April 9, 1929. H. A. W. WOOD 1,708,196

PRINTING PLATE LOCKING MECHANISM

Original Filed March 17, 1926 2 Sheets-Sheet 1

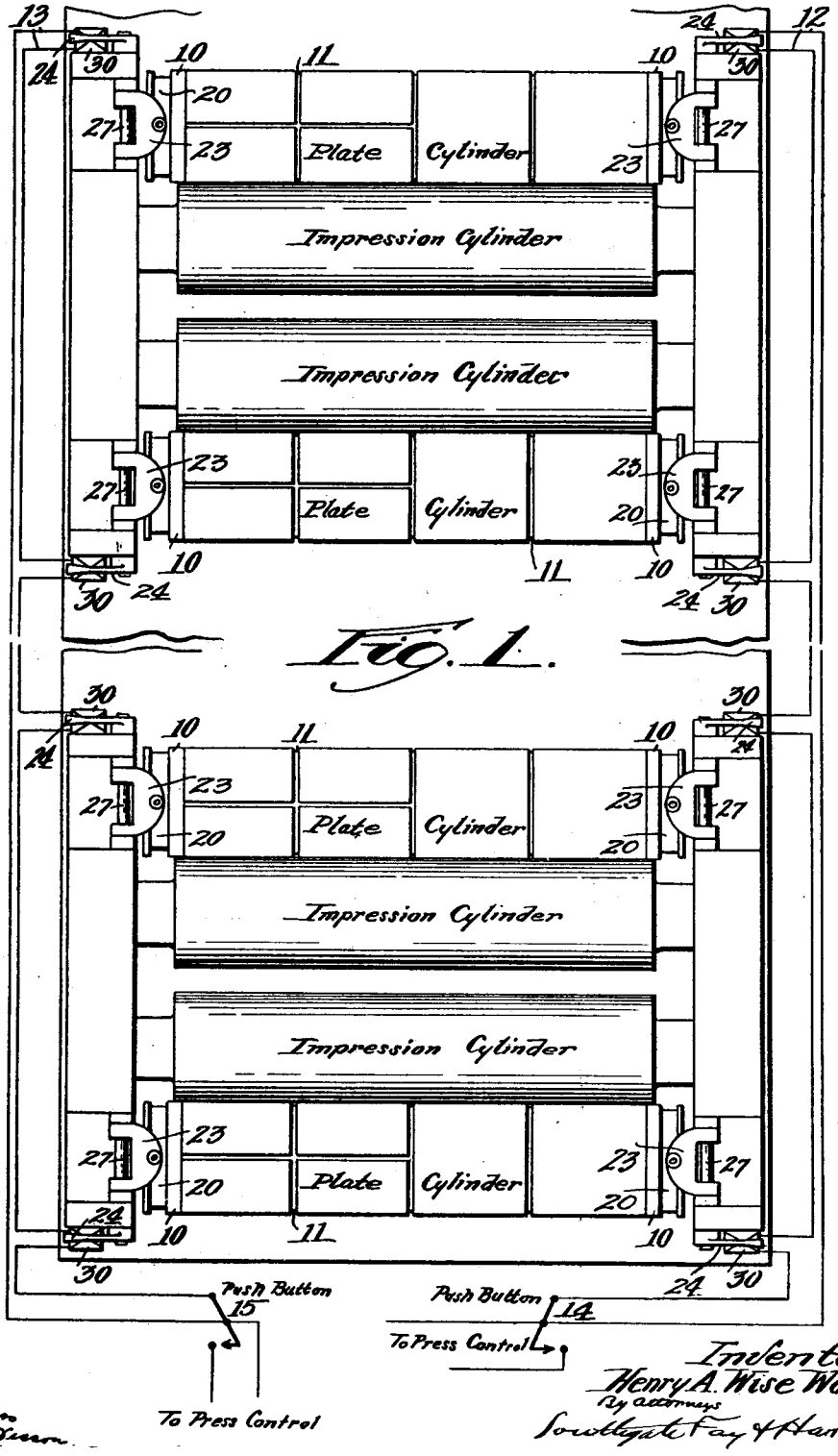


Fig. 1.

