July 15, 1947. W. F. HUCK 2,424,170

PLATE CLAMPING MECHANISM FOR PRINTING MACHINES

Filed Feb. 10, 1944 4 Sheets-Sheet 1

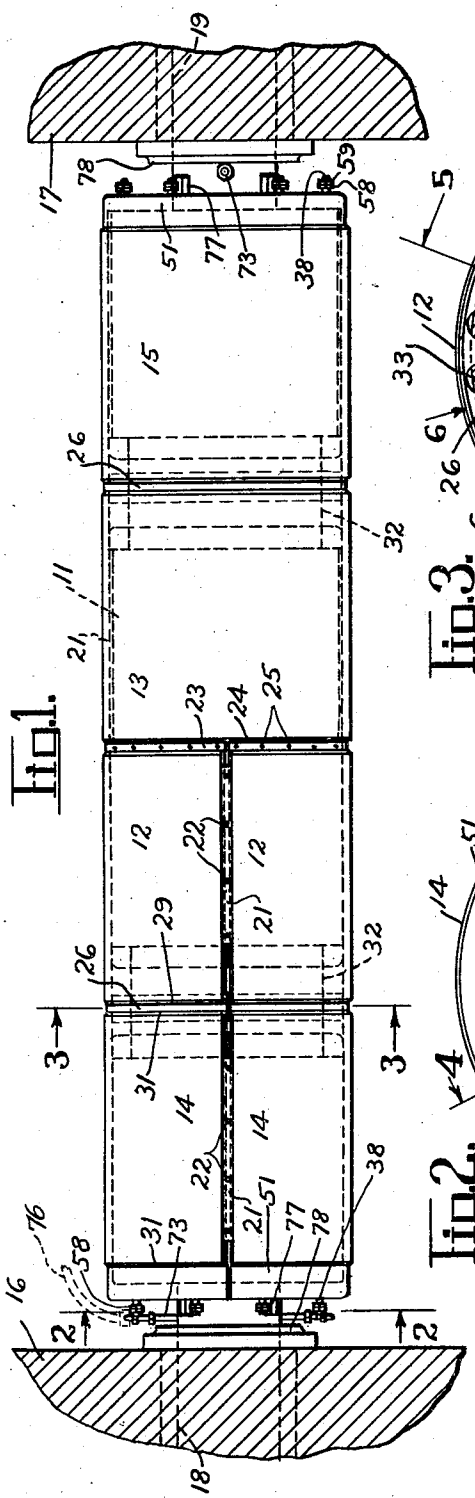


Fig. 1.

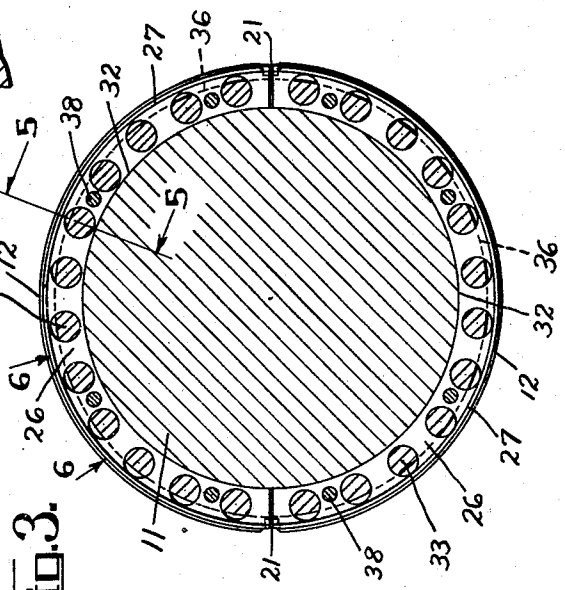


Fig. 3.

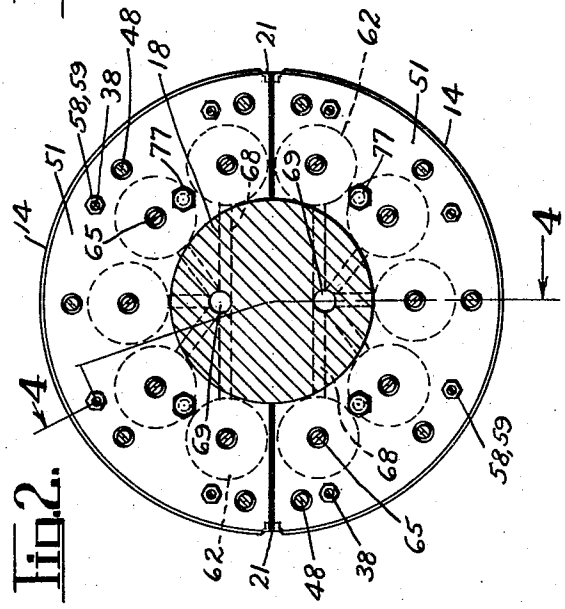


Fig. 2.

