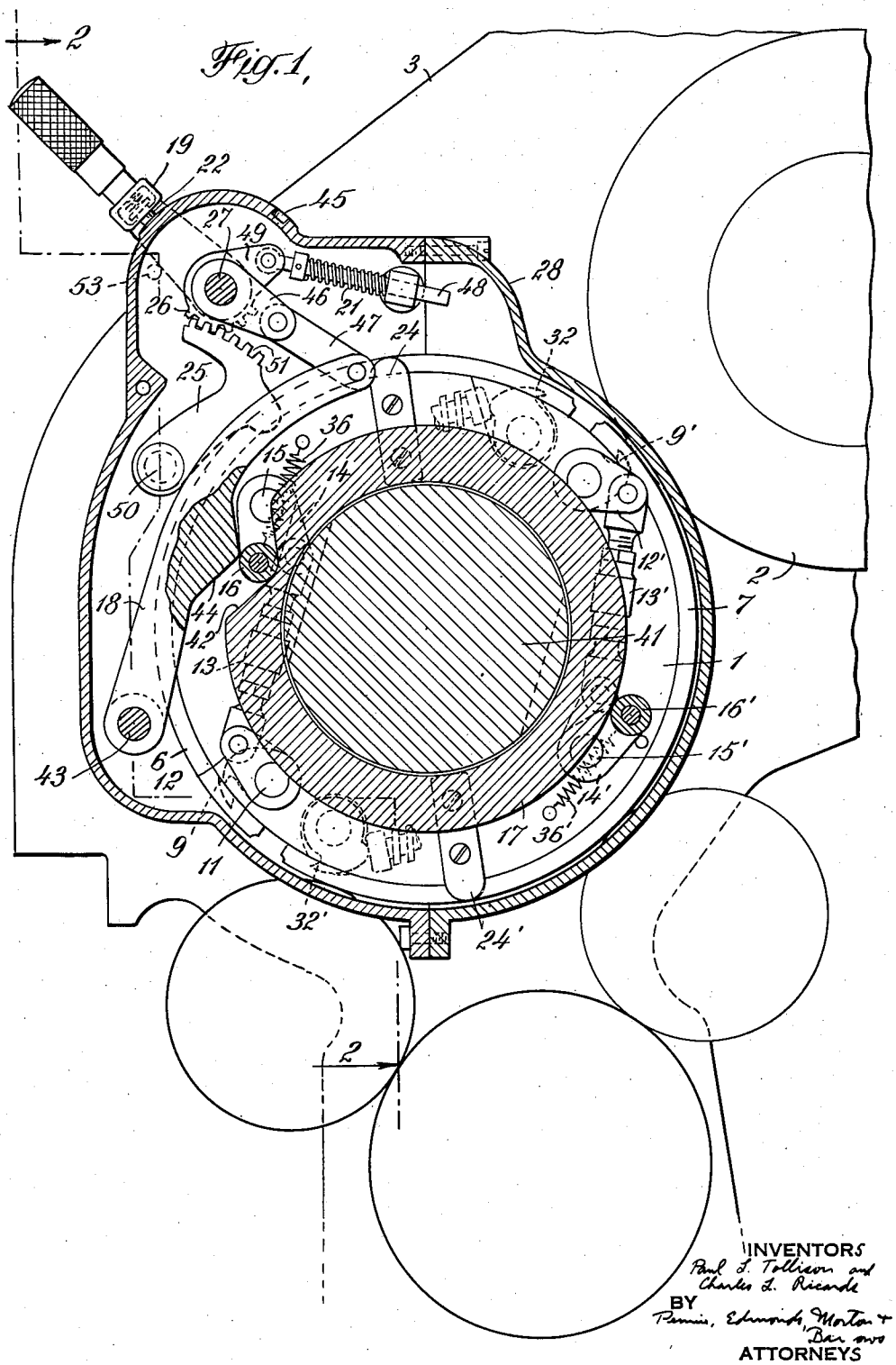
June 21, 1949. P. L. TOLLISON ET AL 2,474,127

CLAMPING APPARATUS FOR TENSION LOCKED PRINTING PLATES

Filed Aug. 13, 1946 4 Sheets-Sheet 1

Fig. 1.



