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W. F. HUCK
 PLATE CLAMP FOR SECURING AND POSITIONING
 PRINTING PLATES ON PRINTING CYLINDERS
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2,320,239

FIG. 3.

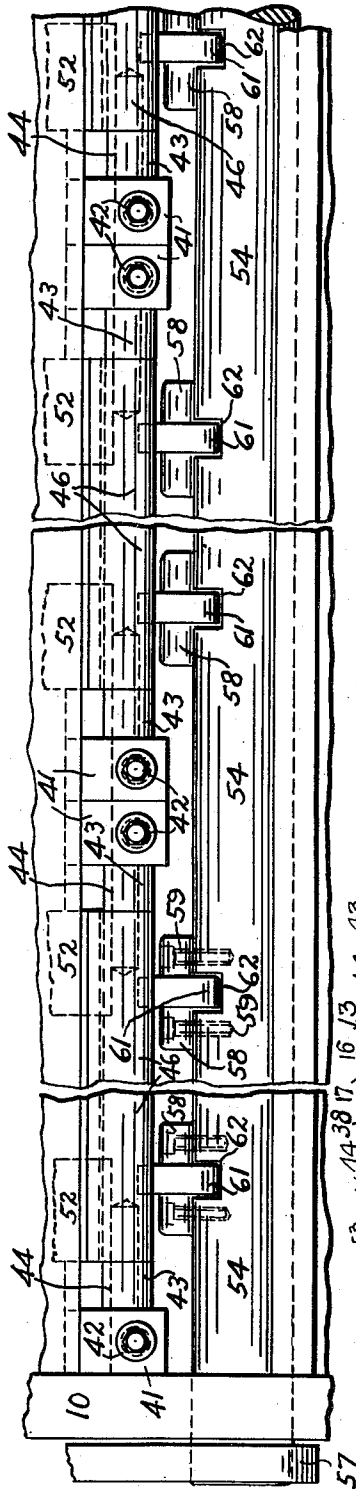


FIG. 2.

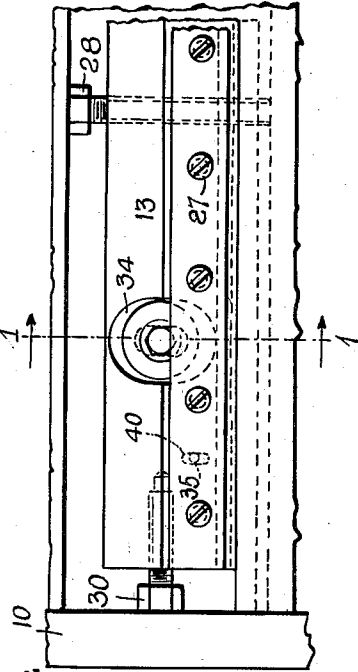
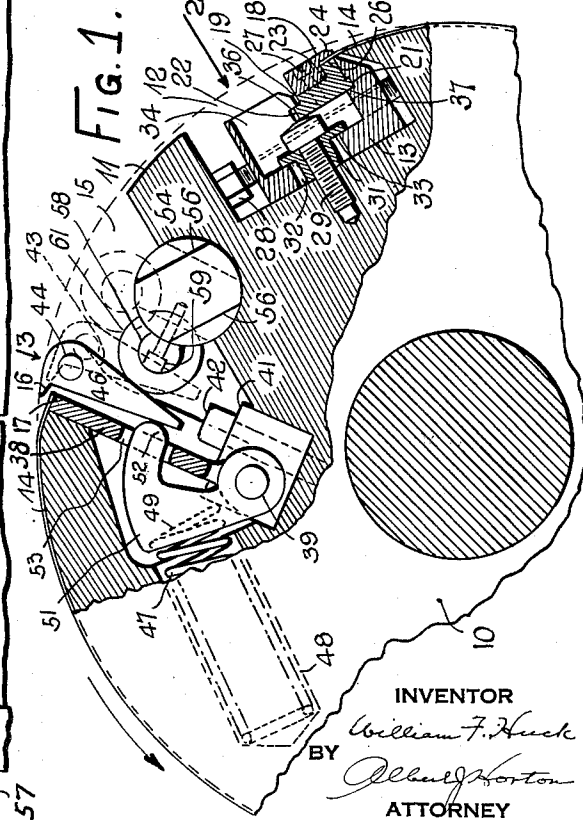


FIG. 1.