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PLATE CLAMPING MECHANISM FOR PRINTING MACHINES

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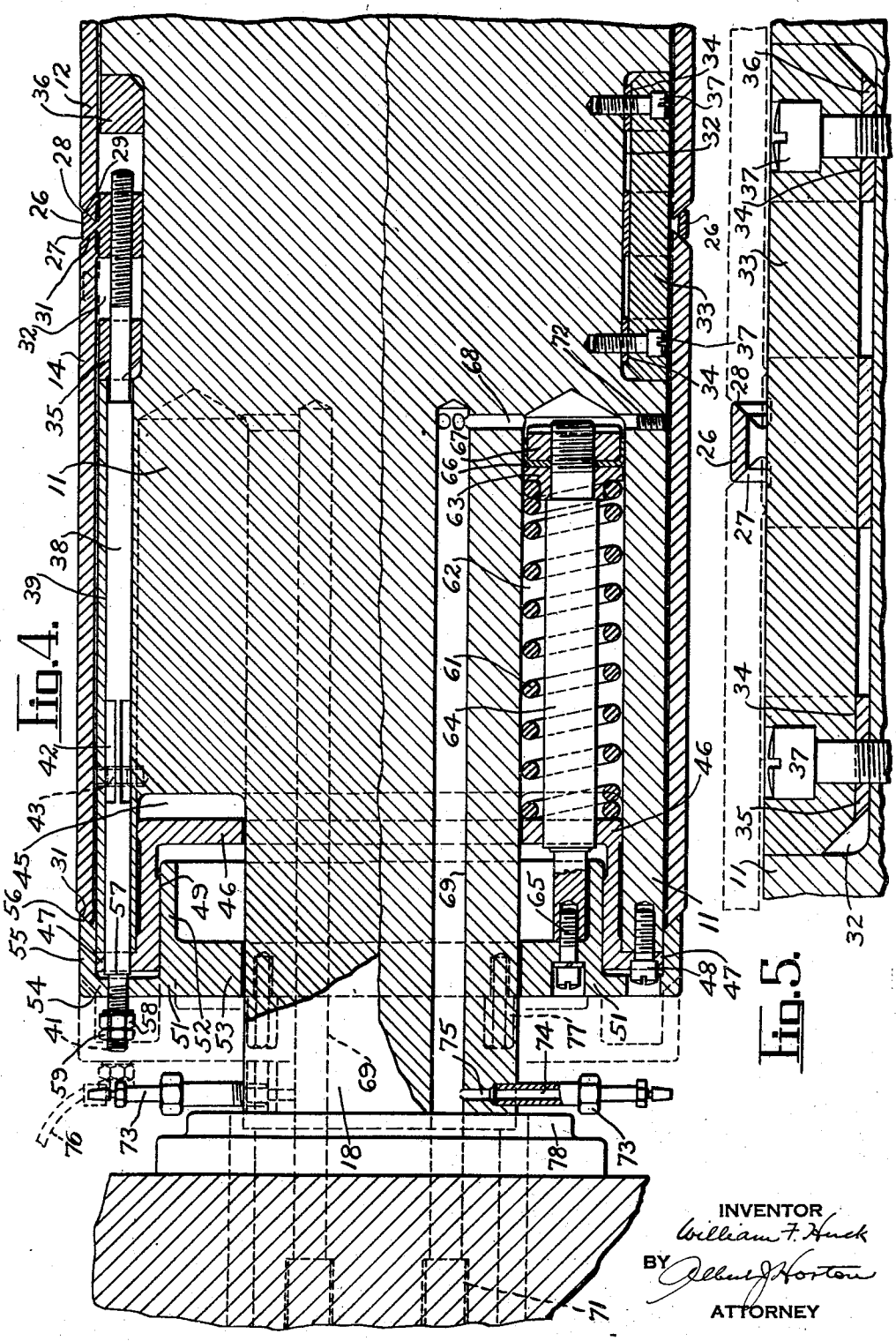


Fig. 4.

Fig. 5.

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PLATE CLAMPING MECHANISM FOR PRINTING MACHINES

Filed Feb. 10, 1944 4 Sheets-Sheet 3

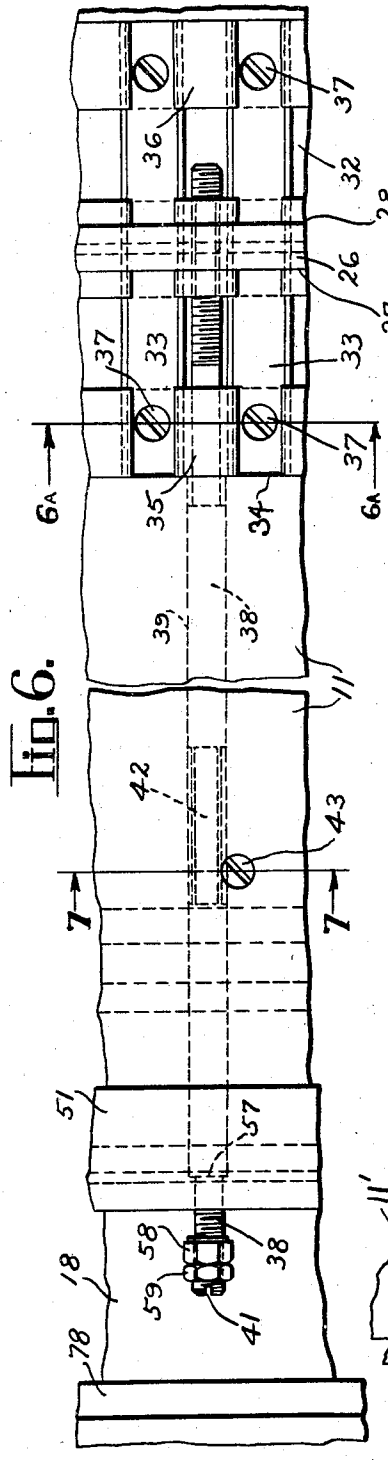


Fig. 6.

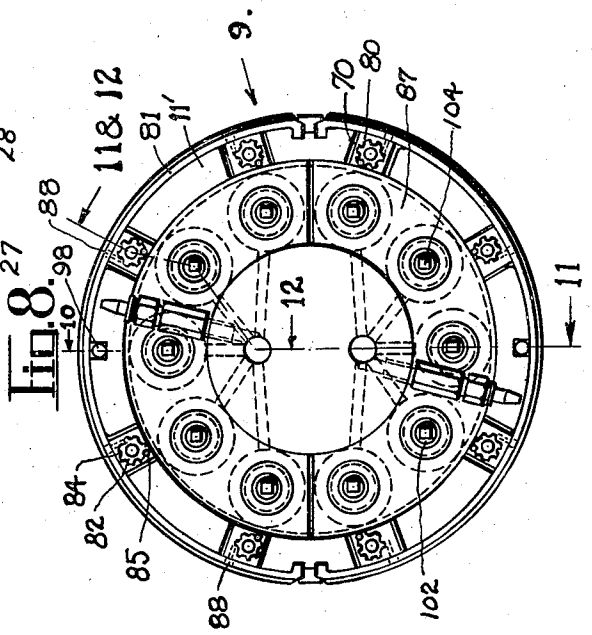


Fig. 8.

