

Jan. 17, 1956

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2,730,948

CLAMP FOR MASTER SHEETS OF PRINTING MACHINES

Original Filed Jan. 22, 1952

2 Sheets-Sheet 1

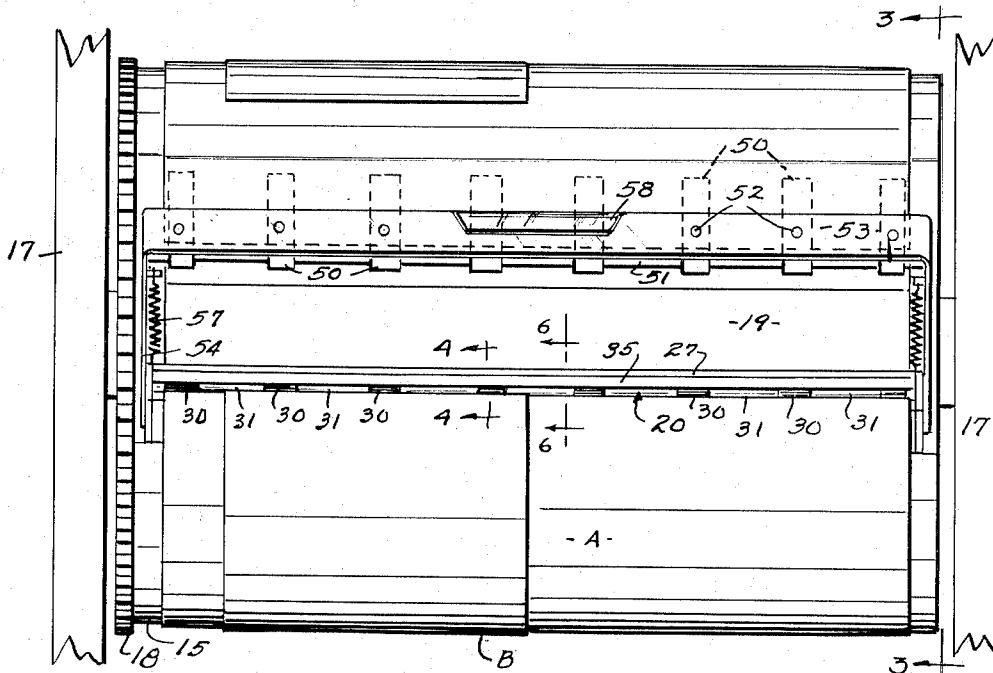


FIG- 1

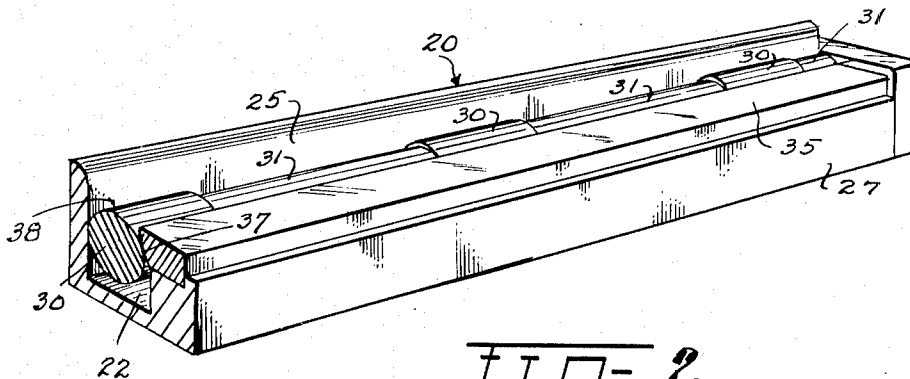


FIG- 2

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2 Sheets-Sheet 2

FIG- 3

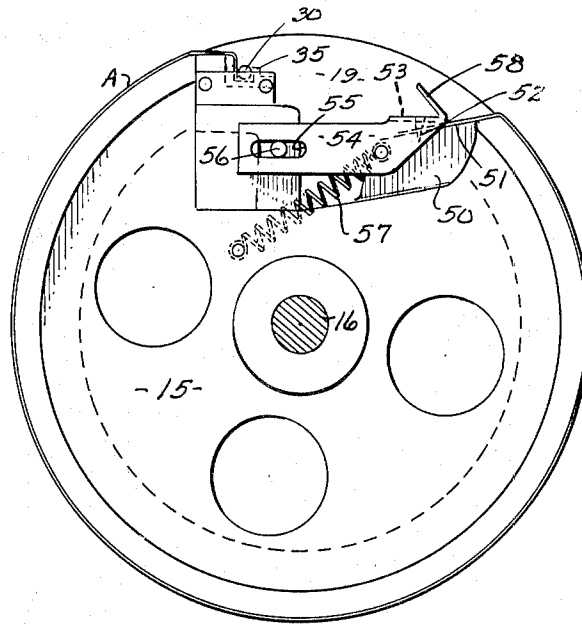


FIG- 5

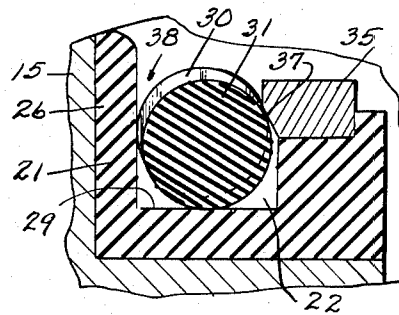
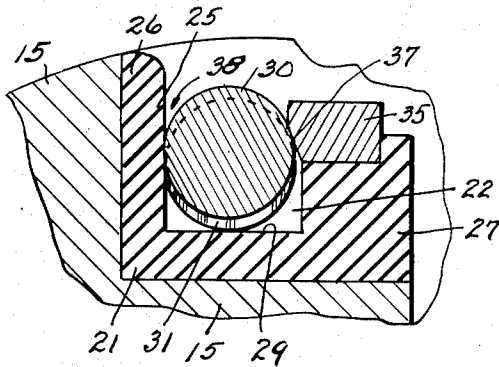


FIG- 6

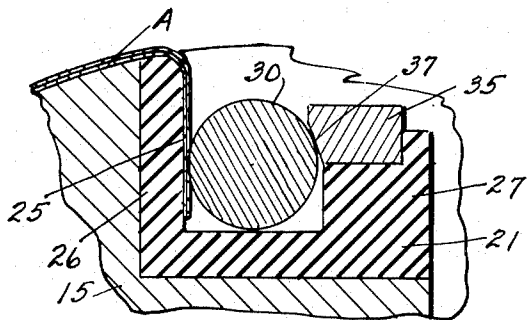


FIG- 4

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2,730,948

CLAMP FOR MASTER SHEETS OF PRINTING MACHINES

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Original application January 22, 1952, Serial No. 267,530. Divided and this application November 12, 1952, Serial No. 319,898

8 Claims. (Cl. 101—415.1)

This invention relates to improvements in or relating to a clamping device for securing one end of a printing plate or master sheet on the drum or cylinder of a rotary printing machine. The present application is a division of my prior application filed January 22, 1952, and assigned Serial No. 267,530, now abandoned.

The present invention is particularly concerned with the provision of a clamping device which will facilitate rapid mounting of the leading end of a thin flexible printing plate on the drum without manipulation of the clamping device other than by its contact with the printing plate. Further, the invention is concerned with the provision of an improved clamping device which will accurately position and secure one end of a thin flexible printing plate to the periphery of a printing drum without damage to the plate, and in a manner which will permit the plate to be readily removed. These therefore are the general objects of the present invention.

