

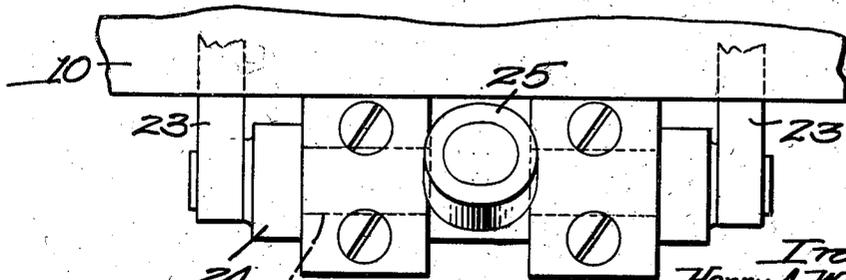
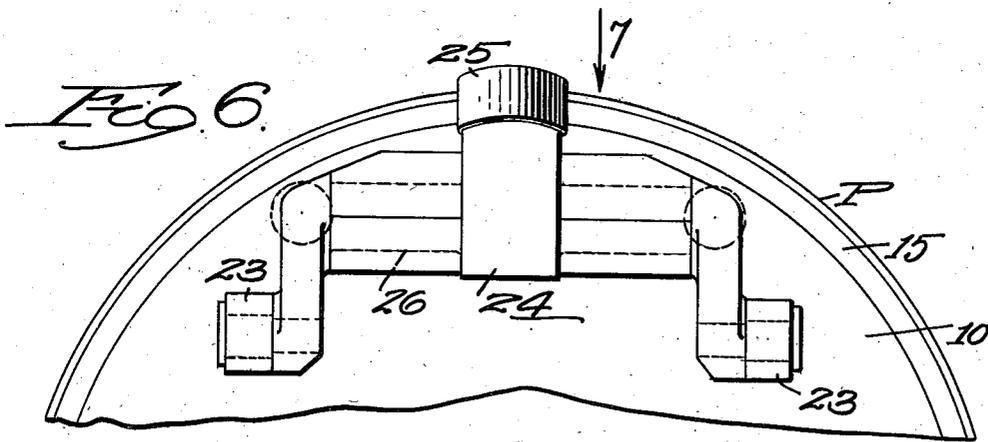
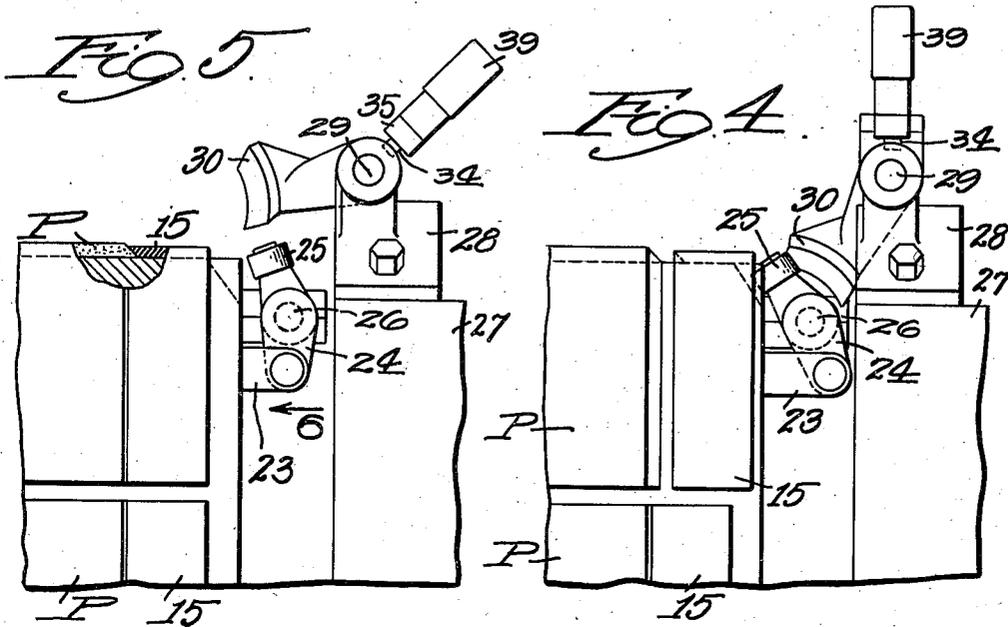
Nov. 26, 1935.