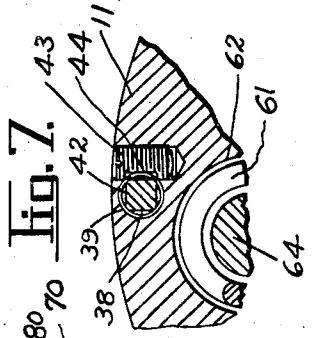


Fig. 7.

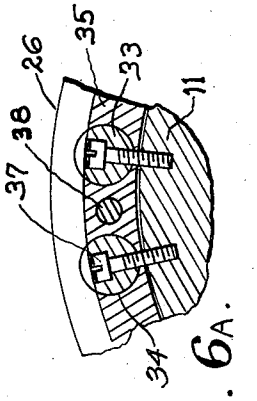


Fig. 6A.

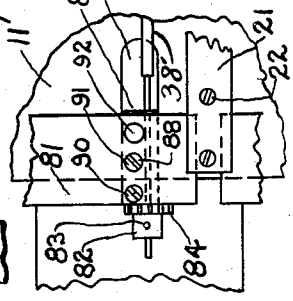


Fig. 9.

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PLATE CLAMPING MECHANISM FOR PRINTING MACHINES

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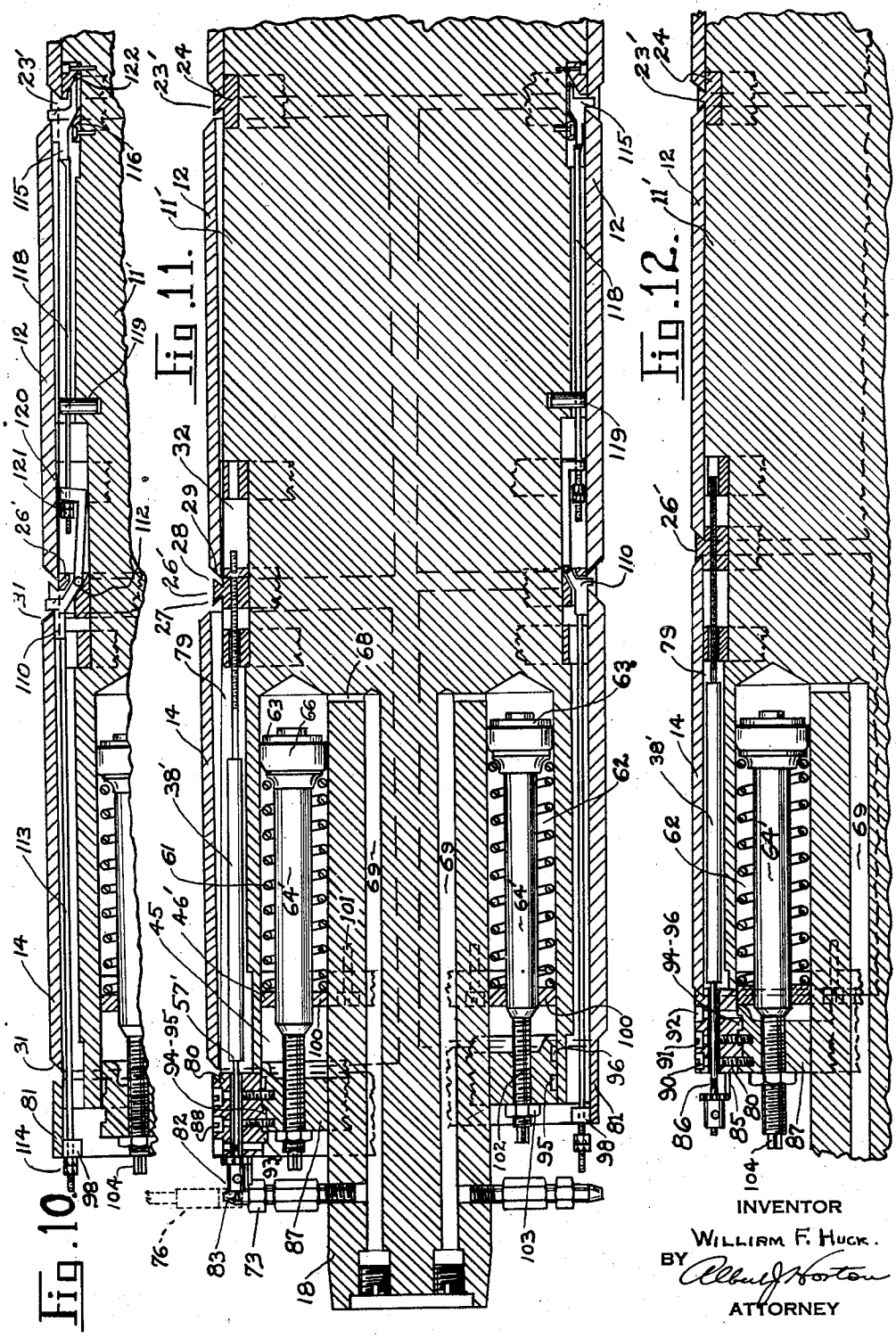


Fig. 10.

Fig. 11.

Fig. 12.

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UNITED STATES PATENT OFFICE

2,424,170

PLATE CLAMPING MECHANISM FOR PRINTING MACHINES

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Application February 10, 1944, Serial No. 521,829

19 Claims. (Cl. 101—378)

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This invention which relates to mechanism for securing printing plates to the form cylinder of a rotary printing machine and more particularly to a fluid actuated means for operating the mechanism, was disclosed in part, in application Serial Number 466,987, filed November 26, 1942, of which this application is a continuation in respect to the mechanism thus previously disclosed.

