

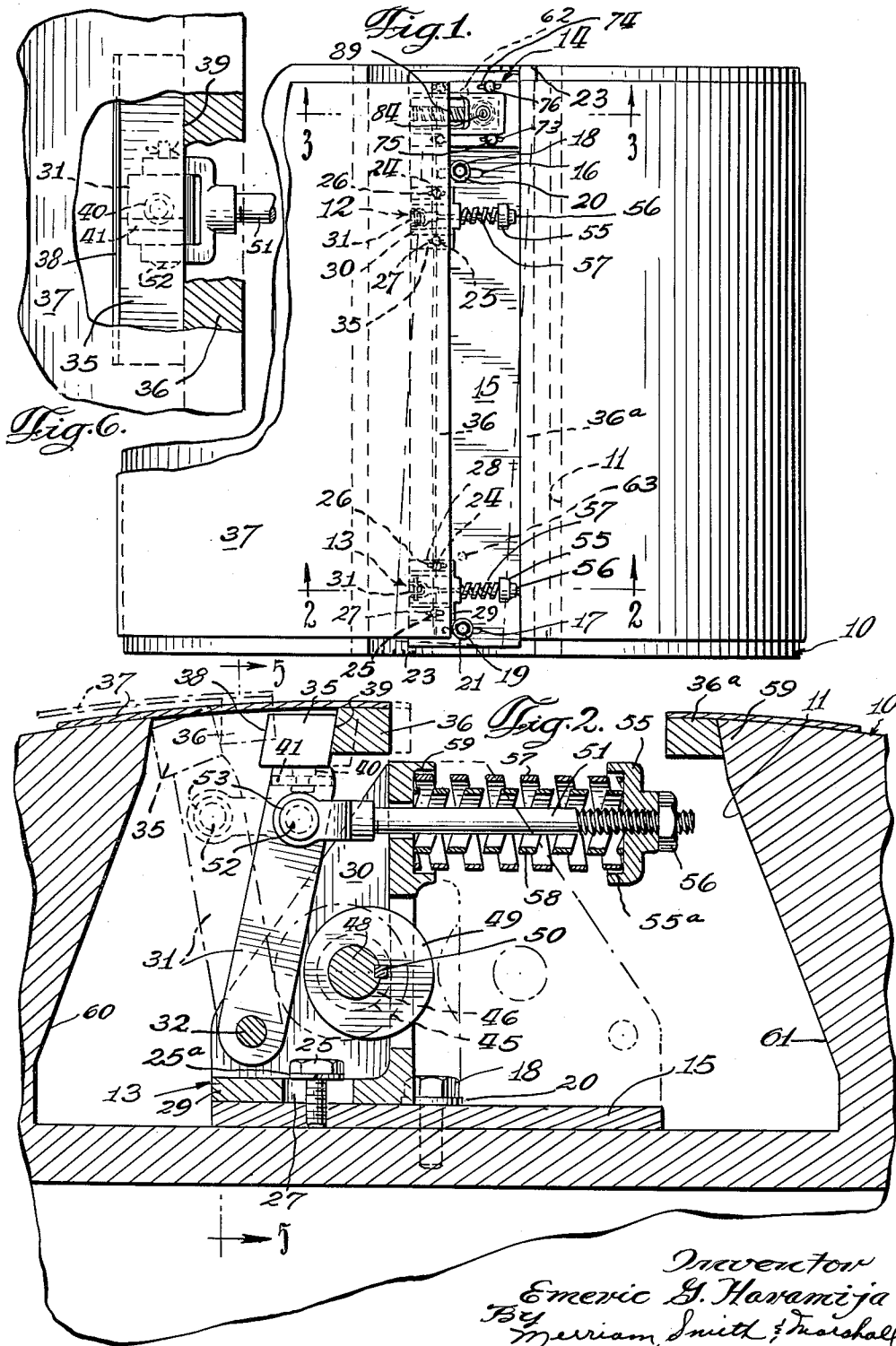
Oct. 22, 1963

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MECHANISM FOR HOLDING AND TENSIONING A PRINTING PLATE
ON A PRINTING CYLINDER