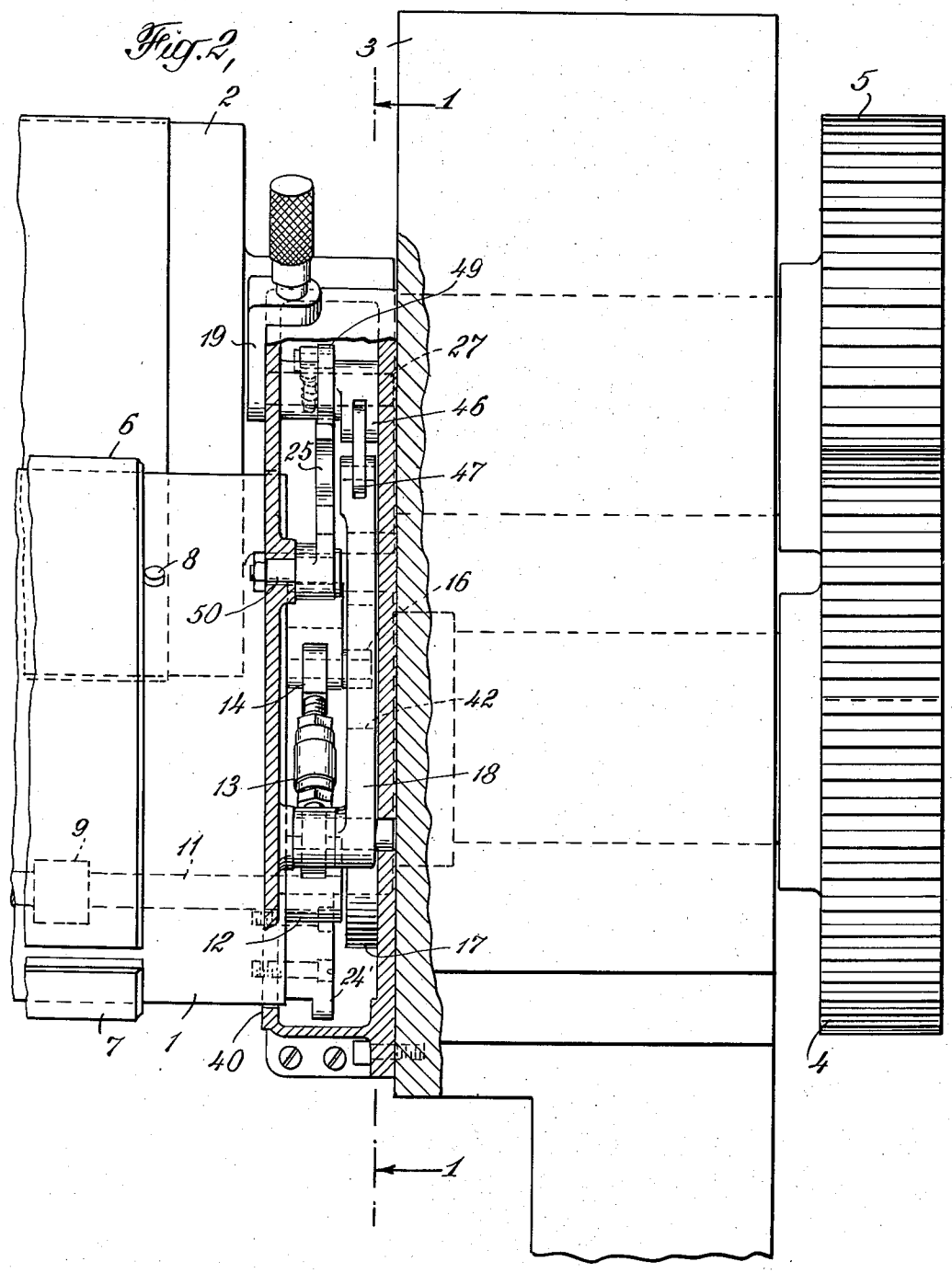
INVENTORS
Paul L. Tollison and
Charles L. Ricards
BY
Pennie, Edmonds, Morton & Barrows
ATTORNEYS

June 21, 1949. P. L. TOLLISON ET AL 2,474,127

CLAMPING APPARATUS FOR TENSION LOCKED PRINTING PLATES

Filed Aug. 13, 1946 4 Sheets-Sheet 2

Fig. 2.