An object of this invention is to provide an improved form of automatic plate clamping mechanism in which the operating components are all carried by the cylinder upon which the plates are mounted.

Another object is to provide an improved plate clamping mechanism having spring operated means for clamping the plate and fluid operated means for releasing it.

Still another object of this invention is to provide an improved plate clamping mechanism having means for adjusting the plate clamps whereby they may be adapted to clamp plates which vary in width to a considerable extent.

A further object is to provide an improved plate clamping mechanism wherein plate lifting means is included to loosen the plates from the cylinder when the plate clamps are released.

It is also an object of this invention to provide a printing 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, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction 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 the claims without departing from the spirit of the invention.

A preferred embodiment and a modified form of the invention are illustrated in the accompanying drawings, wherein:

Figure 1 is a plan view of a form cylinder having printing plates clamped thereon by the plate clamping mechanism of this invention;

Figure 2 is an enlarged view partly in section, showing one end of the form cylinder shown in Figure 1 and taken on the line 2—2 of that figure;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1;

Figure 4 is an enlarged sectional view taken on the broken line 4—4 of Figure 2;

Figure 5 is an enlarged sectional view taken on the line 5—5 of Figure 3;

Figure 6 is a top plan view of a portion of the form cylinder with the printing plates removed and taken in the direction of arrows 6 of Figure 3;

Figure 6A is a fragmentary sectional view taken on the line 6A—6A of Figure 6 and showing the plate clamp guide rods;

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Figure 7 is a fragmentary sectional view taken on the line 7—7 of Figure 6 showing a locking screw in unlocked position;

Figure 8 is an end view of a form cylinder having a plate clamping mechanism of somewhat modified form;

Figure 9 is an enlarged fragmentary surface view of a portion of the cylinder shown in Figures 8 and 11, taken in the direction of arrow 9 of Figure 8;

Figure 10 is a sectional view taken on the line 10 of Figure 8, showing certain parts of the plate clamping mechanism in position after unclamping a relatively wide plate, and showing the plate lifting means in raised position after releasing the unclamped plates from the cylinder;

Figure 11 is a sectional view taken generally on the broken line 11—11 of Figure 8, showing other parts of the plate clamping mechanism in position after unclamping a relatively wide plate, and in the lower portion, showing the plate lifting means in its position when a plate is clamped; and

Figure 12 is a sectional view taken on the line 12—12 of Figure 8 and showing parts of the plate clamping mechanism in position to clamp relatively narrow plates.

As illustrated in Figure 1 of the drawings, a form cylinder 11 is arranged to carry eight semi-cylindrical printing plates, the plates being arranged four lengthwise of the cylinder and two plates around the cylinder. Inner plates 12 and 13, are positioned on each side of the middle of the cylinder and arranged in the usual staggered relation, while outer plates 14 and 15 are positioned two at each end of the cylinder and each in alignment with an adjacent inner plate.

The adjacent straight edges of the plates of each pair are spaced apart and held upon the cylinder 11 by the usual margin bars 21 secured to the cylinder by screws 22. The adjacent curved edges of the inner plates 12 and 13 are held on the cylinder and spaced apart by a center clamp ring or clip 23. The clamp ring 23 is seated in a peripheral groove 24 formed in the cylinder 11 and is secured therein by screws 25 threaded into the cylinder 11.

The adjacent curved edges of inner and outer plates, 12, 14, and 13, 15, respectively, are spaced apart and secured to the cylinder 11 by semi-annular inner plate clamp members or clips 26 and having lips 27 and 28 (Figure 4) which overhang the opposing beveled edges 29 and 31 of the adjacent inner and outer plates 12, 14, and 13, 15 respectively. The inner clips 26 are arranged to slide in a peripheral recess 32 provided in the cylinder 11. Each of the inner clips 26 rides on a plurality of guide rods 33 (Figures 3, 4, 5 and

6A), in this instance twelve rods 33 being provided for each clip 26. The rods 33 extend lengthwise of the cylinder and across the peripheral recess 32 with their ends disposed in holes 34 provided in semi-annular guide rod supports 35 and 36 (Figures 4, 5 and 6A) to receive them. The outer surface of the guide rods 33 is shaped to conform with the peripheral surface of the cylinder 11 to engage the underside of the plate. The supports 35 and 36 are secured in the recess 32 by screws 37 passing through the guide rods 33 and into the cylinder 11. The arrangement is such that the inner clips 26 slide on these guide rods axially in respect to the cylinder, their movement being within the recess 32, and between the supports 35 and 36. Thus a plate 12 or 13 may be clamped between a clip 26 and the ring 23, or be released from such clamped position.

As herein shown four plate clip connecting rods 38, extend through clearance holes 39 in the cylinder 11 (Figures 3, 4 and 6). Four of these rods are provided for each clip ring 26. They have their inner ends threaded and are screwed into the inner plate clips 26. The outer end of each of the connecting rods 38 has a screw-driver slot 41, by which the rod 38 may be rotated to adjust the position of the clip 26 within a certain range, to suit the width of the printing plates to be used.

Means to lock the connecting rods 38 against rotation and thereby retain the adjustment of the clip 26, is shown in Figures 6 and 7, and includes a plurality of flat surfaces 42 cut on each rod 38, and adapted to be engaged by the periphery of a lock screw 43, screw-threaded into the cylinder 11. The lock screw is provided with a cross-slot 44 on its periphery in alignment with the rod 38 whereby, when it is turned in position disposes this slot 44 adjacent the rod 38, and the latter may be rotated to adjust the clip 26, but when the lock screw is turned to present its periphery against one of the flat surfaces 42, the rod 38 is prevented from turning.