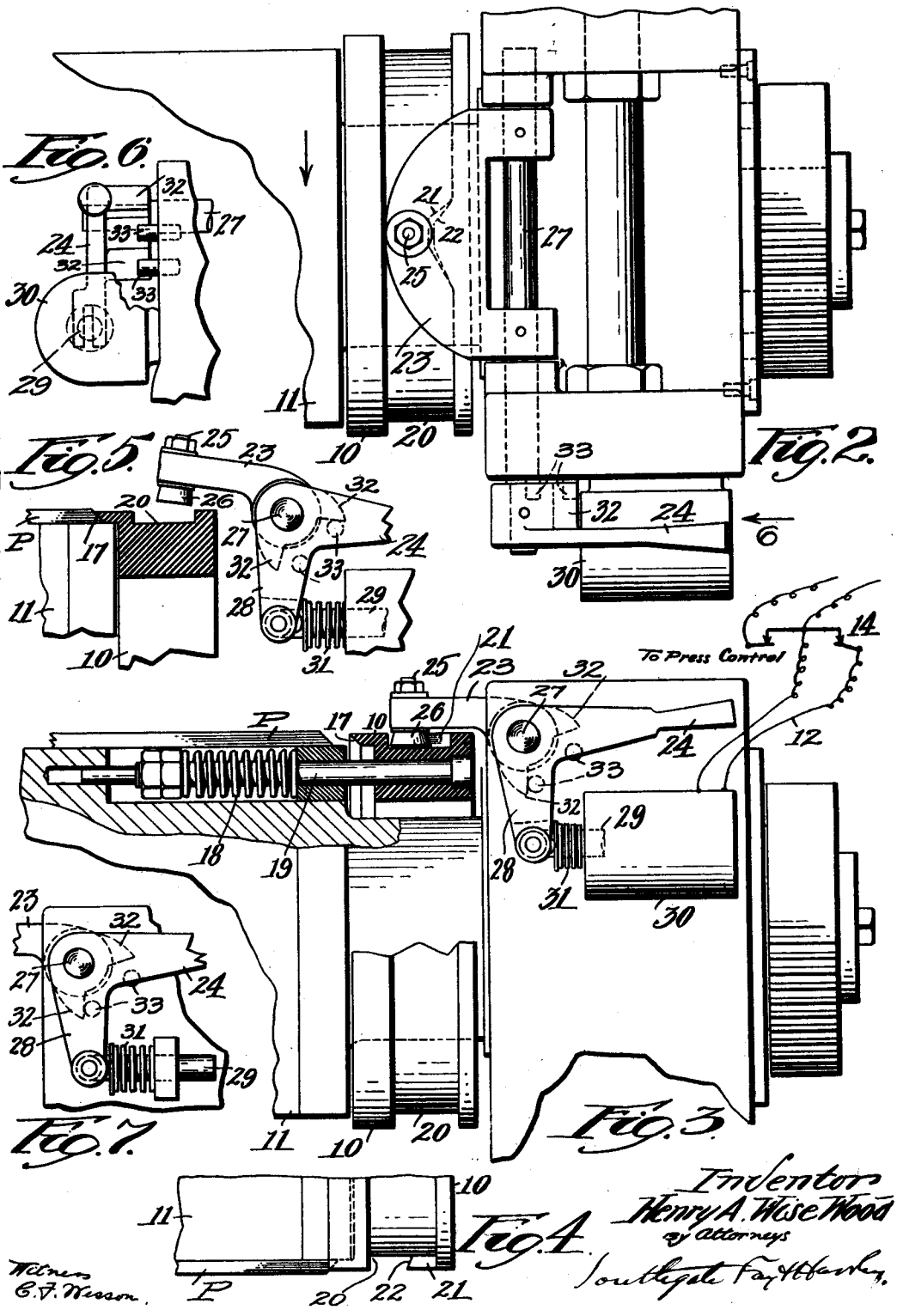
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PRINTING PLATE LOCKING MECHANISM

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UNITED STATES PATENT OFFICE.

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PRINTING-PLATE-LOCKING MECHANISM.

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This invention relates to a quick lock-up mechanism for the plates of printing cylinders.

The principal objects of the invention are to provide an instantaneously acting plate locking and unlocking device which will effectively lock the plates on the cylinders; to provide means whereby the locking and unlocking means is operated by the power of the press, and, specifically, by the rotation of the plate cylinder itself; to provide means for preventing the operation of the unlocking device accidentally; to provide connections between the various plate locking devices of a press whereby the plates on the various cylinders will be automatically locked or unlocked simultaneously and by the use of a single control, and also to provide electrical or mechanical means whereby when the means for unlocking the plates is in operative condition it will be impossible to drive the press at any other than threading-in speed.