INVENTORS
Paul L. Tollison and
Charles L. Ricards
BY
Pennie, Edmonds, Morton & Barrows
ATTORNEYS

June 21, 1949. P. L. TOLLISON ET AL 2,474,127

CLAMPING APPARATUS FOR TENSION LOCKED PRINTING PLATES

Filed Aug. 13, 1946 4 Sheets-Sheet 3

Fig. 3,

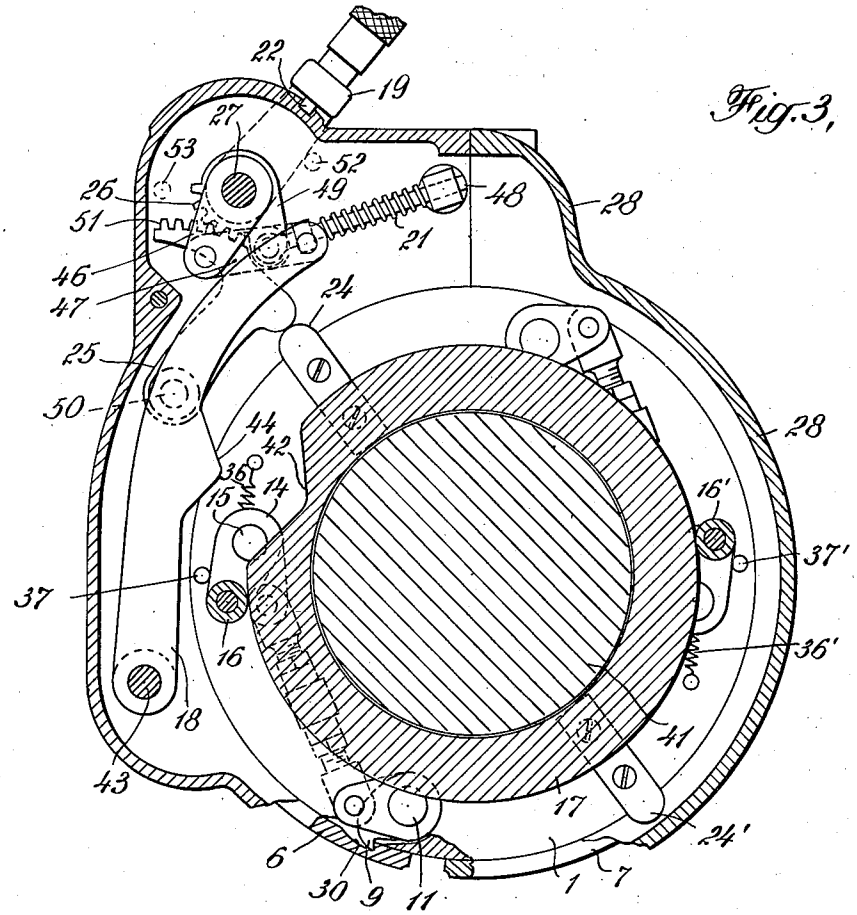
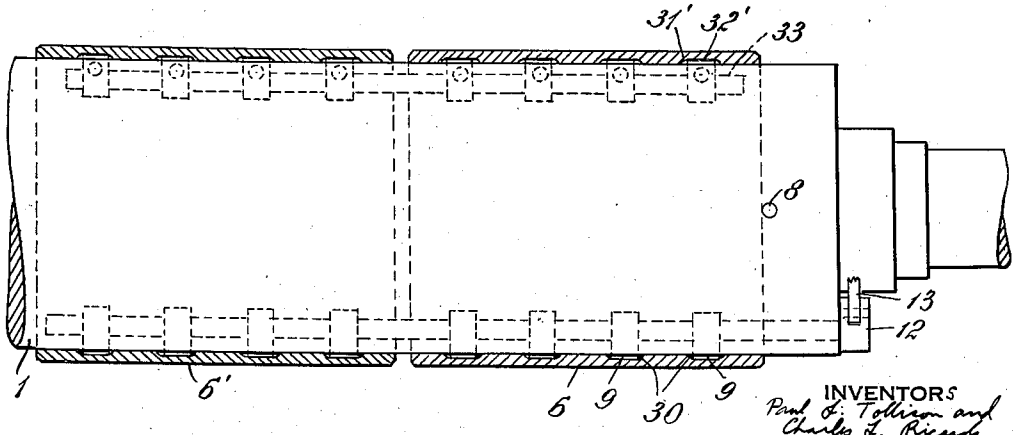