The cylinder 11 is provided with an annular recess 45 at each end to receive a pair of semi-annular spring retainers 46, each having a radially extending flange 47 on its periphery which seats upon the respective cylinder end and is secured thereto by screws 48. A bore 49 is provided in the retainers 46, and receives a pair of arcuate thrust members or yokes 51, each having a semi-cylindrical portion 52 fitted to slide in the bore 49 of the adjacent retainer 46. Each yoke 51 also has a portion 53 extending toward and surrounding the respective shaft end 18 or 19, and a flange portion 54 extending radially therefrom over the flange 47 of the spring retainer 46. An arcuate outer plate clamping member or clip 55 extends from each flange portion 54 over the periphery of the cylinder 11, and is adapted at its edge 56, to engage an adjacent beveled edge 31 of an outer plate 14 or 15.

The connecting rods 38 pass through the flange portion 54 of the thrust yokes 51 and are reduced in diameter at this portion to form a shoulder 57 which, when only an inner plate is to be clamped, is engaged by the flange portion 54. Thus when a thrust yoke 51 is moved axially along the cylinder 11, it moves the plate clip 26 against an inner plate 12 or 13 and clamps it between the clip 26 and the clamp ring 23. When both an outer and an inner plate are mounted adjacently on the cylinder, the shoulders 57 are slightly spaced from the flange 54 so as not to be engaged thereby when the latter is moved. A nut 58 is screw-threaded on the outer end of each rod 38

and adjusted to be engaged by the flange 54 when the latter is moved axially along the cylinder 11 toward its end, to draw the rods 38 axially and release the inner clip 26 from clamping engagement with the respective inner plate 12 or 13. A lock nut 59 is provided to lock the nut 58 in its adjusted position.

Each thrust yoke 51 is moved inwardly and axially along the cylinder 11 by springs 61, there being five such springs as herein shown for each yoke. Each of the springs 61 is disposed in a bore 62, formed in the cylinder 11 to receive it, and reacts between a spring retainer 46, and a piston 63 secured on a piston rod 64. The piston rod 64 extends through the spring 61 and the retainer 46 and is secured at its outer end to the thrust yoke 51 by a screw 65. There are thus five piston rods connected to each thrust yoke. A packing cup 66, of leather or similar material, is clamped against each piston 63 by a nut 67 screw-threaded upon the piston rod 64. The piston cup 66 forms a fluid-tight joint against the well of the bore 62.

The inner end of each of the five bores 62 is connected by a port 68 to a passage 69 extending axially in the cylinder shaft end 18 or 19 and sealed at its outer end preferably by a plug 71. Each of the ports 68 is preferably drilled through from the periphery of the cylinder 11 and sealed by a plug 72, as indicated in Figure 4. A hole 75 communicates with each passage 69 to provide an inlet and vent for the bores 62 with which the passage is connected, and it is arranged to receive a connection or terminal fitting 73, having a bore 74. A hose or tube having a suitable terminal fitting 76, preferably including an automatic valve of the type used on automobile tire inflating equipment, is connected to a source of compressed air or other suitable fluid. It is preferable that the bore 74 in the fitting 73 be made relatively small or constricted at some point, to prevent a too rapid flow of air into, or out of the bores 62, in order to avoid too rapid operation and consequent damage to the equipment or injury to the operator. The terminal 76 is adapted to be detachably connected to the fitting 73, to direct air into and through the holes 75, 69, and ports 68 into the bores 62 to act against the packing cup 66 and pistons 63 to simultaneously force five of the piston rods 64 outwardly and move one of the thrust yokes 51 and its outer plate clamping member 55 away from the end of the cylinder 11, and thereby move the outer and inner plate clamping members 55 and 26 into position to receive plates 12 and 14 or 13 and 15. During its movement outwardly the flange 54 moves the outer clip 55 farther away from the inner clip 26, and then engages the nut 58 and through the rod 38 moves the inner clip 26 farther away from the clamp ring 23, thereby preparing the cylinder to receive an inner and an outer plate. A plurality of stop studs 77, two being herein shown, are screw-threaded into each yoke 51, to limit the outward movement of the yoke to the extent indicated by dotted lines in Figure 4. When so moved, the studs 77 strike against a collar 78 secured to the machine frame and surrounding the shaft end 18 or 19.

With the plate clamping mechanism thus in the "open" position, an inner plate 12 or 13 is placed on the cylinder with its inner edge against the ring 23, and the outer plate 14 or 15 is placed on the cylinder between the inner and outer clips 26 and 55. The host terminal 76 is then removed from the fitting 73, disconnecting the air supply

and allowing the air to escape from the bores 62, whereupon the springs 61 act on the yoke 51 to force the outer clip 55 into engagement with the outer plate, moving it into engagement with the inner clip 26, which then moves into engagement with the inner plate and presses it against the ring 23, thereby securely clamping both plates and holding them under a spring pressure that is maintained constant, notwithstanding any tendency of the clips to loosen due to their becoming embedded in the edges of the plates during prolonged operation.

When it is desired to clamp only an inner plate 11 or 12, no adjustment or deviation from the procedure when both inner and outer plates are used is necessary, because the rods 38 perform the same function in respect to the operation of the inner clip 26 that would be performed by an outer plate 14 or 15 if it were present. The pressure of the thrust ring exerted against the shoulders 57 and the rods 38, moves the inner clip 26 into locking engagement with the inner plate, although in this instance, the thrust yoke 51 moves a slightly greater distance than when an outer plate is used, this distance being the small clearance shown between the shoulder 57 and the inner side of the flange 54 in Figure 4.

When air pressure is applied to the pistons 63 the outer clip 55 first moves away from the plate 14, a distance sufficient to provide clearance for the removal of the plate. At this point the nuts 58 engage the flange 54 and the rods 38 draw the inner clip 26 and the plate 14 away from the plate 12, thereby providing sufficient clearance between the clamping members and the plates so that either or both plates may be removed.