In the use of the device the various plate clamps are left open in order that the plates may be removed and new ones applied, so that up to the last instant the plates may be shifted or replaced without additional labor, and then by the mere starting of the press all the clamps are simultaneously closed by the rotation of the cylinders themselves. In this way much time is saved in getting ready to start the press and the number of men necessary to start it is reduced.

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 press equipped with a preferred plate locking and unlocking device constructed in accordance with this invention;

Fig. 2 is an enlarged plan view of one end of one plate cylinder showing the locking device;

Fig. 3 is a side view of the same partly in central section showing certain electrical connections;

Fig. 4 is a similar fragmentary view showing the clamping ring cam;

Fig. 5 is a sectional view similar to Fig. 3, but showing the clamping ring operating mechanism in inoperative position;

Fig. 6 is an end view indicated by the arrow 6 in Fig. 2; and

Fig. 7 is a side view of a modification in which the device is simplified by the elimination of the electrical connections and the setting of the device solely by hand.

Various mechanisms have been devised for quickly locking plates on the printing cylinders of a press, as it is realized that the time spent in this operation results in some delay. Newspaper printing plants are run at the present time so that everything has to be held up until the last minute, and then it is desired to start the operation of the press without any more delays at this period than are absolutely necessary. Heretofore all of the quick locking and releasing devices have required the manual operation of a wrench or other removable tool. This invention is designed to save all delays due to the operation of such a tool, and to the separate locking of the plates on the several plate cylinders of a press.

I have shown in Fig. 1 a plan of a press with several impression and plate cylinders. In each case the various plates on the plate cylinder 11 are locked by a semi-circular locking ring 10 at each end. In this view I have shown the locking devices, which will be described in detail later, as under the control of electric circuits 12 and 13 connected with each locking device all along the press through electro-magnets 30. Those at the two ends of the cylinders are controlled by two push-buttons 14 and 15. These circuits are connected to the press control in the manner indicated in Fig. 1 and may be of any ordinary electrical arrangement.

Each of the locking rings 10 extends half way around the cylinder and two of them lock all the plates at that end of the cylinder, and the four rings on each cylinder of course lock all the plates thereon.

In the form shown the locking ring 10 has a beveled edge 17 which engages the beveled edge of the plate P and holds the plate on the cylinder as is well understood. The actual force which holds the plate is supplied by a plurality of springs 18 on guide rods 19 extending longitudinally of the cylinder and having their heads inserted in recesses in the ring 10, so that this ring is normally held by the springs with sufficient force to clamp the plates firmly in position. I employ yielding force for this purpose so that the ring can be pulled back to release

the plates and so that, when the means for pulling the plate back is out of operative connection with the ring 10, the springs will quickly and automatically draw the ring back into the locking position as is indicated by a comparison of Figs. 3 and 5.

For this purpose the ring is provided with a groove 20 which has a cam 21. This cam is undercut at 22 to provide an inwardly slanting surface for a purpose that will appear. The operating means for the clamping ring comprises a lever 23 which I have shown as having a handle 24 for operating it manually. The lever and handle are fixed on a shaft 27. This is the only operation shown in the form illustrated in Fig. 7, but in the other figures the lever is operated automatically in the ordinary work.

On this lever 23 is a stud 25 having on the bottom a cam roller 26. This roller is of a truncated conical form to fit the slant 22 of the undercut of the cam. It will be obvious that if the cam roller is down in the groove 20, which is uniform around the ring except for the cam 21, and is located at a point at a distance from the cam, the springs 18 will be free to clamp the plate. Now if the cylinder rotates in the direction of the arrow in Fig. 2, the cam 21 will be moved to the position shown in that figure, and in doing so the ring 10 will be drawn back to the releasing position shown in Figs. 2 and 3.

The purpose of undercutting the cam will now be obvious. The lever 23 cannot be moved to release the roller 26 from the cam while in contact therewith on account of this undercut and the conical shape of the roller. Therefore, normally the press will be stopped in this position and the clamps will be held open, the plates can be changed or adjusted and then the press can be started up, which will result in the roller riding off the cam and the ring 10 moving back into clamping position.