3,107,609

Filed May 4, 1961

2 Sheets-Sheet 1



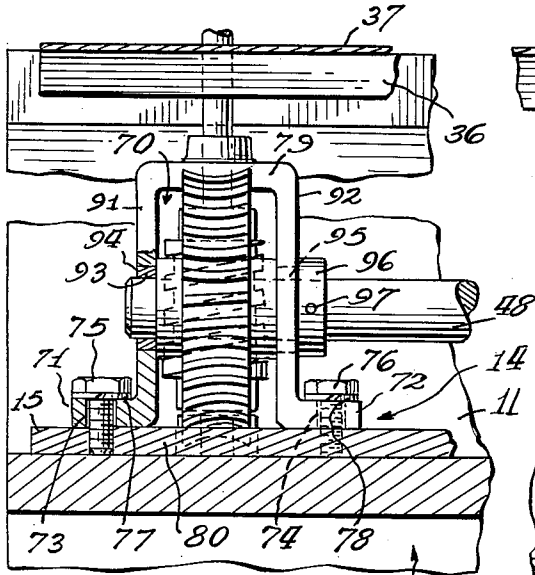
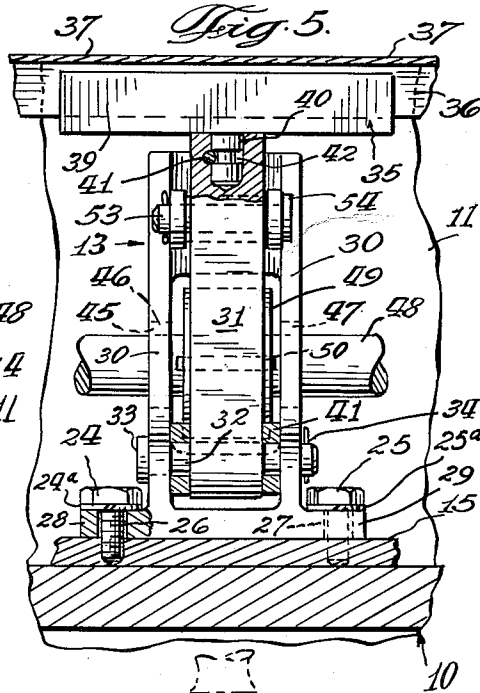
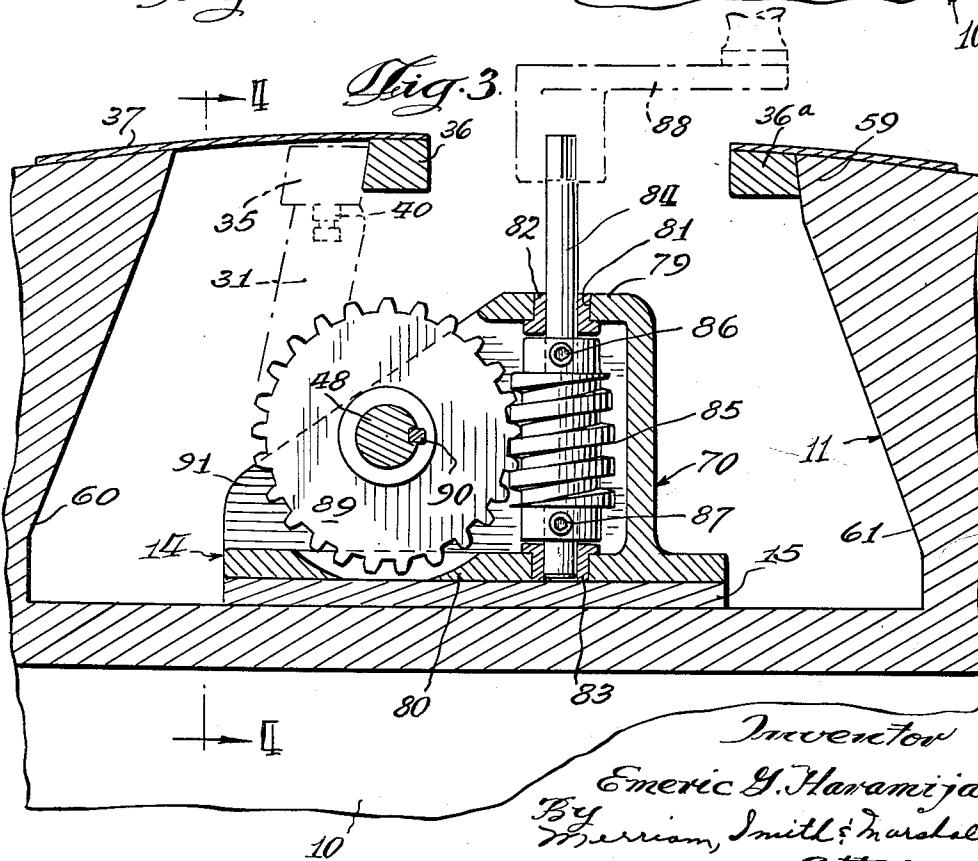
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MECHANISM FOR HOLDING AND TENSIONING A PRINTING PLATE ON A PRINTING CYLINDER

