May 10, 1960 L. ROSSETTO ET AL 2,935,937

PLATE CLAMP FOR PRINTING MACHINE

Filed Oct. 29, 1957 3 Sheets-Sheet 1

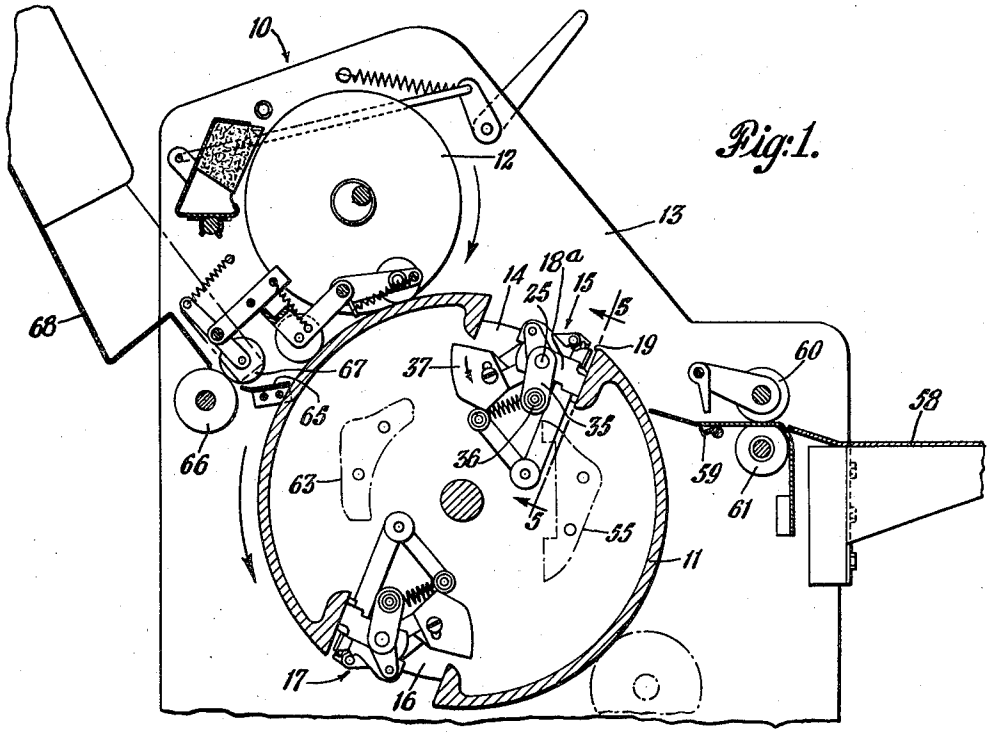



Fig. 1.