INVENTOR

William F. Huck

BY

Albert Horton

ATTORNEY

UNITED STATES PATENT OFFICE

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PLATE CLAMP FOR SECURING AND POSITIONING PRINTING PLATES ON PRINTING CYLINDERS

William F. Huck, Richmond Hill, N. Y., assignor to R. Hoe & Co., Inc., New York, N. Y., a corporation of New York

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10 Claims. (Cl. 101—415.1)

This invention relates to plate holding devices, and more particularly to method and means for locating a lithographic printing plate or the like in a desired position on a printing cylinder and quickly securing it.

An object of the invention is to provide plate clamping mechanism whereby a plate may be attached to or removed from a printing cylinder quickly and with little effort on the part of the operator.

Another object is to provide in a printing cylinder, a plate clamping mechanism arranged to accurately position plates to which clamping bars have previously been attached and positioned in definite respect to a printing form on the plate, by means of a registering device.

Still another object of the invention is to provide a method and means for accurately positioning a series of multicolor printing plates, each on one of a plurality of printing cylinders, with the printing forms carried by each of the plates in corresponding position on each cylinder, and quickly securing the plates in position and under tension.

Still another object of the invention is to provide a plate clamping mechanism that will accurately position a plate in a desired location on a printing cylinder without the necessity of sharply bending the edge of the plate.

It is also an object of the invention to provide a plate clamping mechanism of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view that will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction and in the method of operation hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

The preferred embodiment of the invention is illustrated in the accompanying drawing, wherein:

Figure 1 is an end view of a printing cylinder having plate clamping means made in accordance with the invention, certain parts being broken away, and certain parts being shown in section as indicated by lines 1—1 of Figure 2;

Figure 2 is a longitudinal view showing a por-

tion of the cylinder as seen in the direction of arrow 2 of Figure 1; and

Figure 3 is a longitudinal view of another portion of the printing cylinder as seen in the direction of arrow 3 of Figure 1.

In large printing plants where operations are standardized to a great extent, it is desirable to so lock the printing plates on the cylinders, that the printing forms will always occupy identical positions on the cylinders, this being particularly necessary in multicolor printing, where several impressions are successively made on the same sheet and it is necessary that the impressions be in accurate register.

The plate clamping mechanism herein disclosed provides means for accurately positioning the printing forms on the cylinders without the necessity for adjustment of the plate after it is placed on the cylinder, and the operation may be performed in a much shorter time than when using a clamping device of the types heretofore employed.

Referring to the drawing which shows a portion of a printing cylinder adapted to the use of the invention, 11 indicates the printing cylinder, and one of its bearers 10 is broken away to better show a recess 12 arranged to receive plate clamping mechanism for one edge of a printing plate 14 which is wrapped about the cylinder, its opposite edge extending to another recess 15 in which a second clamping mechanism having jaws 16 and 17 is mounted. In the preferred method of operation, the printing cylinder shown on the drawing will be rotated in a counter-clockwise direction, as indicated by the arrow in Figure 1, and the leading edge of the plate will be secured to a clamping fixture 13, and the trailing edge of the plate will be held by the jaws 16 and 17. For this reason, the two edges of the printing plate that are held by the clamping devices are referred to herein as the "leading" and "trailing" edges for convenience in distinguishing them, but it will be understood that in cases where it is more convenient to operate the printing cylinder in the reverse direction, the terminology applied to the plate edges engaged by the clamps will be considered as reversible.

In the use of the invention, upper and lower clamping bars 18 and 19 respectively are placed preferably on the leading edge of the printing plate and in a predetermined relation to the printing form, this relation being the same for all of the several plates in a set of multicolor printing plates, or on any other plates where uniformity in the position of the image is desired. The

proper location of these clamping bars on the plate may be effected by the use of a registering device shown in United States Patent Number 2,234,170, granted March 11, 1941, which discloses a table-like plate support having a registering device, whereby a series of plates having similar printing forms may be identically positioned on the support. A holder is provided which extends across the support and in which the lower clamping bar 19 is placed. Thus, when the plate is correctly located and the upper clamping bar 18 is placed in position and the bars are secured to the plate, these clamping bars will be in proper relation with the printing forms, to produce correctly registered printing.