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2 Claims. (Cl. 101—378)

This invention relates to a mechanism for holding and tensioning a printing plate on a printing cylinder. In particular, the invention provides a mechanism which is conveniently operable from one end of the printing cylinder, and the mechanism includes one or more devices adjustable with respect to one edge of the printing plate. The device or devices, because of their adjustability, accommodate printing plates of slightly different lengths as well as printing plates the leading and trailing edges of which are not parallel to each other. The amount of tensioning force which the devices or devices, as the case may be, exert on the printing plate can be varied. When the device or devices are in their clamped position only the resilient force of an urging means acts to tension the printing plate. The mechanism thereby takes up any slack which results from the ironing out of the printing plate during its use.

The mechanism can be used as a holding and tensioning mechanism for the leading edge of the printing plate or, alternatively, it can be used as a holding and tensioning mechanism for the trailing edge of the printing plate. The invention includes an adjustable jaw which can be quickly adjusted for flexible printing plates of different lengths.

In the diagrammatic drawings:

FIGURE 1 is a plan view of the printing cylinder with the mechanism for holding and tensioning a printing plate;

FIGURE 2 is a cross-sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a cross-sectional view taken along line 3—3 of FIGURE 1;

FIGURE 4 is a cross-sectional view taken along line 4—4 of FIGURE 3;

FIGURE 5 is a cross-sectional view taken along line 5—5 of FIGURE 2; and

FIGURE 6 is a detailed view showing the clamping jaw and a portion of the spring rod.

In the illustrative drawings, there is shown a longitudinally extending rotary printing cylinder 10 suitably mounted for rotation in a printing press (not shown). The cylinder 10 is cut out to form a channel 11. Disposed within the channel 11 are a plurality of plate holding and tensioning devices 12 and 13 and an actuating device 14. The actuating device 14 is located at one end of the cylinder 10 and is employed to operate the plate holding and tensioning devices. While a plurality of identical plate holding and tensioning devices are shown in the illustrative drawing, it is to be understood that a single plate holding and tensioning device can be employed, if desired.

A base plate 15 is disposed in the bottom of the channel 11 and serves to mount the devices 12 and 13 and the actuating device 14. Curved elongated slots 16 and 17 are provided in the base plate 15. Screws 18 and 19 extend through the slots 16 and 17 and are threaded into the cylinder 10 at the bottom of the channel 11. The slots 16 and 17 permit the base plate 15 to be adjusted transversely of the longitudinally extending channel 11 in a substantially circumferential direction when the screws 18 and 19 are loosened.

The slots 16 and 17 are curved and are somewhat wider than the threaded portion of screws 18 and 19. This permits the base plate 15 to be skewed with respect to the axis of the cylinder. The screws 18 and 19 pass through washers 20 and 21 which prevent the head portions of the screws from entering the slots 16 and 17. This arrange-

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ment permits the base plate 15 to be positioned in the channel 11 and skewed with respect to the longitudinal axis of the cylinder 10. This arrangement is especially useful when one edge of the printing plate is skewed with respect to the axis of the cylinder. The entire mechanism which includes the plate holding and tensioning devices 12 and 13 and the actuating device 14 can therefore be positioned roughly parallel to one edge of the plate with which it is associated. Graduations 22 and 23 at each end of the cylinder aid the press operator in adjusting the base plate 15 with respect to the cylinder.

The devices 12 and 13 are each secured to the base plate 15 by screws 24 and 25 which pass through elongated slots 26 and 27 in lugs 28 and 29 on the devices 12 and 13. Washers 24a and 25a prevent the head portions of the screws from entering the slots 26 and 27.