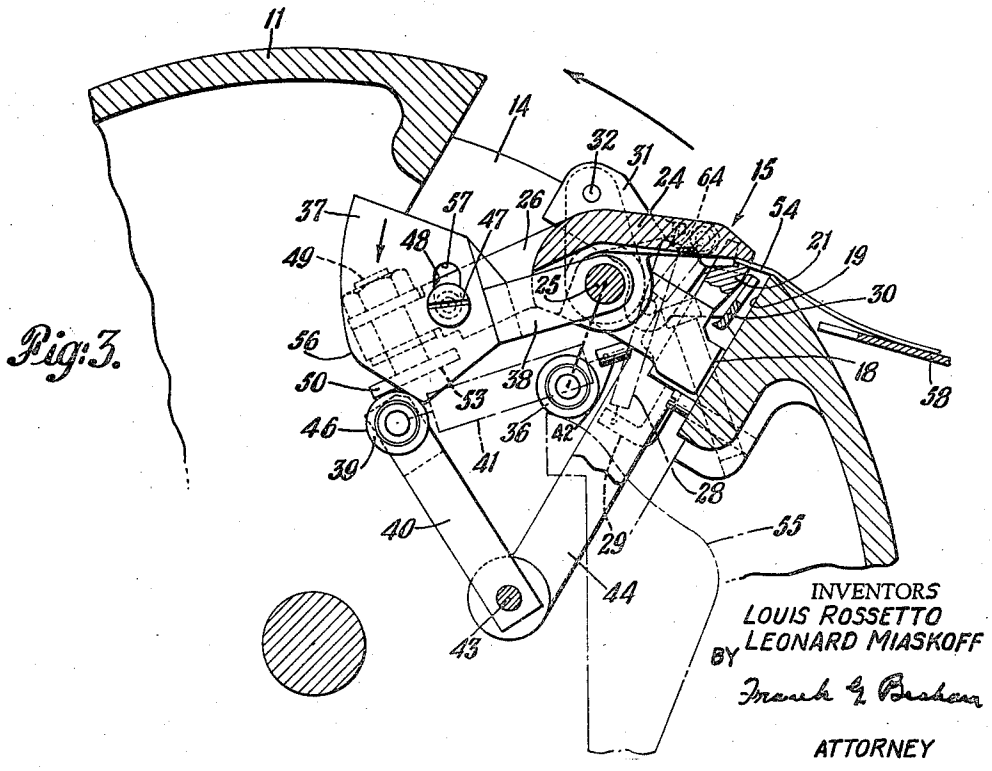



Fig. 3.

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PLATE CLAMP FOR PRINTING MACHINE

Filed Oct. 29, 1957 3 Sheets-Sheet 2

Fig: 2.

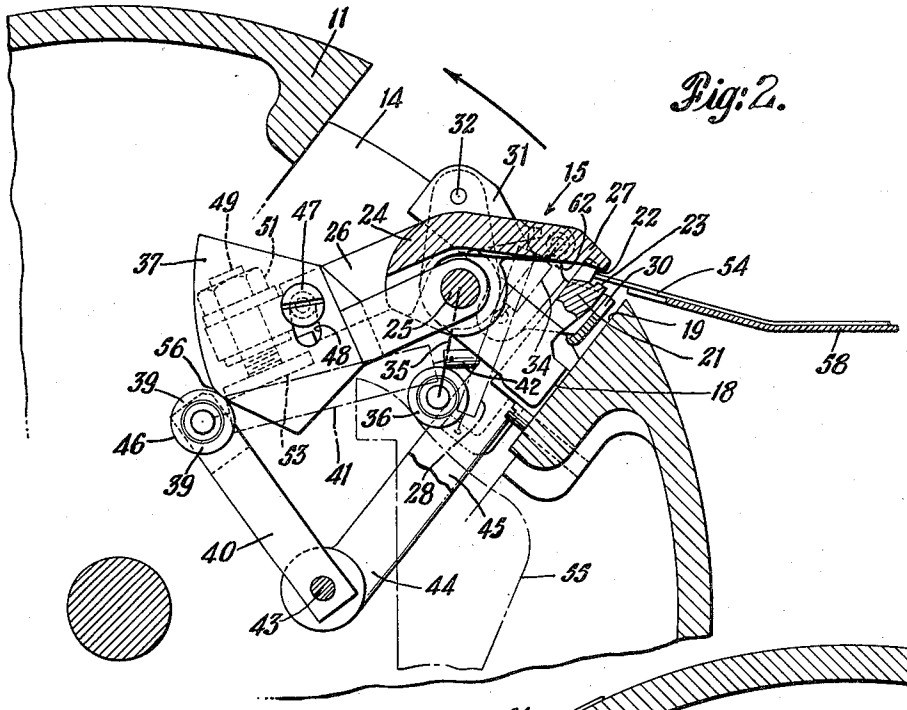
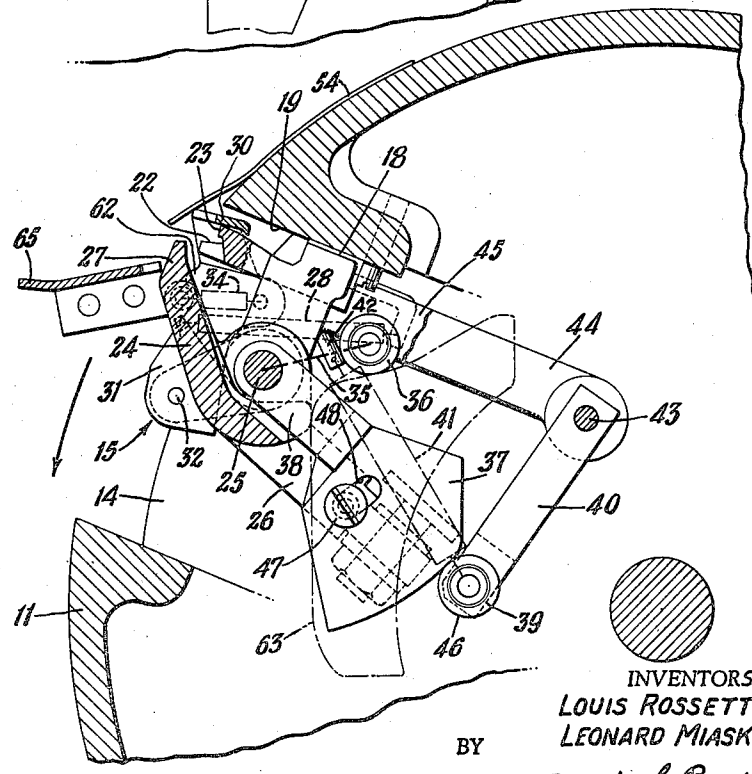



