a pitch cylinder also substantially concentric with the cylinder axis and a helical angle of substantially 30°.

3. In a magazine press printing cylinder, a plate clamping mechanism comprising a hook for engaging a recess in the plate, supporting and guiding means mounting the hook for arcuate movement concentrically about the cylinder axis, and operating mechanism for moving the said hook between plate clamping and plate releasing positions comprising an axially movable operating member with cooperating meshing gear tooth segments formed on the hook and operating member respectively and being involute helical tooth segments having a pitch cylinder also substantially concentric with the cylinder axis.

4. In a magazine press printing cylinder, a plate clamping mechanism comprising a hook for engaging a recess in the plate, supporting and guiding means mouting the hook for arcuate movement concentrically about the cylinder axis, and operating mechanism for moving the said hook between plate clamping and plate releasing positions comprising an axially movable spring-urged operating member with cooperating meshing gear tooth segments formed on the hook and operating member respectively and being helical tooth segments having a pitch cylinder also substantially concentric with the cylinder axis.

5. Plate clamping mechanism according to claim 4, in which the said tooth segments have a relatively low helical angle whereby the spring-urged operating member is enabled to hold the hook in engagement under substantially fixed spring pressure while preventing backing up of the hook against the said spring pressure.

6. Plate clamping mechanism according to claim 5, in which the said helical angle is about 30°.

7. In a magazine press printing cylinder, a plate clamping mechanism comprising two sets of axially aligned hooks for engaging respectively in recesses under adjoining plate edges and operating mechanism for the two said sets comprising an axially movable operating rod for one set and spring means connecting the same to the hooks of that set, and a second operating rod with rigid means connecting the said second rod to the other set of hooks, means for axially moving the first said rod between plate clamp engaging and plate clamp releasing positions, an axially movable operating member for moving the second said rod between predetermined plate clamp engaging and plate clamp releasing positions, means for axially moving the said operating member between its said predetermined positions and means adjustably connecting the second said rod to the last said member for adjusting the plate clamping position of its set of hooks.

8. Plate clamping mechanism according to claim 7, in which the means adjustably connecting the second said rod to the said axially movable operating member comprises meshing bevel gears, one having a screw connection to the said rod and the other being turnable about a radial axis.

9. Plate clamping mechanism according to claim 8, in which the cylinder comprises a surface portion covering the said axially movable operating member and having an aperture providing access to the second said bevel gear for turning the same when the axially movable member is in its plate clamping position, but blocking access thereto when the axially movable member is moved toward plate releasing position.

10. Plate clamping mechanism according to claim 7, in which the means for moving the first said operating rod and the said axially movable operating member comprises a Scotch-yoke connection including a crank member movable between two dead center positions, one corresponding to plate clamping position and the other corresponding to plate releasing position.

11. Plate clamping mechanism according to claim 10, comprising also spring detent means for holding the said crank members in plate clamping position.

12. Plate clamping mechanism according to claim 8, comprising spring detent means for holding the second said bevel gear in a plurality of predetermined angular positions, corresponding to predetermined adjustment of the clamping hooks associated therewith.

References Cited in the file of this patent

UNITED STATES PATENTS

1,733,653	Durrant	Oct. 29, 1929
1,805,134	Durrant	May 12, 1931
2,072,909	Stephenson	Mar. 9, 1937
2,095,724	Warnock	Oct. 12, 1937
2,621,590	Faeber	Dec. 16, 1952
2,645,177	Dressel et al.	July 14, 1953
2,667,832	Ziebell	Feb. 2, 1954
2,709,405	McWhorter	May 31, 1955
2,709,406	Knowles	May 31, 1955
2,909,999	Polgalze et al.	Oct. 27, 1959