Where a provision for a greater range in plate width, than is possible with the clamping mechanism hereinbefore described is desired, the clamping mechanism, shown in Figures 8 to 12 may be employed. In this form, which is best shown in Figure 11, plate clip connecting rods 38' correspond with the rods 38 of Figure 4, and the inner ends of the rods 38' are screw-threaded into a semi-annular clip 26'. The rods 38' extend lengthwise of the cylinder 11' through grooves 79 and their outer ends project beyond the main body of the cylinder 11' and pass through holes provided in lugs 80 that are spaced around the inner surface of outer semi-annular plate clips 81 and formed integral therewith. The inner surface of the outer clips 81 conforms to the outer surface of the cylinder 11', and the lugs 80 extend radially inward from this inner surface and are fitted to slide in slots 70 (Figure 9), formed in the over-hanging end portion of the cylinder 11'. A nut 82 is secured to the outer end of each rod 38', by a screw 83, and has a flange portion provided with notches 84 about its periphery. Stop pins 85 are secured in the lugs 80 in position to engage the notches 84 and prevent rotation of the nuts 82 and of the rods 38' when the nuts are secured thereon. The rods 38' are flattened at 86 to provide a wrench engaging surface to be used when making adjustments. An intermediate portion of the rods 38' is enlarged in diameter to provide a shoulder 57' corresponding to the shoulder 57 of the form shown in Figure 4.

In order to provide for adjustment between the clip ring 81 and the piston 63, the inner surfaces of the lugs 80 are provided with tongues 93 and 94 adapted to be selectively seated in grooves 95 and 96 provided in the periphery of the yoke or thrust member 87. As shown at the upper left

hand portion of Figure 11, the tongue 94 is seated in the groove 95 to clamp comparatively long plates and the tongues 93 and 94 as shown in Figure 12, are seated in the grooves 95 and 96 respectively to clamp shorter plates. Three rows of holes 90, 91 and 92 extend through the outer clip 81 and its lugs 80. When the tongue 94 is seated in the groove 95 (Figure 11), the screws 88 are placed in the holes 91 and 92 and when the tongues 93 and 94 are seated in the grooves 95 and 96 respectively (Figure 12), the screws 88 are placed in holes 90 and 91.

In the form shown in Figures 8 to 12, each piston rod 64' is fitted to slide in a hole provided in a semi-annular spring retainer 100 which is secured in the cylinder 11' by screws 101 (Figure 11), and a spring 61 reacts, as in the previously described form, between each of the pistons 63 and the spring retainer 100. In this form the piston rods 64' each have a threaded portion 102 that engages one of several threaded holes provided in the yokes 87 and is secured thereto by a lock nut 103. A wrench engaging section 104 is provided at the extreme outer end of each of the rods 64' whereby each piston may be adjusted in respect to its yoke.

It will be seen that the form of the invention shown in Figures 8 to 12, in addition to providing means for moving the clip 81 the distance required for properly clamping and unclamping the plates, also provides means for shifting the plate clips with respect to the yokes 87 to effect a coarse adjustment, and means for adjusting the position of the yokes with respect to the pistons, to effect an additional and fine adjustment.

Means whereby the plates are freed from the plate clamping members and raised from the cylinder each time the clamping mechanism is released are shown in Figures 8, 10 and 11 and include plate lifting dogs 110 and 115 which are depressed when the plate clamps are closed, as shown in the lower portion of Figure 11, but when the plate clamps are released, the dogs 110 and 115 engage the under side and the inner edge of each plate and moving with the plate clips, ride up inclined grooves or guides, moving the plates away from the center clip ring and the inner clip, and lifting their inner edges from the cylinder as shown in Figure 10, and the upper portion of Figure 11. The lifting dogs 110 for the outer plates 14 and 15, each rides in an inclined groove 112 formed in the inner clip 26' and is secured on the inner end of a rod 113 which extends through a hole provided in a small lug 98, which like lugs 80, is formed as a part of the outer clip 81. The outer end of the rod 113 is threaded and fitted with lock-nuts 114, to provide for adjustment that is required when a change is made to plates of a different width.

The plate lifting dogs 115 which act on the inner plates 12 and 13 are operated through a rod 118 that is secured to a dog 115, and extends through a bearing post 119 and an L-shaped connecting link 120. The outer end of the rod 118 is threaded to receive adjusting nuts 121. The link 120 is pivotally connected to the dog 110. When the dog 110 is moved, the link 120 will engage the inner nut 121 and move the dog 115 up an inclined guide 116 thereby freeing the plate 12 from the clamp ring 23' and raising it as shown in Figure 10, and in the upper portion of Figure 11.

When air pressure is applied to the piston 63 in the form of the invention shown in Figures 8 to 12 the outer clip 81 is moved away from the

plate 14 and the nuts 82 and 114 engage the lugs 80 and 98 respectively. This acts on the inner clip 26' the same as in the form shown in the Figures 1 to 6 and also moves the rod 113 and the dog 110 to raise the inner edge of the plate 14 toward the position shown in the upper portion of Figure 11. The movement of the inner clip 26', acting through the link 120 and rod 118, also moves the dog 115 to raise the inner edge of the plate 12 to the position shown in Figure 10 and the upper portion of Figure 11. When the air pressure is removed the outer clip moves into engagement with the outer plate pushing it toward the inner clip and sinking the dog 110 into the cylinder. The outer plate meanwhile engages the inner clip which is moved into engagement with the inner plate, and further movement brings the inner plate into engagement with the center clip ring meanwhile sinking the dog 115 and finally locking the plates.

It will be seen that the operations of clamping and unclamping printing plates with the mechanism illustrated in Figures 8 to 12 is essentially the same as with the mechanism illustrated in Figures 1 to 6. The form shown in the Figures 1 to 6 is simpler, but the form shown in Figures 8 to 12 provides for clamping both wide and narrow plates, and is arranged to loosen the plates from the cylinder when they are unclamped.