Fig: 4.




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May 10, 1960 L. ROSSETTO ET AL 2,935,937

PLATE CLAMP FOR PRINTING MACHINE

Filed Oct. 29, 1957 3 Sheets-Sheet 3

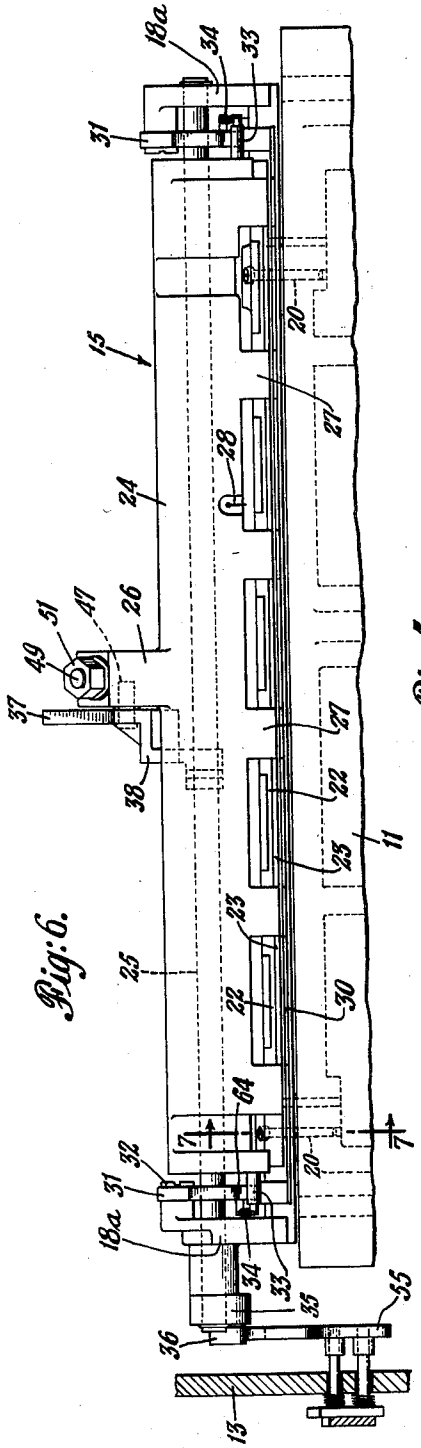


Fig. 6.