If the roller 26 were left in the position shown in Fig. 3 the plates would be unclamped at each revolution. For the purpose of withdrawing the cam roller 26 from its operative position the handle 24 as stated, can be used, but I prefer to provide automatic control. For that purpose the shaft 27 is provided with an arm 28 which is connected with a rod 29 controlled by an electro-magnet 30 which is connected with the line 12 or 13 as the case may be. Therefore, when the press is running, the push-button 14 or 15 can be operated to connect the circuit and all the levers 23 will be pulled down so as to bring the cam rolls 26 into the grooves 20 of the rings. Then during that rotation of the press all the clamps on the press will be released and the press will be stopped with the cam roller in the position shown in Fig. 2.

Now if the current is broken by means of the push-button there will be no magnetic energy to hold the levers 23 in operative position. A spring 31 operating on each arm 28 will be free to move the lever up to the inoperative position shown in Fig. 5. On the lever are two projections 32 which come into contact with stops 33 at the ends of the oscillation of the lever and restrict its motion in that way.

In the above description the modification shown in Fig. 7 has been described. In this case the lever 23 is moved into operative position by the handle 24 and when the operator lets go of that the spring 31 restores it to inoperative condition.

In this way it will be seen that, particularly with the electrical control, all the clamps of the press can be withdrawn automatically during the same rotation to release the plates and the press stopped at the same time. On starting up, the plates will all be clamped during the same rotation and without any necessity for any attendant to be near any of them or perform any operation adjacent thereto. Even in the handle-operated device the only thing necessary is for the attendants to hold up the handles 24. They do not have to manipulate screws or bolts or see that any adjustments are made correct. All the handles 24 have to be held up until each cylinder is rotated through part of a revolution. Then they let go of the handles and the springs 31 render the unclamping device inoperative until the levers 23 are turned again.

It will be seen that all the clamps on one side of each cylinder can be opened simultaneously and left open so that the plates can be removed and new ones applied. The press is started up at threading-in speed and the clamps remain open during the entire printing period of the press or one rotation of the plate cylinders. Up to the last instant plates can be shifted or replaced without additional labor and then with the mere starting of the press all clamps are simultaneously closed with one revolution of the cylinders. This saves much time in the starting of the press and a great deal of hurrying around on the part of the operators to get the plates locked.

Although I have illustrated and described only two forms of the invention I am aware of the fact that other modifications can be made therein by any person 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 details of construction herein shown and described but what I do claim is:

1. The combination with a printing plate cylinder and a plate clamp, of automatic means for moving said clamp into a position to lock the plate on the cylinder by the partial rotation of the cylinder.

2. The combination with a printing plate cylinder and a plate clamp thereon, of means actuated by the cylinder for automatically operating said clamp to lock and release the plate.

3. The combination with a printing plate cylinder and a clamp for normally locking a plurality of plates thereof, of automatic means for moving said clamp back into a position to release all of said plates simultaneously when the cylinder turns.

4. The combination with a printing plate cylinder and a clamp thereon for engaging the end of a series of plates on the cylinder, of means for moving the clamp automatically into a position to clamp the plates on the cylinder by the turning of the cylinder.

5. The combination with a printing plate cylinder of a clamp thereon for engaging the end of a series of plates on the cylinder, means for normally holding said plate clamp in locking position, and automatic means for moving back the clamp into plate releasing position actuated by the movement of the cylinder.

6. The combination with a printing plate cylinder and two pairs of clamps thereon for engaging the plates at both ends of the cylinder, of means for normally holding said plate clamp in locking position, and automatic means operated by the cylinder for moving the clamps on one side of the cylinder simultaneously into releasing position.

7. In a printing press, the combination with a plate cylinder and means for holding a printing plate thereon, of means operated by the press for causing the plate to be released from its fixed printing position on the cylinder.

8. The combination with a printing plate cylinder of a clamp thereon for engaging the end of a series of plates on the cylinder, means for normally holding said plate clamp in locking position, and means operated by the rotation of the plate cylinder for pulling back the clamp into inoperative position.

9. The combination with a printing plate cylinder and a plate clamp for locking the plate thereon, of means actuated by the rotation of the cylinder for releasing the clamp and unlocking or releasing the plate.

10. The combination with a printing plate cylinder, of means for locking the plates thereon, of means operated by the rotation of the cylinder for releasing or unlocking said locking means.

11. The combination with a printing plate cylinder and plate clamp therefor, of means for moving the clamp to fix a plate on the cylinder, at a predetermined point in the rotation of the cylinder.

12. The combination with a printing plate cylinder and a plate clamp, of automatic means for moving said clamp into a position to lock the plate on the cylinder, by the mere starting of the cylinder into rotation.