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2,021,974

PLATE LOCKING DEVICE

Original Filed Nov. 21, 1931 3 Sheets-Sheet 2



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2,021,974

PLATE LOCKING DEVICE

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Application November 21, 1931, Serial No. 576,522
Renewed April 4, 1934

11 Claims. (Cl. 101—378)

This invention relates to a mechanism for locking stereotype printing plates on the printing cylinder of a printing press and unlocking them. It is particularly applicable to a high speed newspaper printing press.

The principal objects of the invention are to provide an improved means for unlocking the plates which are automatically locked when the plate cylinder rotates; to provide means whereby the unclamping and clamping is done in a relatively small angle of the rotation of the plate cylinder so that the plates are not moved before they get into the bite of the form roller; to provide a safety feature so that improper operation will be prevented from causing damage and so that there will be no way in which the plates will become unclamped when the press is operated at high speed; to provide simple mechanical means for operating a movable cam to unclamp the plates by the rotation of the plate cylinder itself and consequently at a definite point in the rotation of the cylinder, and to provide means whereby when the plates are automatically locked by the rotation of the cylinder this cam will automatically return to its inoperative position without any attention on the part of the operator.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a plan of a fragment of a plate and impression cylinder showing a preferred embodiment of this invention applied thereto;

Fig. 2 is a detail view of the safety device shown in Fig. 1 showing the parts in a different position;

Fig. 3 is an end view of the printing couple shown partially in section;

Fig. 4 is a side view showing the operating cam in operative position to withdraw the end plate;

Fig. 5 is a similar view showing the cam in inoperative position with the clamp holding the plate on the cylinder;

Fig. 6 is a fragmentary view of the plate clamping mechanism carried on the end of the plate cylinder;

Fig. 7 is a plan of the same;

Fig. 8 is a fragmentary view of the plate clamp showing the manner in which the clamp is held in locking position;

Fig. 9 is a sectional view of the same on a line taken radially with respect to the cylinder;

Fig. 10 is a similar view showing the manner of

drawing the center clip endwise to release the inside plate;

Fig. 11 is a plan of a safety device for preventing the roller from coming up solidly against the end of the cam;

Fig. 12 is an elevation of the same;

Fig. 13 is a fragmentary view showing a modification of the safety device, and

Fig. 14 is a similar view showing the parts in a different position.

This invention is particularly adapted for high speed rotary printing presses and is shown as applied to the plate cylinder 10 of such a press, the impression cylinder 11, cooperating with the plate cylinder 10 to form a couple, is involved in the invention to some extent. The plate cylinder is provided with a recess 12 in which is located a stationary guide 13 constituting an integral part of the plate cylinder. In this guide operates a longitudinal rod 14 which, at one end, is adjustably but firmly secured to the end clamp 15. This rod passes through the center clip 16 which is mounted to slide in a guiding slot 17 in the cylinder. On the end of the rod 14 are jam nuts 18 adapted, in one position, to project beyond the center clip and, in another, to engage the center clip as shown in Fig. 10, to draw it toward the end of the cylinder and free the inner plate P'. The end plate P is clamped between this center slip and the end clamp.

On the rod 14 are another pair of jam nuts 19 which engage a compression spring 20 held between these jam nuts and the stationary guide 13. The guide or filling-in block 13 acts, not only as a stop for the end clamp through the jam nut 21, but also as an abutment for the spring 20.

It will be seen that this spring 20 exerts an even pressure to hold the end clamp against the plate P. This has an advantage over the use of a tension spring because if the spring cracks it is confined so closely to the slot 17 in the cylinder that it would still act as a spring. This provides for safety which would not be present if a tension spring were used.

It will be seen that, when the end clamp 15 is moved to the left, it first secures the plate P between this clamp and the center clip 16 and then, through the plate, forces the center clip over from the position shown in Fig. 10 to that shown in Fig. 9 when both sets of plates are firmly clamped.

The end clamp is operated through a link 23 adjustably secured to the end clamp and connected through a lever 24 with a cam roll 25. These parts of course are on the cylinder and rotate with it. The lever 24 is pivoted on a transverse

stud 26, carried by a projection on the cylinder.