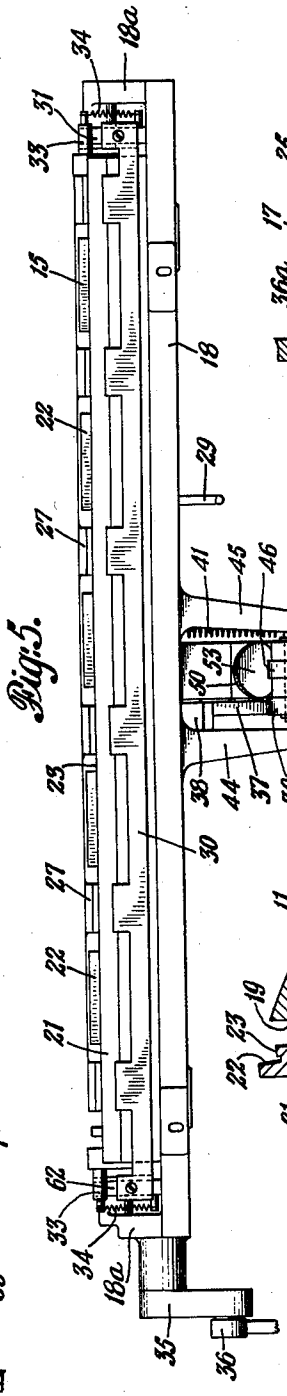


Fig. 5.

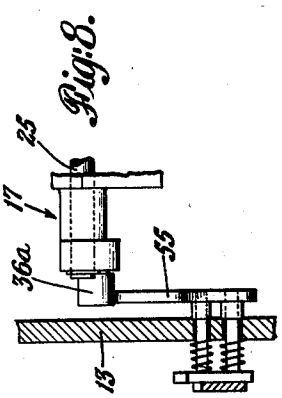


Fig. 8.

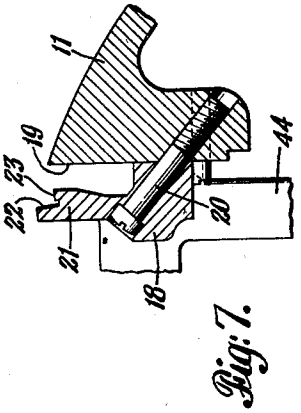


Fig. 7.

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2,935,937

# PLATE CLAMP FOR PRINTING MACHINE

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Application October 29, 1957, Serial No. 693,207

2 Claims. (Cl. 101—132.5)

This invention relates to plate clamping means used on short run duplicating machines. More particularly the invention relates to plate clamping means which permit the automatic mounting of printing plates on the printing cylinders of such machines, as well as their removal and ejection therefrom, without interference with the normal running of the machine.

In short run duplication work, generally only a small number of printed copies are reproduced from each printing plate. However, during the course of a day, it may be desired to reproduce copies from a large number of different printing plates, thus requiring frequent interchanging of plates. In order to minimize the non-productive time during which plates are changed, it is desirable to effect the change of plates automatically without the necessity of arresting the motion of the printing cylinders. In so automatically changing the plates, it is the practice to clamp only the leading edge of the printing plate to the plate cylinder while permitting the trailing edge to be free. Furthermore, the clamping action is such that the printing plate is held frictionally. That is, there are no hooks, or like elements, which cooperate with perforations in the plate, nor sharp projections which pierce the end of the plate, but only two members which grasp the plate.

It is not unexpected, under such circumstances, to find that after many revolutions of the plate cylinder there is a tendency for the printing plate to slip, or move, minute distances. This, of course, leads to a shifting of the ink image on the blanket cylinder from its original position with a consequent blurring of the reproduced images.