Fig. 5,



INVENTORS
Paul L. Tollison and
Charles L. Ricard

BY
Penne, Edmonds, Morton & Barrows

ATTORNEYS

June 21, 1949. P. L. TOLLISON ET AL 2,474,127

CLAMPING APPARATUS FOR TENSION LOCKED PRINTING PLATES

Filed Aug. 13, 1946 4 Sheets-Sheet 4

Fig. 4,

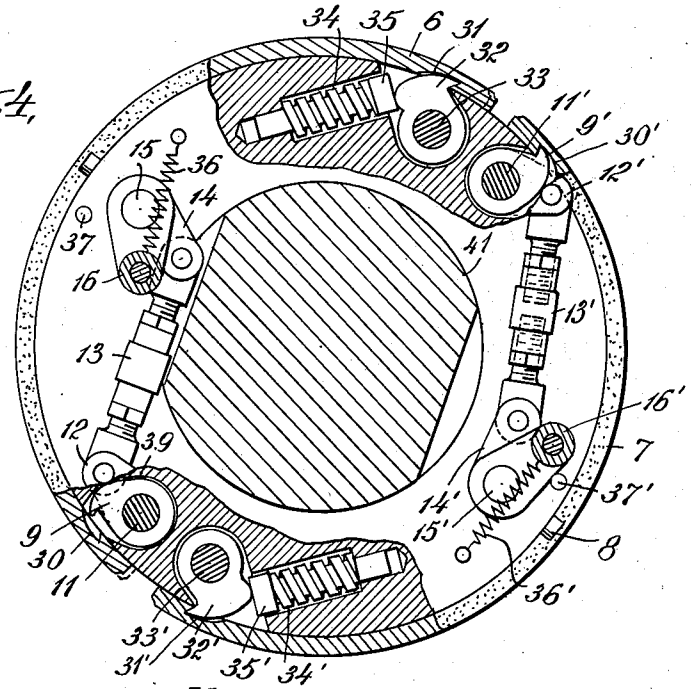
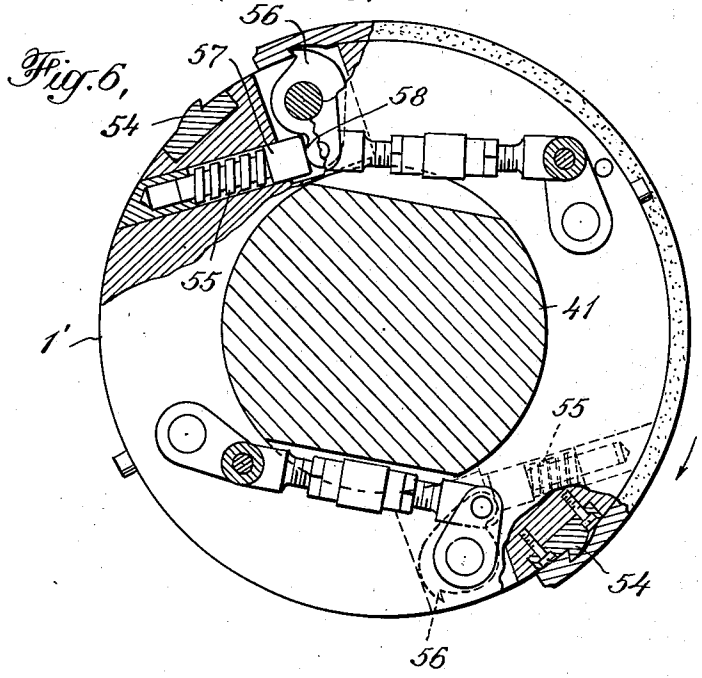