A further object of the present invention is to provide a device for clamping one end of a thin flexible printing plate, as for instance, a plate made of paper, on a printing drum without either damage to the plate or the use of springs.

According to the present invention there is provided a printing drum having an axially extending recess formed in its periphery in which an anvil and a plurality of master plate clamping magnets are mounted, the magnets being normally held in position by magnetic force so that they may move yieldingly to permit the end of the master plate to be inserted between them and the anvil, the magnetic force of the members thereafter being utilized to clamp the master plate between the members and the anvil consequent upon tensioning of the plate.

In the drawings, Fig. 1 is a fragmentary plan view of a printing machine having a printing drum equipped with the improved printing plate clamping mechanism;

Fig. 2 is a perspective view of a portion of the clamping mechanism removed from the printing cylinder;

Fig. 3 is a transverse section, as indicated by the lines 3—3 on Fig. 1, and illustrates the printing drum and clamping mechanism in end elevation;

Fig. 4 is a sectional view, on an enlarged scale, illustrating the clamping mechanism as used to clamp a pair of super-imposed printing plates in position, the plane of the section being indicated by the line 4—4 on Fig. 1;

Fig. 5 is a sectional view similar to Fig. 4, but with the printing plates removed; and

Fig. 6 is a sectional detail, similar to Fig. 5 but taken in the plane indicated by the line 6—6 on Fig. 1.