In order to overcome this difficulty, there is provided, according to the present invention, a plate clamping mechanism which "locks" or, at minimum, holds the plate clamp on the printing plate with an extraordinary high force. Furthermore, the "locking" action is achieved without resort to high spring forces acting directly on the clamping members. Rather a comparatively light spring is used to urge the members into a clamping position and this has been found to facilitate the rapid actuation of the clamping mechanism as is desired for automatic plate changing.

In carrying out the invention, there is provided a plate clamping member which is locked in clamping position by a spring-urged link that engages, in toggle fashion, a remote portion of the clamping member. To actuate the clamping member to a non-clamping position, means are provided to cam the link out of engagement with the clamping member after which the member itself is cam actuated to its non-clamping position. Thus, the clamping member will be cam actuated to clamping position and the link thereafter moved into engagement therewith, whereby the clamping member is locked in its plate holding position.

Features and advantages of the invention will be gained from the foregoing and the description of a preferred embodiment thereof which follows.



In the drawings:

Figure 1 is a partial cross-sectional side elevational view of a short run duplicator equipped with the preferred embodiment of the present clamping mechanism;

Figure 2 is a partial cross-sectional view of a plate cylinder taken perpendicular to the axis of rotation showing a flexible plate being introduced into the open clamp;

Figure 3 is similar to Figure 2 showing the clamping mechanism in closed position;

Figure 4 is similar to Figure 2 showing the clamp ejector presenting the leading edge of a plate to the stripper;

Figure 5 is a front elevational view of the present clamp taken on line 5—5 of Figure 1;

Figure 6 is a plan view of the improved clamp;

Figure 7 is a cross-sectional view taken on line 7—7 of Figure 6 showing the preferred means of fastening the clamp to the plate cylinder; and

Figure 8 is a partial plan view of the clamp showing the follower roller which would be employed if the clamp were used as a paper gripper.

Referring to the drawings, a two cylinder short run duplicator **10**, which is fully described in United States Patent No. 2,759,416, is shown equipped with the present clamping mechanism. The plate and platen cylinder **11**, and the blanket cylinder **12** of the duplicator are rotatably mounted between the vertical side frames of the machine, one of which frames is indicated at **13**, and driven by a suitable driving means (not shown). A peripheral slot **14** in cylinder **11**, longitudinally disposed with respect to the cylinder axis, contains the plate clamping mechanism **15**. A similar peripheral slot **16**, disposed 180° from slot **14**, contains the paper gripping mechanism **17**. As will later be shown, the latter mechanism is quite similar to the plate clamping mechanism, but the present description will be directed to the plate clamping mechanism.

The clamping mechanism **15** is composed of a supporting bracket **18** that is fastened to the radial wall **19** of slot **14**. The bracket extends across the width of cylinder **11** and its upright portion **21** is provided with several spaced apart alignment stops **22** against which the leading edge of a plate fed into the mechanism abuts (see also Figures 5 and 6). A shelf **23** on which the leading edge of a plate rests, serves also as an anvil to which the plate is clamped by a gripper member **24** pivotally mounted on a rod **25** that itself is pivotally journaled in the end pieces **18***a* projecting from each extremity of supporting bracket **18**. Gripper member **24** comprises a plurality of gripper fingers **27** that extend between the spaced apart alignment stops **22** and are biased into contact with anvil **23** by a spring **28** connected between member **24** and a pin **29** projecting from the underside of bracket **18**. An ejector strip **30** located adjacent shelf **23**, and normally held below the surface thereof (see Figures 5 and 6), is fastened to arms **31** which are pivotally secured to supporting bracket **18** by pivot members **32**. The upper cam surfaces of arms **31** biased into engagement with pins **33**, projecting outwardly from the ends of gripper member **24**, by springs **34** extending between pins **33** and arms **31**. The arrangement is such that, as will later be described, when gripper member **24** is pivoted out of clamping position, springs **34** urge ejector strip **30** upwardly to a position above the surface of shelf **23** whereby the leading edge of the printing plate is raised to a stripping position.