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 made 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 mechanism for securing a printing plate upon the form cylinder of a printing machine, a stationary first plate clip, a slidable second plate clip positioned on the cylinder for movement to clamp a plate between it and the first clip, a connecting rod extending axially along the cylinder and adjustably connected to the second clip, the rod being adjustable from the end of the cylinder to adjust the position of the second clip, spring means carried by the cylinder and connected to the rod to move the rod and through it the second clip toward the first clip to clamp an inner plate, and fluid pressure actuated means carried by the cylinder to move the rod and through it the second clip away from the first clip to release a plate clamped therebetween.

2. In a plate clamping mechanism for securing inner and outer plates upon the form cylinder of a printing machine, a stationary first plate clip, a slidable second plate clip positioned on the cylinder for movement to clamp a plate between it and the first clip, a third plate clip movable axially of the cylinder to clamp a plate between it and the second plate clip, a connecting rod extending axially along the cylinder and connected to the second plate clip, means to move the third plate clip to clamp a first plate between it and the second plate clip and through the first plate to move the second plate clip to clamp a second plate between it and the first plate clip, means to withdraw the third plate clip to release the first plate, and means adjustably mounted on the outer end of the connecting rod and engageable by the third plate clip, to withdraw the second plate clip and release the second plate.

3. In a plate clamping mechanism for securing inner and outer plates upon the form cylinder of a printing machine, a stationary first plate clip, a slidable second plate clip positioned on the cylinder for movement to clamp a plate between it and the first clip, a third plate clip movable axially of the cylinder to clamp a plate between it and the second plate clip, a connecting rod extending axially along the cylinder and adjustably connected to the second plate clip, said rod being operable from the outside of an end of the cylinder to adjust the position of the second clip, means to move the third plate clip to clamp a first plate between it and the second plate clip and through the first plate to move the second plate clip to clamp a second plate between it and the first plate clip, means to withdraw the third plate clip to release the first plate, and means adjustably mounted on the outer end of the connecting rod and engageable by the third plate clip to draw back the second plate clip and release the second plate.

4. In a plate clamping mechanism for securing inner and outer plates upon the form cylinder of a printing machine, a stationary first plate clip, a slidable second plate clip positioned on the cylinder for movement to clamp a plate between it and the first clip, a third plate clip movable axially of the cylinder to clamp a plate between it and the second plate clip, a connecting rod extending axially along the cylinder and adjustably connected to the second plate clip, the rod being operable from the outside of an end of the cylinder to adjust the position of the second clip, spring means carried by the cylinder to move the third plate clip to clamp a first plate between it and the second plate clip and through the first plate to move the second plate clip to clamp a second plate between it and the first plate clip, fluid pressure actuated means carried by the cylinder to draw back the third plate clip to release the first plate, and means adjustably mounted on the end of the connecting rod extending beyond an end of the cylinder and engageable by the third plate clip, upon release thereby of the first plate, to draw back the second plate clip and release the second plate.

5. In a plate clamping mechanism for securing a plate on a form cylinder of a printing machine, a first plate clip arranged to slide axially along the cylinder and to engage the inner edge of the plate, a second plate clip arranged to move axially of the cylinder and to engage the outer edge of the plate to clamp it between the second clip and the first clip, a connecting rod extending from outside one end of the cylinder to the first clip, being adjustably secured to the first plate clip and operable from outside an end of the cylinder to adjust the position of the first plate clip axially of the cylinder, spring means carried by the cylinder and adapted to act on the second plate clip to move it toward the first plate clip and clamp a plate therebetween, and fluid pressure actuated means carried by the cylinder operable to withdraw the second plate clip to release a clamped plate.

6. In a plate clamping mechanism for securing a plate on a form cylinder of a printing machine, a first plate clip arranged to slide axially along the cylinder and to engage the inner edge of the plate, a second plate clip arranged to move axially of the cylinder and to engage the outer edge of the plate to clamp it between the second clip and the first clip, a connecting rod extending from outside one end of the cylinder to the first clip, being adjustably secured to the first plate

clip and operable from outside an end of the cylinder to adjust the position of the first plate clip axially of the cylinder, means to lock the connecting rod in clip adjusted position, spring means carried by the cylinder and adapted to act on the second plate clip to move it toward the first plate clip and clamp a plate therebetween, and fluid pressure actuated means carried by the cylinder operable to withdraw the second plate clip to release a clamped plate.

7. In a plate clamping mechanism for securing a plate on a form cylinder of a printing machine, a first plate clip arranged to slide axially along the cylinder and to engage the inner edge of the plate, a second plate clip arranged to move axially of the cylinder and to engage the outer edge of the plate to clamp it between the second clip and the first clip, a connecting rod extending from outside one end of the cylinder to the first clip, being adjustably secured to the first plate clip and operable from outside an end of the cylinder to adjust the position of the first plate clip axially of the cylinder, means to lock the connecting rod in clip adjusted position, spring means carried by the cylinder and adapted to act on the second plate clip to move it toward the first plate clip and clamp a plate therebetween, fluid pressure actuated means carried by the cylinder operable to withdraw the second plate clip to release a clamped plate, and means adjustable axially on the rod and extending outside one end of the cylinder to position it for engagement by the second clip when the plate is released to draw the first clip toward the end of the cylinder.

8. In a plate clamping mechanism for securing inner and outer plates upon the form cylinder of a printing machine, a stationary first plate clip, a slidable second plate clip positioned on the cylinder for movement to clamp a plate between it and the first clip, a connecting rod extending axially along the cylinder and adjustably connected to the second clip, the rod being operable from outside of an end of the cylinder to adjust the position of the second clip, spring means carried by the cylinder and connected to the rod to move the rod and through it the second clip toward the first clip to clamp a plate, a fluid operated device carried by the cylinder and connected to the rod to move the second clip away from the first clip to release a plate clamped therebetween, a duct connecting with the fluid operated device and having a vent, and a tube connected to a supply of fluid under pressure and having a terminal member connectable to the vent.