The lower clamping bar 19 is preferably formed with shoulders 21 and 22 on its lowermost side, and with a rabbet 23 on its uppermost side. The upper clamping bar 18 is formed to fit into the rabbet 23, and has an extended lip 24 that cooperates with the jaw surface 26 on the lower clamping bar 19 to grasp the plate. Clamp screws 27 which are threaded into the lower clamping bar, when tightened, serve to rigidly secure the bars to the plate.

The clamping fixture 13 is provided with adjusting screws 28 which are screw threaded through suitable holes therein, whereby its position in the recess 12 may be adjusted.

The fixture 13 is held in the cylinder by means of screws 29 that pass through bushings 31 and are screw threaded into the cylinder body. The bushings 31, which are loose in elongated openings 32 in the fixture 13, have flanges 33 which engage the lower surfaces of the cutaway portions 34 of the fixture 13. The openings 32 are made wide enough to permit a limited longitudinal adjustment of the fixture by means of adjusting screws 30 which are screwed into the fixture and are turned so their heads abut against the bearers 10. It will be seen that this arrangement permits peripheral adjustment of the fixture 13 in the cylinder recess by turning the screws 28, and longitudinal adjustment by means of the screws 30. Both of these adjustments are usually employed for initial adjustment only and are not used during ordinary operation of the machine. The fixture 13 is formed with a slot having a side recess 36 arranged to receive the shoulder 22 of the clamping bar 19, and an oppositely disposed recess 37 is arranged to receive the shoulder 21 of the clamping bar 19. Clearance between the clamping bar and the fixture 13 is preferably provided, so that the bar may be moved counter-clockwise in respect to the cylinder to a slight extent, and then swung outwardly without loosening any of the parts. Dowel pins 35 are secured in the clamping fixture 13, and slots 40 are provided in the under side of the clamp bars 19 for the reception of pins 35 to insure accurate alignment of these parts when the plate is placed on the cylinder.

Referring now to the clamping mechanism for the trailing edge of the plate, the jaw 17 is formed on the outer edge of a jaw plate 38, of which there may be several aligned in the recess 15. These jaw plates are pivotally supported on pins 39, held in blocks 41, secured in the body of the cylinder 11 by means of screws 42. Each jaw plate has pivot pins 44 which pivotally support a jaw member 46.

For each jaw member, a compression spring 47 is arranged in a bore 48 in the cylinder 11, and its outer end abuts against the bottom of a recess 49

formed in a lever 51 which is pivotally supported on the pins 39, and having a projection 52 that extends through an opening 53 in the jaw plate 38 to engage the jaw member.

An operating shaft 54 is provided which extends lengthwise of the cylinder, and it is formed with an outer end having flattened surfaces 56 to be engaged by a wrench 57 (Figure 3) for manual operation. Pins 58, preferably having concave surfaces shaped to conform to the peripheral surface of the shaft 54, are secured thereto by means of screws 59, and rollers 61 are rotatably supported on the pins 58 and rotate in suitable slots 62 cut in the shaft.

From the foregoing description, it will be understood that the springs 47 tend to move the jaw members 46 and with them the jaw plates 38 towards the right, as shown in Figure 1. When the rollers 61 carried by the shaft 54 are in the position indicated by the dotted lines, each jaw member 46 is also in the position shown by dotted lines. Rotation then of the shaft 54 in counter-clockwise direction will first engage the jaw members 46, and, due to the spring pressure on the levers 51 and the resulting pressure of their projections 52 on the jaw members 46, the jaw plates 38 and the jaw member 46 will be swung together about the pivot 39 towards the position shown in full lines in Figure 1, but when each jaw plate reaches the limit of its travel, its jaw member 46 will then turn on its pivot 44 to the position shown in full lines, wherein the jaws are open and the edge of the plate may be inserted between them.