The bearings for the two cylinders of the couple are held by a cap 27 on which is a bracket 28 having bearings for a shaft 29. On this shaft is secured an operating cam 30 also an operating arm 31. This shaft 29 is provided with a torsion spring 32 having one end secured in a stationary bearing on the bracket 28 and the other end secured in an adjustable sleeve 33 which surrounds the shaft. This arrangement is adjusted in such a way that the spring, through the sleeve 33, tends to keep the cam 30 in the upper position shown in Fig. 5, the arm 31 being secured to the sleeve 33. This is the inoperative position in which this cam performs no function. At this time a retractible dowel 34 carried by a handle 35 is pressed inwardly by a spring 36 and fits in a hole in the bracket 28 to hold the cam in its inoperative position. This handle 35 has a cap 39 connected by a stem with the dowel or plunger 34 by which the latter can be removed by hand from this hole to free the cam.

From comparison of Figs. 4 and 5 it will be seen that, at some intermediate position between the two shown, it might be possible for the cam roller 25 to come up solidly against the forward end of the cam 30. This would cause damage. To obviate this trouble a lever 40 is provided pivoted on a stud 41 carried in a bracket 42 secured to the cap of the press. One end of this lever has a ball construction 42 which fits in a socket of the same shape on the operating arm 31. The other end of the lever 40 carries a pointed oval-shaped projection 43. This projection is so arranged that when the cam is in the danger zone it lines up with similar cam projections 44 carried by, and rotating with, the impression cylinder 11. If these two pointed ovals come in line with each other, as the cylinders are rotated, they strike and throw the lever 40 and push the cam 30 either in or out, thereby eliminating this danger.

Assuming the press to be running, when it becomes time to unlock the plates the operator has to grasp the cap 39 and pull it until the dowel 34 is withdrawn from its hole. He moves the handle 35 to swing the arm 31 in a counter-clockwise direction until the cam reaches the position shown in Fig. 4. This is done against the force of the spring 32. The cam 30 is held in this position until the cam roller 25 rides up on it. This occurs at the plating position. When the operator releases his hold on the cap 39 the spring 32 turns it until the plunger 34 enters its notch. Thus the cam is locked in inoperative position.

As the cam roller is oscillatably carried on the plate cylinder 10 it pulls back the end clamp 15 through the connecting link 23, thereby unclamping the end plate P. When the proper plates are placed on the cylinder 10 the press is started up. Now the cam roller 25 rides off the cam 30 thereby allowing the spring 29 to draw the end clamp 15 in to bear against the bevel edge of the plate P. This holds it securely on the cylinder. As soon as the cam roller 25 runs off the cam 30 the operating handle 39 is returned to the inoperative position shown in Fig. 5.

Figs. 11 and 12 show a modification of the safety device. Here the lever 24^a which takes the place of the lever 24, and operates otherwise in the same way, carries a cam roll 45 which is shorter than the one previously described. Also it carries a V-shaped protecting device 46 which is secured from rotation by a pin 47 entering an opening in the lever 24^a. These parts are held in place by a threaded stud 48 on the lever. This

stud of course passes through the protecting device and the roll into the hub of the lever. The forward end of the cam 49, which takes the place of the cam 30, is made cone shaped, as shown in dotted lines in Fig. 11. As this cam is located directly in front of the roller, the V-shaped protecting device 46 will deflect the cam either in or out, thereby preventing it from coming solidly up against the roller and cause damage.

In Figs. 13 and 14 another modification is shown of the protecting device, in which a flexible steel strip 50 is mounted on the cam in a position to be engaged by the cam roller 25 if this roller is about to come into contact with the cam. This prevents the roller from coming up solidly against the end of the cam. It is shown in Fig. 12 operating against the top of the cam roller for this purpose.

From what has been said it will be seen that this device is a simple and smooth working mechanical means for operating the cam so that the unclamping of the plate may be done by the rotation of the plate cylinder itself. The locking is done while the cylinder rotates through a comparatively small arc. Also when the cylinder is rotated after plating, the plates are automatically locked and the cam returns to its inoperative position without any attention on the part of the operator. Obviously, the device is fully protected against the possibility of having the cam roller come up solidly against the forward end of the cam at any time during the operation of the press.

Although I have illustrated and described only one form of the main part of the invention and three forms of the safety device, I am aware of the fact that other modifications can be made therein by those skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited to the exact form shown, but what I do claim is:—

1. In a printing plate cylinder plate locking device, the combination with an end clamp and yielding means for holding the clamp locked, said clamp having an operating lever at the end of the cylinder, of quick-acting means on the frame of the machine for engaging the lever during the rotation of the cylinder and unlocking the plate.