13. The combination with a printing plate cylinder and a plate clamp thereon, of means for automatically operating said clamp to lock and release the plate, and means for throwing out the clamp operating means.

14. The combination with a printing plate cylinder and a clamp arranged to lock a plate thereon, of means for moving said clamp back automatically into a position to release the plate, and means for removing the plate clamp moving means from operative position.

15. The combination with a printing plate cylinder and a clamp for normally locking a plurality of plates thereof, of automatic means for moving said clamp into a position to release all of said plates simultaneously, and means for disconnecting the automatic means.

16. In a printing press, the combination with a plate cylinder and means for holding a printing plate thereon, of means connected to be operated by the press for releasing the plate, and means for disconnecting the plate releasing means from the press, to permit the press to operate without releasing the plate.

17. In a printing press, the combination with a plate cylinder and means for holding a printing plate thereon, of means operated by the press for causing the plate to be fixed in printing position on the cylinder, and electro-magnetic means for disconnecting the plate fixing means from the power.

18. The combination with a printing plate cylinder and two pairs of clamping rings thereon for engaging the plates at both ends of the cylinder, of means for normally holding said plate clamping rings in locking position, automatic means for moving the clamping rings on one side simultaneously in releasing position, and electro-magnetic means for throwing the ring moving means out of action.

19. In a printing press, the combination with a plurality of printing couples, of automatic plate clamps for the plates on the respective printing cylinders thereof, means for automatically moving the plate clamps and locking or releasing the plates, said means connected with each cylinder being movable to prevent the release of the plates while the press is operating normally, and means for replacing all of said means into engagement with their respective plate clamps, whereby on the next rotation of the several plate cylinders, all the plates will be released automatically.

20. In a printing press, the combination with a plurality of printing couples, of automatic plate clamps for the plates on the respective printing cylinders thereof, means

at the ends of said cylinders for automatically moving the plate clamps to lock the plates by the rotation of the cylinders, said means connected with all the cylinders being movable simultaneously to prevent the operation of the clamps, and means for placing all of said means into engagement with their respective plate clamps, whereby on the next rotation of the several plate cylinders, all the plates will be unclamped.

21. In a printing press, the combination with a plurality of printing couples, of automatic plate clamps for the plates on the respective printing cylinders thereof, means at the ends of said cylinders for automatically withdrawing the plate clamps and releasing the plates by the rotation of the cylinders, said means connected with each cylinder being movable out of engagement with the plate clamps to prevent the release of the plates while the press is operating normally, and means for replacing all of said means into engagement with their respective plate clamps, whereby on the next rotation of the several plate cylinders, all the plates will be released automatically.

22. In a plate clamping device, the combination with a printing plate cylinder adapted to receive printing plates, of a clamping ring at the end of the cylinder having a bevel surface for engaging the end of the plate, yielding means for holding the clamping ring in operative position and securely clamping the end plate, and means connected with the clamping ring for automatically withdrawing the clamping ring from clamping position in opposition to said springs when the cylinder rotates to a certain point.

23. In a plate clamping device, the combination with a printing plate cylinder adapted to receive on its surface a plurality of printing plates circumferentially, of clamping rings at the end of the cylinder for engaging the ends of the plates at the end of the cylinder, yielding means for holding the clamping rings in operative position and securely clamping the end plates thereon, a lever adjacent to the clamping rings, and means connected with the lever cooperating with means on the clamping rings for automatically withdrawing the clamping rings from clamping position in opposition to said springs.

24. In a plate clamping device, the combination with a printing plate cylinder adapted to receive printing plates, of a clamping ring at the end of the cylinder having a bevel surface for engaging the ends of the plates, yielding means for holding the clamping ring in operative position and securely clamping the end plates, and means adjacent the clamping ring cooperating with means connected with the clamping ring for automatically withdrawing the clamping ring from clamping position in opposition to said springs when the cylinder rotates to a certain point, the last named means comprising a cam on the ring and a roller having slanting co-operating surfaces for holding the roller positively in engagement with the cam.

25. In a plate clamping device, the combination with a printing plate cylinder adapted to receive on its surface a plurality of printing plates circumferentially, two clamping rings at the end of the cylinder having surfaces for engaging the ends of all the plates at the end of the cylinder, yielding means for holding the clamping rings in operative position and securely clamping the end plates on the cylinder, a lever adjacent to the clamping rings, means connected with the lever cooperating with means on the clamping rings for automatically withdrawing the clamping rings from clamping position in opposition to said springs, and means whereby when the plates are clamped the lever will be held out of engagement with the rings to prevent accidental operation of the rings during the operation of the press.