Referring now to the drawings, particularly Figs. 1 and 2, it will be seen that the improved clamping device is illustrated as being mounted on a printing drum or cylinder 15 carried by a shaft 16 which is suitably supported by and between a pair of spaced end plates or frame members 17. The drum may be rotated by any suitable driving mechanism, not shown, but which coacts with a gear 18, shown in Fig. 1 as being secured to one end of the drum. The drum 15 has an axially extending slot or re-

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cess 19 formed in its periphery, and in which the improved clamping device 20 is mounted.

The improved clamping device includes an elongated channel-like support 21 which is secured to the drum 15 within the recess 16 and which has an upwardly opening recess 22 extending longitudinally of the drum adjacent to but below the periphery thereof.

The inner face 25 of the leg 26 of the supporting channel 21 forms the anvil against which the leading end of the printing plate A is clamped by individually movable, spaced clamping magnets 30. Each magnet 30 comprises a cylinder formed of a material which, when magnetized, has a high coercive force, such as "Alnico." The magnets 30 are positioned in the channel 21 with their axes extending lengthwise. The channel is slightly wider than the diameter of the magnets 30 and is made of a non-magnetic material. The magnets 30 are preferably longitudinally spaced one from the other by cylinders 31 having substantially the same diameter as the magnets 31 but which, like the channel 21, are made of a non-magnetic material.

The magnets 30 and spacing cylinders 31 are retained in the channel 21, and the magnets 30 are cammed into wedging contact with the anvil surface 26 by an elongated bar 35 of magnetic material which, as shown, is secured to the upper end of the other leg 27 of the channel 21. This bar projects into the channel and restricts the width of its throat to a distance less than the diameter of the magnets 30 and spacing cylinders 31 thereby retaining the magnets and cylinders in the channel 21. The bar 35 is spaced from the bottom wall 29 of the channel 21 to permit vertical movement of the members 30 and 31. The inner face of the bar 35 is beveled to provide a cam surface 37 which cams the magnets 31 into wedging contact with the anvil surface 25 as they move upward in the channel due to their magnetic attraction to the bar 35.

The printing plate A is placed in the improved clamp by first introducing the leading or foremost end of the plate in the entrance angle or throat 38 which is formed by the surfaces of the clamping magnets 30 and the surface 25 of the anvil or leg 26 of the channel 21. The plate is then shoved downward between the magnets and anvil until the end of the plate strikes the bottom wall 29 of the channel 21. As the master plate is moved downward, the magnets 30 roll downward along the cam surface 37 of the bar 35. During the downward movement of the master sheet the magnetic attraction between the bar and the magnets 30 serves to yieldingly retain the magnets in the upper portion of the channel or groove 22 and in contact with the inclined cam surface 37 of the bar 35. When the plate A has been fully inserted it is tensioned by slowly drawing it outward which causes it to be wedged in place by the action of the cylindrical magnets 30 on the cam surface 37. The printing plate then may be held tensioned as hereinafter more fully described. However, it has been found that once tensioned, the tension may be released without danger of being released from the clamp.

The printing plate may be removed from the clamp either by manual depression of the magnets 30 or by first moving it toward the bottom of the channel 21 and then quickly drawing it outward.

The scale of the clamping device has been greatly enlarged in the drawings, particularly in Figs. 3, 4 and 5. However, it has been found preferable to use magnets having a diameter of from three to six thirty seconds of an inch for the clamping members.

The opposite or trailing end of the printing plate may be secured to the drum by a suitable tensioning device. As indicated in Figs. 1 and 3 the drum 15 may be provided with a series of spaced slots 50 which extend into the wall of the drum adjacent the side of the drum recess

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19 which lies opposite the clamp 20. The trailing edge of the tensioned printing plate is drawn across such slots and is held against the surfaces 51 of the drum between the recesses 50 by a series of pins 52, mounted in an axially extending bar 53. The ends of the bar 53 are provided with extensions 54, each of which is provided with a slotted opening 55 (Fig. 3). These openings 55 receive respective pins 56 which extend axially from the opposite ends of the drum. Suitable springs 57 are interposed between the bar 53 and the drum 15 to retain the bar in position adjacent the drum surface and at the same time draw it inwardly, so that the pins 52, which have been forced through the trailing end of the printing plate, will draw the plate tightly across the drum surface and maintain it tensioned.