Each plate holding and tensioning device includes a support member 30. The support member 30 carries the lugs 28 which enable the device to be secured to the base plate 15 by the screws 24 and 25. A clamping member 31 is pivotally mounted at its lower end on the support member 30 by a pivot pin 32. The pivot pin 32 has a head 33 at one end and an aperture at the other end through which a cotter pin 34 passes. The upper end of the clamping member includes a clamping jaw 35 which engages a bar 36 which is suitably attached as for example by soldering to a flexible printing plate 37. The clamping jaw 35 has two clamping faces 38 and 39 which can be alternatively used. The clamping face 38 is further from the center of a pivotal stud 40 than is the clamping face 39. It is apparent that if a longer printing plate than that shown in FIGURE 2 is employed the clamping jaw is only required to be pivoted 180° and the clamping face 38 will be caused to come into abutment with the bar 36. There is therefore provided a clamping jaw that can be quickly adjusted without changing the basic settings of the mechanism or the actuating unit 14 and the devices 12 and 13. The stud 40 and its associated clamping jaw 35 are retained in position by a retainer pin 41. The retainer pin 41 fits into an under cut portion 42 in the stud 40. The retainer pin permits free rotation of the clamping jaw in either direction, that is, either clockwise or counter-clockwise when viewed in FIGURE 1.

The support member 30 has a bore 45 which contains bearings 46 and 47. A camshaft 48 is mounted in the bore 45 for rotation in the bearings 46 and 47. A cam 49 is fixedly secured to the camshaft 48 by a key 50.

A spring rod 51 is pivotally attached at one end to the clamping member 31 at a point between the pivot pin 32 and the jaw 35 by means of a pivot pin 52. The pivot pin 52 has a head 53 at one end and an aperture at the other end through which a cotter pin 54 passes. A spring plate 55 is threaded for adjustment into the other end of the spring rod 51 which is threaded for a considerable portion of its length. A lock nut 56, when tightened against the spring plate 55, locks the spring plate 55 in its adjusted position. Springs 57 and 58 encircle the spring rod and one end of the springs 57 and 58 fits into a recess 59 in the support member 30 which it abuts, while the other end of the springs 57 and 58 abuts the spring plate 55 in a recess 55a. Two springs 57 and 58 are provided to give a great force in a minimum of space. Since it is desirable to keep the gap between the ends of printing plates as small as possible to avoid wasting valuable space on the printing plate, dual springs are provided. Because these dual springs can exert a larger force than a single spring, the number of devices 12 and 13 is reduced. Also, when the mechanism is used with presses of slow speed bearing light printing plates it might be found that the spring 57 or the spring 58 can be eliminated and only the remaining spring retained. By eliminating one of the

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springs 57 or 58 it will be apparent that the clamping and holding tension on the printing plate is accordingly reduced. The force which the springs exert upon the clamping member and hence upon the edge of the printing plate depends upon the adjustment of the spring plate 55 with respect to the support member 30. When a plurality of printing plate holding and tensioning devices are provided, one of the spring plates 55 can be adjusted differently from the other spring plates in case the edge of the printing plate is skewed with respect to the axis of the cylinder 10. In this case the clamping member of one of the devices would travel further than the clamping member of the other devices but each would be adjusted to yield sufficient tension.

The profile of the cam 49 is such that when the clamping member 31 is moved into the clamping position shown in FIGURE 2, the cam 49 is out of engagement therewith. In this position, therefore, the springs 57 and 58 alone act to tension the printing plate 37. When the camshaft 48 is rotated by the actuating device 14 the clamping member 31 is moved into the unclamped position against the resilient urging force of the springs 57 and 58 as best shown in phantom in FIGURE 2. The actuating device 14, the camshaft 48, and the cam 49 serve the dual function of holding the clamping member 31 in the unclamped position and of releasing the clamping member into the clamped position whereupon the clamping member exerts its holding and tensioning force on the edge of the printing plate 37.

The printing plate 37 is attached to the bar 36 at one edge thereof as explained above. The other edge of the printing plate is similarly attached to a similar bar 36a which simply abuts a complementary portion 59 of the printing cylinder 10.

In the arrangement shown in FIGURES 1, 2 and 3 the printing plate holding and tensioning devices take up the ordinary slack and that which results from the ironing out of the printing plate during its use. In a word, the mechanism is used to hold and tension the trailing edge of the printing plate. The mechanism is also very useful where the bar 36 is disposed at the leading edge of the printing plate and where the bar 36a is disposed at the trailing edge of the printing plate adjacent portion 59 of the cylinder 10.