Rod **25** extends through one end piece **18***a* of bracket **18** (Fig. 6) and is provided with a link **35** rigidly fastened thereto. A cam follower roller **36** is mounted at the end of link **35** for cooperation with a cam affixed to the side frames of the machine in a manner to be herein-

after described. Also rigidly mounted on rod 25, but intermediate its ends, is an extension arm 38 which carries a cam 37. Engaging this cam is follower roller 39, which is rotatably secured to one side of a lever 40 (Fig. 5) and biased into contact with cam 37 by the spring 41, extending between lever 40 and a stud 42, anchored in bracket 18. Lever 40 in turn is pivotally mounted on the pin 43 extending between the legs 44 and 45 formed on supporting bracket 18. At its extreme end lever 40 is bifurcated to accommodate a roller 46.

An arm 26 of clamping member 24 extending rearwardly with respect to the clamping fingers 27, is provided with a pin 47 which projects through an arcuate slot 48 provided in cam 37. Threaded into the end of arm 26 is a screw 49 which is provided with an oversized flat head 50 which is engaged by roller 46 carried by lever 40. The position of screw 49 is adjusted so that when follower 39 is in engagement with cam 37, roller 46 will be in wedging engagement with the underside of head 50 and the gripper member pivoted so that fingers 27 are tightly pressed on anvil 23. A locking nut 51 is provided to lock screw 49 in its adjusted position. The wedging thus effected by the action of spring 41 produces a large force which is transmitted by lever action to the gripper fingers 27, thereby causing a considerable pressure to develop between gripper fingers 27 and anvil 23. Consequently there results a firm gripping of a plate 54 placed in the clamping mechanism. Since no heavy spring is required to sustain this great pressure, it is relatively easy to release it and open the clamp, thereby facilitating the rapid actuation of the mechanism for automatic operations.

In operation, the plate cylinder 11 rotates in the direction shown. As the plate clamp 15 is brought around to the feed station of the machine, which is the right side in Figure 1, roller 36 contacts cam 55, Figure 1, causing link 35 to rotate outwardly, thereby rotating rod 25 and hence cam 37 in a counter clockwise direction. The initial motion of cam 37 serves to rotate lever 40, as roller 39 moves along the straight portion of the cam surface to point 56, releasing the wedging action of roller 46 on surface 53 of screw 49. However, this initial motion of cam 37 does not effect movement of clamping member 24 due to the movement of elongated slot 48 over pin 47.

Upon further pivotal movement of cam 37, edge 57 of slot 48 contacts pin 47 and clamping member 24 is rotated to the plate accepting position shown in Figure 2. At this point in the cycle, a printing plate or master sheet 54, which has been placed on table 58 and fed to stop fingers 59, is driven forward by feed rollers 60 and 61 until the leading edge of plate 54 enters the opening between gripper fingers 27 and anvil 23, and abuts alignment stop 22. When the clamp is in this primary open position, arms 31 and hence, ejector finger strip 30 are urged upward into the path of plate 54 by tension spring 34. However this presently undesirable motion is prevented by pins 33, positioned on rise 62 of arms 31.

As cylinder 11 continues to rotate, follower roller 36 moves out of contact with cam 55, Figure 3, and lever 35 returns to its normal position, as do cam 37, lever 40, and clamping member 24 which closes tightly on anvil surface 23 thereby firmly gripping the leading edge of plate 54. Printing may commence immediately since, as mentioned before, in short run duplication work only the leading edge of the printing plate is secured to the plate cylinder. Of course, cam 55 is moved sidewise, out of the path of follower 36 so that once a printing plate is secured to the plate cylinder, the clamp remains in clamping position.

When the desired number of copies have been reproduced from plate 54, cam 63 is moved into the path of follower roller 36 to thereby open clamping mechanism 15 to its secondary open position shown in Figure 4.