Fig. 6,



INVENTORS
Paul L. Tollison and
Charles L. Riendo
BY
Pennie, Edmonds, Morton + Barrows
ATTORNEYS

Patented June 21, 1949

2,474,127

UNITED STATES PATENT OFFICE

2,474,127

CLAMPING APPARATUS FOR TENSION LOCKED PRINTING PLATES

Paul L. Tollison, North Plainfield, and Charles L. Ricards, South Plainfield, N. J., assignors to Wood Newspaper Machinery Corporation, Plainfield, N. J., a corporation of Virginia

Application August 13, 1946, Serial No. 690,304

5 Claims. (Cl. 101—378)

1

This invention relates to quick acting lock-up mechanism for securing stereotype printing plates to the plate cylinders of printing presses under tension circumferentially of cylinders, and for releasing the plates from the cylinders.

The primary object of the invention is to provide means by which semi-cylindrical stereotype printing plates may be quickly and easily locked onto the plate cylinders of presses under tension circumferentially of the cylinders, and may be released from such cylinders. A particular object of the invention is the provision of means of this nature which utilizes the rotation of the power driven plate cylinders to positively perform both the locking and unlocking operations and does this regardless of the direction in which the plate cylinder rotates. Other objects include the provision of improved means actuated by the rotation of the plate cylinder which moves the control mechanism that governs the locking and unlocking mechanism to its inoperative position, and performs this function regardless of the direction of rotation of the cylinder. Other specific objects and features of the invention will become apparent as the description of typical embodiments thereof progresses.

In describing the invention in detail, reference will be made to the accompanying drawings in which certain embodiments of the invention are illustrated. In the drawings;

Fig. 1 is an end view, partly in section, of a plate cylinder provided with mechanism embodying the invention, the section being taken along the line 1—1 of Fig. 2;

Fig. 2 is a side elevation of the mechanism shown in Fig. 1, taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view, similar to Fig. 1, showing the mechanism in the plate securing position;

Fig. 4 is an end view, partly in section, of the cylinder carried mechanism;

Fig. 5 is an elevation of a portion of the plate cylinder showing plates in position thereof; and

Fig. 6 is an end view, similar to Fig. 4, showing a modified construction of the cylinder carried mechanism.

In the disclosed embodiment of the present invention, a plurality of plate locking fingers are mounted in the plate cylinder for rocking movement circumferentially of the cylinder between retracted unlocking positions and extended locking positions. These fingers, when extended, engage internal pockets near the straight end edges of the plates and clamp them in circumferential tension against the cylinder, the opposite ends of the plates being held by relatively fixed fingers engaging similar plate pockets. The retractable fingers are operated by the movement of a lever on the plate cylinder, and this lever is moved

2

between locking and unlocking positions by rotary movement of the cylinder relative to a non-rotating cam surface adjacent its end. In accordance with the invention, the cam surface is of the closed or box type so that both the locking and the unlocking movement of the fingers is positive. The cam surface is preferably formed by the cooperation of two cam elements, one of which is movable laterally toward and away from the other. In one position of the movable element, it cooperates with the stationary element to form a box type cam track for positively removing the finger operating lever between its finger extending locking position and its finger retracting unlocking position, and in the other position of the movable cam element, the finger operating lever is permitted to remain in a position in which it extends the fingers and so locks the plate.