Should the need arise, the removable base plate 15 with its associated devices 12 and 13, and the actuating device 14, can be reversed, that is, made to face in the opposite direction as shown by the phantom lines in FIGURE 2. It will be noted that the channel 11 is sufficiently undercut at 60 and 61 to receive the mechanism in either position. When the mechanism is reversed, threaded holes 62 and 63 are employed to receive screws 18 and 19. The mechanism is fully adapted also in the reversed position to engage either the leading or the trailing edge of the printing plate.

The operating device 14 includes a support member 70 which carries lugs 71 and 72. The lugs 71 and 72 contain elongated slots 73 and 74. Screws 75 and 76 pass through washers 77 and 78 and the slots 73 and 74 in the lugs 71 and 72 and are threaded into the base plate 15. The support member 70 is bifurcated and includes arms 79 and 80. The arms 79 and 80 have a bore 81 which contains bearings 82 and 83. A shaft 84 is mounted in the bore for rotation in the bearings 82 and 83. A worm 85 is keyed to the shaft 84 by set screws 86 and 87. A wench 88 is employed to rotate the shaft 84 and hence the worm 85. A worm gear 89, keyed to the camshaft 48 by means of a key 90, meshes with the worm 85. The worm gear 89 is straddled by arms 91 and 92 of the support member 70. The camshaft 48 is mounted for rotation in a bore 93 for rotation in the bearings 94 and 95. The bearing 95 has a collar 96 which has an aperture therein which is fitted with a retainer pin 97. The retainer pin 97 fits into an undercut portion similar to undercut portion 42 of FIGURES 2 and 5.

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The elongated slots 73 and 74 permit adjustment of the actuating device along with the holding and tensioning devices without change of the adjustment of the base plate 15.

The above-described embodiment being exemplary only, it will be understood that the present invention comprehends organizations differing in form or detail from the presently described illustrative embodiments. Accordingly, the invention is not to be considered as limited save as is consonant with the scope of the following claims.

I claim:

1. A mechanism for holding and tensioning a flexible printing plate wrapped around a printing cylinder having a peripheral channel extending between the cylinder ends, with a first transverse edge of said printing plate having a bar attached therealong and extending into said channel, said mechanism comprising:
 - an elongated base in said channel;
 - means adjustably mounting said base in said channel for longitudinal disposition in a direction parallel to said first transverse edge of said printing plate;
 - a support element fixed to said base;
 - a member extending upwardly from said support member;
 - a jaw means at the upper end of said member for engaging said bar at the first transverse edge of the printing plate and for tensioning the printing plate;
 - means mounting said member on said support element for pivotal movement of the member with said jaw means between a first engaging position and a second retracted disengaged position;
 - a spring rod pivotally attached at one end thereof to said member and extending slidably through said support element;
 - a spring plate at the other end of said spring rod and longitudinally adjustable thereon;
 - spring means, encircling said spring rod, and having one end thereof abutting said support element and the other end thereof abutting said spring plate, whereby said engaging means is normally urged to its first position;
 - and means, on said support member, actuatable to retract the engaging means to its second position;
 - and means on said base for actuating said retracting means.
2. A mechanism for holding and tensioning a flexible printing plate wrapped around a printing cylinder having a peripheral channel extending between the cylinder ends, with a first transverse edge of said printing plate having a bar attached therealong and extending into said channel, said mechanism comprising:
 - an elongated base in said channel;
 - means adjustably mounting said base in said channel for longitudinal disposition in a direction parallel to said first transverse edge of said printing plate;
 - means, connected to said base, for engaging said bar at the first transverse edge of the printing plate and for tensioning the printing plate, said engaging means comprising:
 - a member extending upwardly from said base;
 - a jaw located at the top of said member;
 - said jaw having a pair of opposite parallel faces;
 - a pivotal stud extending downwardly from said jaw and rotatably mounting said jaw on the top of said member for movement between a first position, in which a first of said pair of faces is in an engaging position relative to said bar at the first transverse edge of the printing plate, and a second position in which the second of said pair of faces is in an engaging position;
 - said pivotal stud being located substantially closer to one of said faces than to the other;
 - means mounting said engaging means for pivotal move-

ment relative to said base between a first engaging position and a second retracted disengaged position; means on said base normally urging said engaging means toward said first position; means, on said base, adjacent said engaging means, 5 actuable to retract the engaging means to its second position; and means on said base for actuating said retracting means.

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