This position differs from the primary open position effected by cam 55 in that all the pivotable members are pivoted further by cam 63 that by cam 55. Therefore, since clamping member 24 has undergone added movement in Figure 4 over that shown in Figure 2, pins 33 are now disposed in depression 64 of arms 31 allowing arms 31 and ejector strip 30 to move upwardly, under the influence of spring 34, and lift the leading edge of plate 54 into engagement with stripper plate 65. Plate 54 is thereby guided between delivery rollers 66 and 67 which drive it into delivery tray 68.

When the present invention is employed as a plate clamp, it is desirable obviously to open the clamp only when inserting a printing plate therein or removing such plate therefrom. Therefore, engagement of cams 55 and 63 with follower roller 36 should be restricted to the two mentioned occasions on which the clamp is to be opened. For this reason, cams 55 and 63 are adjustable in a direction parallel to the axis of plate cylinder 11, allowing them to be brought into and out of the path of follower roller 36. When cam 55 is in the path of roller 36, Figure 6, the clamp will open. However, when cam 55 is in the position shown in Figure 8, it is out of the path of roller 36, hence the clamp will not open.

With just one exception, this clamp remains the same whether used as a plate clamp or as a paper gripper. Therefore, only one, the plate clamp has been described. Should it be desired to use the novel clamping means as a paper gripper, follower roller 36 of plate clamp 15 is replaced with follower roller 36*a*, Figure 8, double the width of roller 36. Roller 36*a* will contact cam 55 in either of its abovementioned positions, hence, the paper gripper 17 will open with every revolution of cylinder 11. Cam 63 may be adjusted in exactly the same manner as cam 55.

It is not intended to set forth all the variations that may be made, but it is contemplated that many of the features of the invention disclosed may be carried out in other ways and that many widely different embodiments of the invention can be made without departure from the spirit and scope of the invention. It is therefore intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a printing press, a cylinder having a peripheral slot disposed parallel to the cylinder axis, and a clamping device secured in said slot for gripping the leading edge of a flexible sheet, said clamping device comprising a supporting bracket, a shaft pivotally supported by said bracket, said shaft being provided with a cam follower so that it is pivoted under cam control, a sheet clamping member supported by said shaft and free to turn thereon to and from a sheet clamping position, spring means for urging said member to a clamping position, a spring biased lever for engaging said sheet clamping member to lock it in sheet clamping position, a cam fixedly secured to said shaft and engaging said lever so that an initial shaft rotation will move the lever out of locking engagement with said clamping member, said cam being provided with an elongated slot, and a pin member projecting from said clamping member through said slot whereby the initial unlocking movement of said cam is not transmitted to said pin, but further cam movement causes the end of the slot to engage said pin and move the clamping member to a sheet receiving position.

2. A clamping device according to claim 1 wherein said clamping member may be moved to a sheet rejecting position as well as a sheet receiving position, which clamping device includes an arm pivotally mounted in said supporting bracket, said arm being provided with a cam surface, an ejector strip fastened to said arm, a cam follower attached to said clamping member, and resilient means biasing said arm into contact with said cam follower so that said follower remains in engagement with

the cam surface of said arm as the clamping member is moved, whereby when said clamping member is moved to its sheet receiving position the contour of said cam surface serves to maintain said ejector strip below the periphery of said cylinder against the action of said resilient means, and when said clamping member is moved to its sheet rejecting position said cam surface permits said resilient means to raise said ejector strip above the periphery of said cylinder.



**References Cited in the file of this patent**

UNITED STATES PATENTS

| | | |
|---|---|---|
| 137,347 | Cottrell | Apr. 1, 1873 |
| 1,832,284 | Eckhard | Nov. 17, 1931 |
| 2,622,517 | Denison et al. | Dec. 23, 1952 |
| 2,766,689 | Kowalsky et al. | Oct. 16, 1956 |
| 2,821,910 | Mazzio et al. | Feb. 4, 1958 |