Referring to the drawings and particularly to Figs. 1 and 2, we have shown a printing couple comprising essentially a plate cylinder 1 and an impressed cylinder 2, both of which are carried by shafts journaled in a side frame 3 and connected by the gears 4 and 5. Power from a suitable source is connected to drive the plate cylinder in a known manner, and the direction of rotation of this cylinder may be reversed under certain conditions, for example when rearrangement of the threading of the paper web leads for color printing is required as is well known in the art. Semi-cylindrical stereotype plates 6 and 7 are carried on the surface of the plate cylinder 1 between margin pins 8. Additional oppositely disposed plates may be carried at adjacent points longitudinally of the cylinder in accordance with known practice, and one such plate is illustrated at 6' in Fig. 5.

The plates are secured to the cylinder by tension lock-up mechanism. Each plate is provided with a plurality of internal pockets or recesses adjacent its straight end edges, as shown in Fig. 5 where the pockets of the plate 6 are designated 30 and 31. The pockets 31 receive spring loaded fingers 32 which extend outward from the surface of the cylinder 1 at longitudinally spaced points and are journaled on a shaft 33. The fingers 32 are spring loaded by suitable springs 34 embracing poppets 35 which engage abutments on the fingers 32 as best shown in Fig. 4. The opposite end of the plate 6 is engaged by spaced retractable and extensible fingers 9 secured to a rocker shaft 11 journaled in and extending longitudinally of the cylinder 1. The fingers 9 extend into the plate pockets 30 as shown in Figs. 3, 4 and 5 and lock the plate onto the cylinder under circumferential tension. A lever 12 is secured to the shaft 11 beyond the end of the cylinder, and an adjustable link 13 is pivotally connected between the lever 12 and a

cam roller lever 14 journaled on a stud 15 fixed to the cylinder 1. The lever 14 carries a cam roller 16 which extends outwardly from the head of the cylinder for operation by the cam mechanism as hereinafter described. It will be understood that when the cam roller lever 14 is turned clockwise to the position shown in Fig. 3, the fingers 9 will be extended into the plate pockets 30 and will lock the plate 6 against the cylinder 1 by tensioning the plate against the relatively fixed spring loaded fingers 32. When the lever 14 is turned counterclockwise to the position shown in Fig. 1, the fingers 9 will be retracted from the pockets 30 and so will release the plate 6 and permit its removal from the cylinder. A toggle spring 36 is secured to the lever 14 for maintaining it in its two extreme positions which are respectively fixed by a stop pin 37 and the walls 39 of the cavities in which the fingers 9 move (Fig. 4). As shown in Fig. 3, the lever 14 moves past center in the plate locking position and compresses the springs 34 which supplements the locking action of the spring 36.

The cylinder 1 carries at each end thereof two sets of tension lock-up mechanism of the construction described, the corresponding parts of which are disposed at diametrically opposite points, that is, the sets of lock-up mechanism respectively cooperate with the two opposite plates 6 and 7. Since the parts of the opposite lock-up mechanisms are of identical construction, they will not be separately described and the parts of the mechanism for securing the plate 7 will be designated by reference characters corresponding to those designating the mechanism for the plate 6, but with distinctive exponents.

The non-rotating parts of the apparatus are carried by the frame 3 in a protective housing 28 secured to the frame and having an inner wall 40 surrounding and lying close to the cylindrical surface of the cylinder 1 as shown in Fig. 1. A stationary circular cam 17 is fixed within the housing 28 and surrounds the hub 41 of the cylinder 1. A symmetrical depression or cam notch 42 is formed in the circumferential surface of the cam 17, as shown in Figs. 1 and 3. A cam 18, pivotally secured to the housing 28 at 43, has a symmetrical raised cam surface 44 which cooperates with the notch 42 of the cam 17 to form a box cam or closed cam track between these elements when the cam 18 is moved to its inner or plate releasing position as shown in Fig. 1. The cam track formed between the cams 17 and 18 is disposed to receive the cam roller 16 on the lever 14, and to engage the opposite sides of this roller so as to positively move it in either direction.