In applying a clamping bar 19 with a plate secured thereto, as hereinbefore described, to a printing cylinder, the clamping bar is placed in the clamping fixture 13 by first inserting the shoulder 22 in the recess 36, and then swinging the bar into place, so that the shoulder 21 engages in the recess 37. The cylinder is then rotated and the plate wrapped around the cylinder surface until the trailing edge of the plate is in the position shown in Figure 1, whereupon the shaft 54 is turned counter-clockwise, moving the jaws 16 and 17 into position to engage the trailing edge of the plate as shown in full lines in Figure 1. Then, by turning the shaft 54 in a clockwise direction, the rollers 61 move upwardly and when the rollers 61 move upwardly along the jaw members 46, the action of the springs 47 will cause the jaws 16 to engage the plate and press it against the jaws 17. When the jaws are firmly engaged, further rotation of the shaft 54 will permit the springs 47, acting through the jaw members 46 and their pivot pin 44, to swing the jaw plates 38 clockwise on their pivot pins 39, thus imposing a pull on the trailing edge of the plate which secures it firmly to the cylinder.

From the foregoing, it will be seen that when printing plates having clamping bars located in proper relation to printing forms thereon, are secured on similar printing cylinders, or successively on a single cylinder by means herein disclosed, the resulting printing will be in accurate register, and that, when employing this invention, plates can be applied to and removed from a printing cylinder in much less time than by methods heretofore employed.

It will also be seen that with the plate clamping mechanism herein disclosed, the edge of the plate is engaged without bending it sharply as is necessary with most plate clamps heretofore used, and in consequence, when the invention

herein disclosed is employed, a plate after being removed from the cylinder is perfectly flat and can be conveniently stored, also, if desired, the plate then may be used on an entirely different press, which might not be possible if one or more of the edges of the plate had been bent.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a plurality of first jaw members movably carried by the cylinder and having first jaws to engage the opposite edge of the plate on the cylinder, a plurality of second jaw members each movably supported on a first jaw member and having second jaws cooperating with the first jaws to engage the said opposite edge of the plate on the cylinder, a movable member for operating the second jaw members to open the jaws, and pressure-imparting means operable in opposition to the movable member and continuously coacting with each pair of jaw members for closing the jaws and tensioning the plate when the movable member is moved in a direction to release the jaw members.

2. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing the leading edge of the plate relative to the cylinder, a plurality of first jaw members movably carried by the cylinder and having first jaws to engage the trailing edge of the plate on the cylinder, a plurality of second jaw members each movably supported on a first jaw member and having second jaws cooperating with the first jaws to engage the trailing edge of the plate on the cylinder, a movable member for operating the second jaw members to open the jaws, and pressure-imparting means continuously coacting with the second jaw members and operable in opposition to the movable member whereby upon movement of the movable member in a direction to release the jaw members the jaws are closed to grip the said opposite edge of the plate and then the jaw members are moved relative to the cylinder to tension the plate on the cylinder.

3. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a plurality of first jaw members pivotally connected to the cylinder and having first jaws to engage the opposite edge of the plate on the cylinder, a plurality of second jaw members each pivotally supported on a first jaw member and having second jaws cooperating with the first jaws to engage the said opposite edge of the plate on the cylinder, a movable member for operating the second jaw members to open the jaws, and pressure-imparting means continuously coacting with each pair of jaw members and operable in opposition to the movable member whereby upon movement of the movable member in a direction to release the jaw members the jaws are closed to grip the said opposite edge of the plate and then the jaw members are moved relative to the cylinder to tension the plate on the cylinder.

4. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a plurality of first jaw members pivotally supported on the cylinder and having first jaws to engage the opposite edge of the plate on the cylinder, a plurality of second jaw members each pivotally supported on a first jaw member and having second jaws cooperating with the first jaws to engage the said opposite edge of the plate on the cylinder, a movable member for operating the second jaw members to open the jaws, and pressure-imparting means continuously contacting the second jaw members and operable in opposition to the movable member whereby upon movement of the movable member in a direction to release the jaw members the second jaw members are moved relative to the first jaw members to close the jaws to grip the said opposite edge of the plate and then the jaw members are moved relative to the cylinder to tension the plate on the cylinder.

5. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a plurality of first jaw members pivotally supported relative to the cylinder and having first jaws to engage the opposite edge of the plate on the cylinder, a plurality of second jaw members pivotally supported on the first jaw members and having second jaws cooperable with the first jaws to engage the said opposite edge of the plate on the cylinder, a rotatable shaft having members for contacting said second jaw members to open the jaws, and pressure-imparting means operable in opposition to the shaft and its members and continuously coacting with each pair of jaw members for closing the jaws and tensioning the plate when the shaft is rotated in a direction to release the jaw members.

6. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate to the cylinder, a first jaw member pivotally secured relative to the cylinder and having a first jaw to engage the opposite edge of the plate on the cylinder, a second jaw member pivotally connected to the first jaw member and having a second jaw cooperating with the first jaw to engage the said opposite edge of the plate on the cylinder, a member movable to and from engagement with the second jaw member, and pressure-imparting means operably engaging the second jaw member between the pivotal connections of the first jaw member and the point of engagement of the said movable member with the second jaw member, the pressure-imparting means being operable in opposition to the said movable member to maintain the jaws in plate-receiving relation until the said opposite edge of the plate is gripped between the jaws responsive to movement of the said movable member and to tension the plate on the cylinder upon further movement of the said movable member.

7. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a first jaw member pivotally connected to the cylinder and having a first jaw to engage the opposite edge of the plate on the cylinder, a second jaw member pivotally connected to the first jaw member at a point removed from the pivotal connection of the first jaw member with the cylinder and having a sec-

and jaw cooperating with the first jaw to engage the said opposite edge of the plate on the cylinder, a movable member engaging the second jaw member between the said pivotal connections, and pressure-imparting means operable in opposition to the said movable member and operably engaging the second jaw member between the pivotal connection of the first jaw member with the cylinder and the point of engagement of the movable member with the second jaw member to thereby maintain the jaws in plate-receiving relation until the said opposite edge of the plate is gripped between the jaws responsive to movement of the said movable member and to tension the plate on the cylinder upon further movement of the movable member.

8. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a first jaw member pivotally connected to the cylinder and having a first jaw to engage the opposite edge of the plate on the cylinder, a second jaw member pivotally connected to the first jaw member at a point removed from the pivotal connection of the first jaw member with the cylinder and having a second jaw cooperating with the first jaw to engage the opposite edge of the plate on the cylinder, a rotatable shaft, a roller rotatably supported by the shaft and engaging the second jaw member between the said pivotal connections and movable relative to the second jaw member upon rotation of the shaft, and a pressure-imparting member operable in opposition to the roller and yieldingly engaging the second jaw member between the pivotal connection of the first jaw member with the cylinder and the point of engagement of the roller with the second jaw member to maintain the jaws in plate-receiving relation until the said opposite edge of the plate is securely gripped between the jaws responsive to movement of the roller by rotative movement of the shaft and to then move the jaw members relative to the cylinder upon further rotative movement of the shaft to tension the plate on the cylinder.

9. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a first jaw member piv-

otally connected at one terminal to the cylinder and having a first jaw to engage the opposite edge of the plate, a second jaw member pivotally connected to the opposed terminal of the first jaw member and having a second jaw to engage the said opposite edge of the plate, pressure-imparting means operably engaging the second jaw member between the pivotal connections of the first and second jaw members, and a movable member operably engaging the second jaw member between the pivotal connection of the second jaw with the first and the point of engagement of the pressure-imparting means with the second jaw member whereby upon movement of the movable member the second jaw member is moved by the pressure-imparting means about its pivotal connection with the first jaw member to grip the said opposite edge of the plate and then both jaw members are moved about the pivotal connection of the first jaw member with the cylinder to tension the plate on the cylinder.

10. In a plate clamping device for securing a flexible printing plate on the periphery of a cylinder, means for securing an edge of the plate relative to the cylinder, a first jaw member pivotally connected at one terminal to the cylinder and having a first jaw to engage the opposite edge of the plate, a second jaw member pivotally connected to the opposed terminal of the first jaw member and having a second jaw to engage the said opposite edge of the plate, pressure-imparting means operably engaging the second jaw member between the pivotal connections of the first and second jaw members, and a movable member operably engaging the second jaw member between the pivotal connection of the second jaw with the first and the point of engagement of the pressure-imparting means with the second jaw member whereby upon movement of the movable member outwardly towards the pivotal connection of the second jaw member with the first the second jaw member is moved by the pressure-imparting means about its pivotal connection with the first to grip the said opposite edge of the plate and then both jaw members are moved about the pivotal connection of the first jaw member with the cylinder to tension the plate on the cylinder.

WILLIAM F. HUCK.