When it is desired to remove the plate from the drum, the trailing end of the plate is released by raising the bar 53 from engagement with the plate. For this purpose the operator grasps a lip 58 of the bar 53 and moves the bar outward against the action of the springs 57, thus freeing that end of the plate.

As heretofore mentioned it is preferable that a series of individually movable, spaced magnets 30 be used. Accordingly, when the plate A has been clamped to the drum, a narrow plate B may be positioned to overlie portions of the plate A by inserting one end of the plate B between the plate A and certain of the magnets 30. This may be accomplished without disturbing the other clamping magnets which maintain the main plate A in position. This facilitates the use of supplemental master plates to supply data in addition to that on the main plate. Likewise, the supplemental plate may be blank so that it may be used to eliminate part of the data on the main plate A. The supplemental plate B is inserted and removed in the same manner as heretofore described in connection with the main plate A.

From the foregoing it will be seen that the present invention provides a simple and efficient device for clamping the leading end of a printing plate to a printing drum, which avoids the use of springs. Further the movable members of the device are so positioned that the centrifugal force developed by the rotation of the drum acts to increase the clamping action. Further the arrangement of the clamp is such that a relatively small force is required to move the members to clamping position thereby avoiding possible damage to the plate. Further the arrangement is such that the printing plate may be inserted and removed from the clamping device without manipulation of the device other than by the plate itself.

I claim:

1. A clamping device for securing a thin flexible master sheet on the periphery of a printing machine drum, an axially extending recess formed in its peripheral surface, said device comprising an anvil formed of non-magnetic material mounted in the recess, a sheet clamping member comprising a permanent magnet mounted for movement to and from the anvil to permit a sheet to be inserted therebetween, and guide means formed of a magnetic material to attract and to guide said magnet into wedging engagement with a sheet positioned on the anvil consequent upon tensioning of said sheet.

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2. A clamping device according to claim 1 having a plurality of cylindrical magnets spaced in a row with their axes aligned and parallel with the axis of the drum.

3. A clamping device according to claim 2 wherein the guiding means comprises a common cam bar formed of a magnetic material which acts to cam the individual magnets into wedging contact with a master sheet positioned between the magnets and anvil.

4. A clamping device according to claim 2, wherein the magnets are axially spaced by movable cylinders made of non-magnetic material.

5. A clamping device for securing a thin flexible master sheet on the periphery of a printing machine drum having an axially extending recess formed in its peripheral surface, said device comprising an anvil mounted in the recess and made of a non-magnetic material, a plurality of sheet clamping magnets mounted for movement to and from the anvil to permit a sheet to be inserted therebetween, magnet attracting means secured to said anvil to attract said magnets, and guide means to guide said magnets into wedging engagement with a sheet positioned on the anvil consequent upon movement of said magnets towards said means.

6. A clamping device according to claim 5, wherein the magnets comprise a series of cylindrical members extending axially relative to the drum, and means including a plurality of non-magnetic cylinders substantially aligned with the magnets and interposed alternately therewith to space the magnets axially from each other.

7. A clamping device according to claim 6, wherein the magnets and non-magnetic cylinders all have the same external diameter.

8. A clamping device for securing a thin flexible master sheet on a printing drum having an axially extending slot formed in its periphery, said device comprising an upwardly facing channel formed of non-magnetic material secured to said drum within said slot, said channel having an outwardly facing recess extending longitudinally of the drum, a series of spaced cylindrical magnets mounted in said recess with their axes extending longitudinally thereof, means to retain said magnets in said recesses while permitting a limited movement thereof in all directions, means providing a cam surface associated with one leg of said channel to cause the magnets to move individually into wedging engagement with the other leg of said channel consequent upon movement of the magnets away from the channel, and a bar of magnetizable material rigidly secured to the channel and to which the magnets are attracted, said bar being positioned to cause the magnetic attraction to move the magnet in a direction out of the channel.

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