Manually operable means are provided for moving the cam 18 to its finger operating position as shown in Fig. 1. A hand lever 19 is fixed to a shaft 27 and is provided with a spring latch pin 22 which cooperates with an opening 45 in the housing to hold the lever 19 in the cam retracting position, as shown in Fig. 3. A lever 46 is fixed to the shaft 27 and is connected through a link 47 to the free end of the pivoted cam 18. A toggle spring 21, surrounding a pivoted sliding rod 48 connected to an arm 49 on the shaft 27 assists in holding the lever 19 in each of its extreme positions.

For the purpose of returning the hand lever 19 to the position in which it retracts the pivoted cam 18, there is provided a lever 25 pivoted to the housing at 50 and having a gear segment 51 at its outer end. The gear segment 51 meshes

with a gear segment 26 secured to the hand lever shaft 27. Two trip blocks 24 and 24' are secured to the end of the cylinder at diametrically opposite points, and are disposed to engage an extension on the lever 25 as the cylinder rotates, thus forcing this lever outward and moving the hand lever 19 to its latched up position in which it retracts the pivoted cam 18. This action of the trip block 24 is illustrated in Fig. 3. A pair of stop pins 52 and 53 limit the movement of the hand lever 19 in its extreme positions.

In the operation of the described mechanism, when a stereotype plate is to be removed from the cylinder, the hand lever 19 is moved to its operating position by first retracting the spring latch pin 22 and then moving the lever against the stop pin 53, thereby moving the pivoted cam 18 into a position in which it cooperates with the cam 17 to form a box cam or cam track. The press is then turned or jogged to the plating position in which the roller 16 is moved by the cam track to rotate the shaft 15 in a counterclockwise direction to the position shown in Fig. 1. This retracts the plate clamping fingers 9 and so permits the removal of the plate 6 from the cylinder 1. A new plate may then be placed on the cylinder 1 with its pockets 31 engaged over the fingers 32. The press is then started, and as the cylinder 1 starts to turn, the cooperating cam surfaces 42 and 44 which form the box cam, turn the cam roller lever 12 clockwise to the position shown in Fig. 3, thus extending the fingers 9 into the plate pockets 30 and clamping the plate on the cylinder. After this locking operation is completed, the trip block 24 engages the lever 25 and moves it outwardly, thus swinging the hand lever 19 to and latching it in its inoperative position in which the pivoted cam 18 is retracted. With this arrangement, continued rotation of the cylinder does not again unclamp the plate unless and until the operator again moves the hand lever 19 to its operating position.

In the described operation, the plate clamping fingers are positively moved to both their plate clamping and plate releasing positions by a power derived from the rotation of the cylinder. The operator merely sets the hand lever 19 in the operative position prior to the unclamping operation and it is automatically returned to inoperative position after plate clamping also by power from the rotation of the cylinder. The described operations are performed regardless of the direction of rotation of the cylinder due to the fact that the box cam defined by the cooperating surfaces 42 and 44 positively moves the cam roller lever in both directions. The trip blocks 24 and 24' are disposed at diametrically opposite points between the opposite clamp finger operating rollers 16 and 16', and so act to return the hand lever 19 to its inoperative position after the plate clamping operation regardless of the direction of rotation of the cylinder.

In a modified form of the invention, illustrated in Fig. 6, the fingers 54 are fixed to the cylinder 1', and springs 55 are provided to exert clamping pressure on the other plate recess engaging fingers 56. The springs 55 are carried in recesses in the cylinder and embrace slidable poppets 57, the heads of which engage abutments 58 on the fingers 56. One of these springs 55 is provided to bias each of the fingers 56. With this arrangement, the plate clamping and tensioning force is applied directly to each of the individual fingers 56. This construction avoids the relative angular displacement of the several plate pocket

engaging fingers 9 and 9' of the previously described embodiment, which displacement may occur due to progressive torsional deflection of the shafts 11 and 11' under the clamping force applied at one end of these shafts by the shaft operating levers 14 and 14'. The effects of such deflection can of course be avoided in the previously disclosed embodiment by fixing the several fingers 9 and 9' to the respective shafts 11 and 11' in slightly displaced relatively angular positions progressively along the shafts so that the fingers are properly aligned when the clamping pressure progressively torsionally deflects the shafts 11 and 11'.