9. In a plate clamping mechanism for securing a plate on a form cylinder of a printing machine, a first plate clip arranged to slide axially along the cylinder and to engage the inner edge of the plate, a second plate clip arranged to move axially of the cylinder and to engage the outer edge of the plate to clamp it between the second clip and the first clip, a connecting rod extending from outside one end of the cylinder to the first clip, the rod being adjustably secured to the first plate clip and operable from outside an end of the cylinder to adjust the position of the first plate clip axially of the cylinder, spring means carried by the cylinder and adapted to act on the second plate clip to draw it toward the first plate clip and clamp a plate therebetween, fluid pressure actuated means carried by the cylinder and operable to withdraw the second plate clip to release a clamped plate, a duct connecting with the fluid operated device and having a vent and a tube connected to a supply of fluid under pressure and having a terminal member connectable to the vent.

10. In a plate clamping mechanism for securing inner and outer plates upon the form cylinder of a printing machine, a stationary first plate clip, a slidable second plate clip positioned on the cylinder for movement to clamp a plate between it and the first clip, a third plate clip movable axially of the cylinder to clamp a plate between it and the second plate clip, a connecting rod extending axially along and beyond the cylinder and adjustably connected to the second plate clip, the rod being operable from the outside of an end of the cylinder to adjust the position of the second clip, spring means carried by the cylinder to move the third plate clip to clamp a first plate between it and the second plate clip and through the first plate to move the second plate clip to clamp a second plate between it and the first plate clip, a fluid pressure actuated means carried by the cylinder to withdraw the third plate clip and release the first plate, a duct connecting with the fluid operated device and having a vent, a tube connected to a supply of fluid under pressure and having a terminal connectable to the vent, and means adjustably mounted on the end of the connecting rod extending beyond the cylinder and engageable by the third plate clip, to withdraw the second plate clip and release the second plate.

11. In a plate clamping mechanism for securing a printing plate on a form cylinder of a printing machine, the said cylinder having a recess extending peripherally thereof, guide rod supports having guide rods secured in the recess and parallel to the axis of the cylinder, an arcuate plate clip slidable on the guide rods and adapted to engage the under side and a beveled curved edge of the plate, and means to move the plate clip toward aand from the edge of a printing plate.

12. In a plate clamping mechanism for securing a printing plate on a form cylinder of a printing machine, the said cylinder having a recess extending peripherally thereof, guide rod supports having guide rods secured in the recess and parallel to the axis of the cylinder, an arcuate plate clip slidable on the guide rods and adapted to engage the underside and a beveled curved edge of the plate, and means to move the plate clip toward and from the edge of a printing plate, the surface of the guide rods farthest from the cylinder axis being shaped to conform with the peripheral surface of the cylinder to engage the under side of the plate.

13. In a plate clamping and releasing mechanism for a printing machine, first, second, and third plate clamping members, means for moving two of the plate clamping members to clamp and alternatively to release plates, a first plate lifting mechanism associated with the second plate clamping member to lift a plate and release it from the second plate clamping member, a second plate lifting mechanism associated with the third plate clamping member to lift another plate and release it from the third plate clamping member, means for operating the first plate lifting mechanism from the first plate clamping member, and means for operating the second plate lifting mechanism from the first plate lifting mechanism.

14. In a plate clamping and releasing mechaanism for a printing machine, first, second, and third plate clamping members, means for moving two of the plate clamping members, a first

plate lifting mechanism associated with one of the plate clamping members, a second plate lifting mechanism associated with another of the plate clamping members, and means connected to one end of the clamping members for operating the plate lifting mechanisms to lift one edge of each plate from the cylinder and simultaneously move the plates from contact with the plate clamping members.

15. In a plate clamping mechanism for securing and releasing printing plates on a form cylinder of a printing machine, a stationary center clamp ring, a movable outer plate clip, a movable inner plate clip, a first means arranged to lift and move a plate from contact with the center clamp ring, and a second means arranged to lift and move a plate from contact with the inner plate clip, the second means being caused to function by a movement of the outer plate clip, and the first means being caused to function by a movement of the second means.

16. In a plate clamping mechanism for securing and releasing printing plates on a form cylinder of a printing machine, a first clip for engaging one edge of a plate, a second clip for engaging an opposite edge of the plate and having a recess with an inclined groove, and a plate lifting dog operably connected to the first clip and having a portion cooperating with the inclined groove to lift and move the plate away from the second clip when the first clip is moved to release the plate.

17. In a plate clamping mechanism for securing and releasing a printing plate on a form cylinder of a printing machine, a first clip for clamping one edge of the plate, and having an inclined recess, a plate lifting mechanism operably connected to the first clip and having a portion positioned in the recess, in the second clip whereby when the releasing mechanism is operated, the lifting mechanism will slide in the inclined recess disengaging the plate from the second clip and lifting the plate from contact with the cylinder.

18. In a printing machine, a form cylinder having a plurality of longitudinal bores arranged to receive pistons, a thrust member, threaded piston rods connecting the thrust member with the pistons and providing means to adjust the spacing between the pistons and the thrust member, a plate engaging clip arranged to be secured to the thrust member in a plurality of positions to adjust the spacing between the plate clip and the thrust member and thereby additionally adjust the spacing between the plate clip and the pistons, spring means acting on the pistons to move the plate clip in one direction to clamp a plate, and fluid pressure means acting on the pistons to move the plate clip in the opposite direction to release the plate, whereby printing plates varying considerably in size may be clamped on the cylinder.

19. In a plate clamping and releasing mechanism for a printing machine, first, second and third plate clamping members, a spring for moving the first plate clamping member to clamp plates, a fluid operated means for moving the first plate clamping member against the pressure of the spring, a means for moving the second plate clamping member when the first plate clamping member is moved, a first plate lifting mechanism associated with the second plate clamping member, means for operating the first plate lifting mechanism from the first plate clamping member, a second plate lifting mechanism associated with the third plate clamping member, and means for operating the second plate lifting mechanism from the first plate lifting mechanism.

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