26. In a plate clamping device, the combination with a printing plate cylinder adapted to receive on its surface a plurality of printing plates, a clamping ring at the end of the cylinder having a bevel surface for engaging the end of the plate at the end of the cylinder, yielding means for holding the clamping ring in operative position and securely clamping the end plate, a lever adjacent to the clamping ring, means connected with the lever cooperating with means on the clamping ring for automatically withdrawing the clamping ring from clamping position in opposition to said yielding means, and means for disconnecting the lever from the clamping ring when the clamping ring has been moved to clamping position.

27. In a plate clamping device, the combination with a printing plate cylinder adapted to receive printing plates on its surface, a clamping ring at the end of the cylinder for engaging the end of the plate at the end of the cylinder, springs for holding the clamping ring in operative position and securely clamping the end plate thereon, a lever adjacent to the clamping ring, means connected with the lever cooperating with means on the clamping ring for automatically withdrawing the clamping ring from clamping position in opposition to said springs, means whereby, when the plate is clamped, the lever will be held out of engagement with the ring to prevent accidental operation of the ring during the operation of the press, means for moving

the lever into operative position, and means for releasing the lever from engagement with the clamping ring when the moving means is rendered inoperative.

28. In a plate clamping and releasing device, the combination with a printing plate cylinder, of a clamping device for holding the end of a plate and provided with a cam groove, said clamping device being slidable along the cylinder, and a cam roll adapted to be located in said groove at a fixed point longitudinally of the cylinder to engage the cam as the cylinder rotates and move the plate clamp by the rotation of the cylinder.

29. In a plate clamping and releasing device, the combination with a printing plate cylinder, of a clamping device for holding the end of a plate and provided with a cam groove, said clamping device being slidable along the cylinder, a cam roll adapted to be located in said groove to engage the cam as the cylinder rotates and move the plate clamp by the rotation of the cylinder, and means movably connected with said cam roller for withdrawing it out of the cam groove when the plate is locked and the cylinder is rotating.

30. In a printing press, the combination with a plurality of printing couples, of automatic plate clamps for the plates on the respective printing cylinders thereof, means at the ends of said cylinders for automatically moving the plate clamps to lock the plates by the rotation of the cylinders, and means for placing all of said means into engagement with their respective plate clamps, whereby on the next rotation of the several plate cylinders, all the plates will be clamped.

31. In a printing press, the combination with a plurality of printing couples, of automatic plate clamps for the plates on the respective printing cylinders thereof, means at the ends of said cylinders for automatically clamping the plates by the rotation of the cylinders, said means connected with each cylinder being movable out of engagement with the plate clamps to prevent the release of the plates while the press is operating normally.

32. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means independent of the printing cylinder for causing said clamp to release the printing plate at the will of the operator.

33. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means independent of the printing cylinder for causing said clamp to engage the printing plate at the will of the operator.

34. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means independent of the printing cylinder for causing said clamp to engage or release the printing plate at the will of the operator.

35. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means independent of the printing cylinder for causing said clamp to engage or release the printing plate when the printing cylinder has come to rest.

36. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means independent of the printing cylinder for causing said clamp to engage or release the printing plate at the will of the operator when the printing cylinder has come to rest.

37. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means independent of the printing cylinder for actuating said clamp to release the printing plate when the cylinder comes to rest, said actuating means being arranged so as to be capable of actuation while the cylinder is still in motion.

38. The combination with a printing plate cylinder of clamps thereon for holding a printing plate, and means independent of the printing cylinder for causing said plate holding clamps of the cylinders to engage the printing plate at the will of the operator as the cylinder starts into rotation.

39. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, means independent of the printing cylinder for automatically operating said clamp to lock or release the plate, and means for throwing the clamp operating means into action.

40. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means carried independently of the cylinder for causing said clamp to move into position to lock the plate on the cylinder.

41. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, and means carried independently of the cylinder for causing said clamp to move into position to release the plate on the cylinder.

42. The combination with a printing plate cylinder of a clamp thereon for engaging a printing plate, means carried independently of the cylinder for causing said clamp to move into position to release the plate on the cylinder, and means carried independently of the cylinder for causing said clamp to move into or out of position to engage or release the plate at the will of the operator.

In testimony whereof I have hereunto affixed my signature.

HENRY A. WISE WOOD.