We claim:

1. In a printing plate locking device, in combination, a rotary plate cylinder, at least one plate clamping element on said cylinder movable between retracted plate releasing and extended plate clamping positions, an operating member connected to said clamping element including a cam follower extending from one end of said cylinder and movable in opposite directions to move said clamping element to its retracted and extended positions, a toggle spring connected to said operating member and biasing said clamping element to move to both its clamp retracting and clamp extending positions, a pair of cam surfaced members fixed against rotation adjacent said end of said cylinder, manually operable means for moving one of said cam surfaced members adjacent the other to form therebetween a cam track for receiving said cam follower and positively moving it in opposite directions during the rotation of said cylinder and for separating said cam surfaced members to prevent movement of said cam follower thereby.

2. In a printing plate locking device, in combination, a rotary plate cylinder, at least one plate clamping element on said cylinder movable between retracted plate releasing and extended plate clamping positions, an operating member connected to said clamping element including a cam follower extending from one end of said cylinder and movable in opposite directions to move said clamping element to its retracted and extended positions, a pair of cam surfaced members fixed against rotation adjacent the end of said cylinder, manually operable means for moving one of said cam surfaced members adjacent the other to form therebetween a box cam track for positively moving said cam follower in opposite directions during the rotation of said cylinder and for separating said cam surfaced members to prevent movement of said cam follower thereby, and means responsive to the rotation of said cylinder for moving said manually operable means to separate said cam surfaced members.

3. In a printing plate locking device, in combination, a rotary plate cylinder, at least one plate clamping element on said cylinder movable between retracted plate releasing and extended plate clamping positions, an operating member connected to said clamping element including a cam follower extending from one end of said cylinder and movable in opposite directions to move said clamping element to its retracted and extended positions, a pair of cam surfaced members fixed against rotation adjacent said end of

said cylinder and acting when in cooperating relation to engage therebetween and positively move said cam follower in both directions during rotation of said cylinder, manually operable means for moving one of said cam surfaced members into and out of cooperating relation with the other and means responsive to the rotation of said cylinder for moving one of said cam surfaced members out of cooperative relation with the other.

4. In a printing plate locking device, in combination, a rotary plate cylinder, at least one plate clamping element on said cylinder movable between retracted plate releasing and extended plate clamping positions, an operating member connected to said clamping element including a cam follower extending from one end of said cylinder and movable in opposite directions to move said clamping element to its retracted and extended positions, a pair of cam surfaced members fixed against rotation adjacent said end of said cylinder and acting when in cooperating relation to positively move said cam follower in both directions during rotation of said cylinder, manually operable means for moving one of said cam surfaced members into and out of cooperating relation with the other and means operated by the rotation of said cylinder for moving said manually operable means to move one of said cam surfaced members out of cooperating relation with the other.

5. In a printing plate locking device, in combination, a rotary plate cylinder, at least one locking finger on said cylinder movable circumferentially thereof in opposite directions to clamp a plate to said cylinder and to unclamp said plate, a cam follower at the end of said cylinder connected to said fingers and movable substantially radially of said cylinder between clamping and unclamping positions, a fixed inner cam adjacent the end of said cylinder having an external circular surface with a depression therein, an outer cam fixed against rotation adjacent said inner cam and having an internal raised cam surface for cooperation with said depression of said inner cam, manually operable means for moving said outer cam adjacent said inner cam to form therebetween a box cam track for positively moving said cam follower successively to its unclamping and its clamping positions during the rotation of said cylinder, and means on said cylinder for moving said outer cam away from said inner cam during the rotation of said cylinder to prevent further movement of said cam follower after it is moved to its clamping position.

PAUL L. TOLLISON.
CHARLES L. RICARDS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,716,609	Wood	June 11, 1929
1,937,454	Wood	Nov. 28, 1933
2,021,974	Wood	Nov. 26, 1935
2,047,357	Crafts	July 14, 1936
2,236,230	Worthington	Mar. 25, 1941
2,339,310	Wise	Jan. 18, 1944