2. In a printing plate cylinder plate locking device, the combination with an end clamp and yielding means for holding the clamp locked, said clamp having an operating lever at the end of the cylinder, of quick-acting means on the frame of the machine for engaging the lever during the rotation of the cylinder and unlocking the plate, and manual means for moving said quick-acting means into operative position.

3. In a printing plate cylinder plate locking device, the combination with an end clamp and yielding means for holding the clamp locked, said clamp having an operating lever at the end of the cylinder, of quick-acting means on the frame of the machine for engaging the lever during the rotation of the cylinder and unlocking the plate, manual means for moving said quick-acting means into operative position, and automatic means for moving the quick-acting means into inoperative position and holding it there.

4. The combination with a plate clamp and yielding means for holding it in, and returning it to, clamped position, of a lever mounted on the cylinder for withdrawing the clamp and an independently mounted cam for operating the lever on the cylinder to withdraw the clamp in opposi-

tion to said yielding means, the cam being manually movable into operative position.

5 5. The combination with a printing press plate clamp and a compression spring for holding it in clamped position against the plates, of means operated by the rotation of the cylinder for forcing the clamp back to unlock the plate comprising a cam oscillatable toward the cylinder and a lever pivoted to the cylinder and having one end in position to be engaged by said cam and the other end connected with the plate clamp.

10 6. In a plate lock-up, the combination with a plate clamp on the printing plate cylinder, yielding means for holding it in plate-locking position, and a lever connected with the plate clamp and having means thereon for operating it, of a rod oscillatably mounted on the frame of the machine, an arm carried by the rod, a spring-pressed plunger on the arm adapted to engage a recess in a stationary part of the machine located in such a position as to hold the rod in inoperative position, a spring for normally swinging the rod about its axis in a direction to bring the plunger into the recess, and a cam carried by the rod and adapted to be located, when the plunger is not in the recess, in a position to be engaged by said lever as the cylinder rotates for the purpose of unlocking the plate.

20 7. In a plate lock-up, the combination with a plate clamp on the printing plate cylinder, yielding means for holding it in plate-locking position, and a lever connected with the plate clamp and having a roll thereon for operating it, of a rod oscillatably mounted on the frame of the machine, a torsion spring for normally swinging the rod about its axis into inoperative position, an arm carried by the rod, a spring-pressed plunger on the arm adapted to engage a recess in a stationary part of the machine located in such a position as to hold the rod in inoperative position, a cam carried by the rod and adapted to be located, when the plunger is not in the recess, in a position to be engaged by said lever as the cylinder rotates for the purpose of unlocking the plate, a lever cooperating with said arm and having a cam thereon, and a rotary cam adapted to engage the cam on the lever to

turn the rod and move the first-named cam out of the path of the first-named lever whenever the plunger is not in its recess, whereby the first named lever will be prevented from engaging the end of the cam in case the printing plate cylinder rotates far enough for this to happen before the cam has become locked in inoperative position.

8. In a printing plate cylinder plate locking device, the combination with an end clamp and yielding means for holding the clamp locked, said clamp having an operating lever at the end of the cylinder, of quick-acting means on the frame of the machine for engaging the lever during the rotation of the cylinder and unlocking the plate, and means for preventing the engagement of the lever with said quick-acting means.

9. In a printing cylinder plate locking device, the combination with an end clamp and a lever connected with the end clamp to operate it, of means on the frame of the machine for engaging the lever during the rotation of the cylinder and unlocking the plate, and means for preventing the engagement of the lever with said means.

10. In a device for operating a plate clamp on a cylinder of a printing press, the combination of an oscillatable cam pivoted on the frame of the press, means for insuring that the cam shall be in an extreme position, manually operated means for swinging the cam toward and from the cylinder, and a lever supported by the cylinder connected with the plate clamp and adapted to be engaged by said cam when in one extreme position for withdrawing the plate clamp.

11. In a printing cylinder plate locking device, the combination with a movable end clamp, of an operating lever therefor on the cylinder, a cam roller on the operating lever, an oscillatable cam movable to two extreme positions in one of which it is out of the path of said roller and in the other of which it is directly in the path of the roller, whereby the roller is prevented from engaging the cam.

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