

June 22, 1965

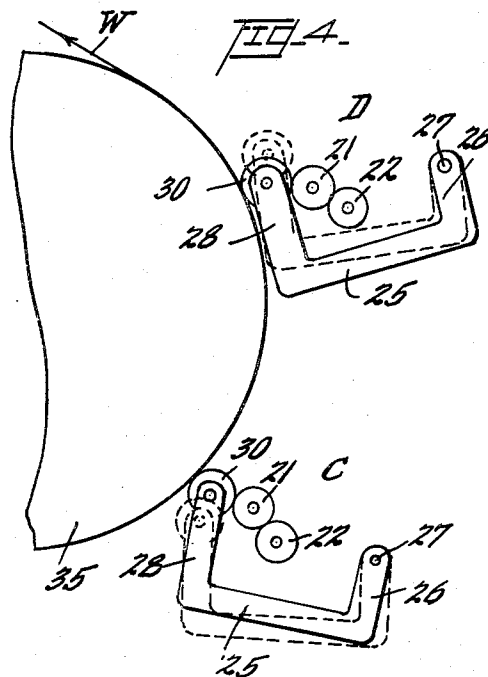
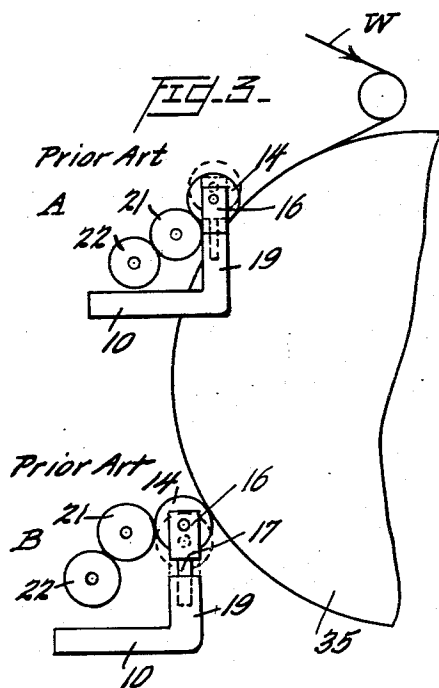
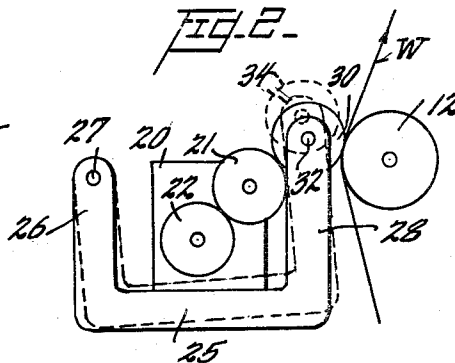
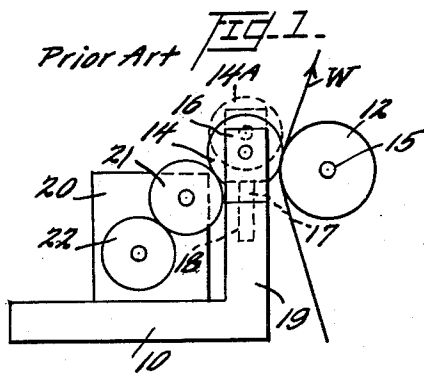
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3,190,218

ADJUSTABLE PLATE CYLINDER MOUNTING FOR PRINTING PRESSES

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3 Sheets-Sheet 1



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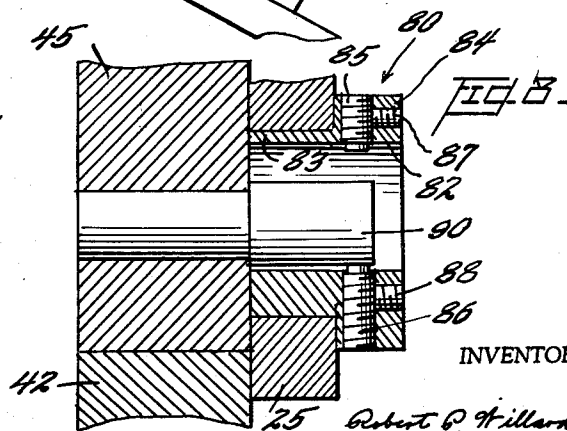
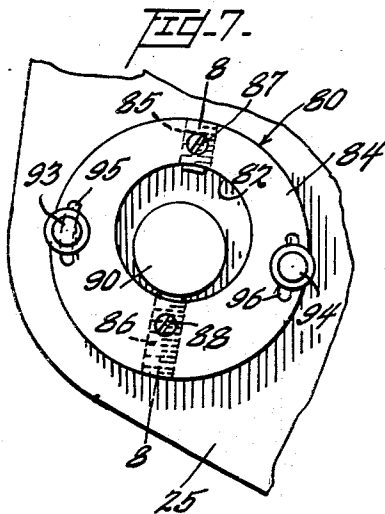
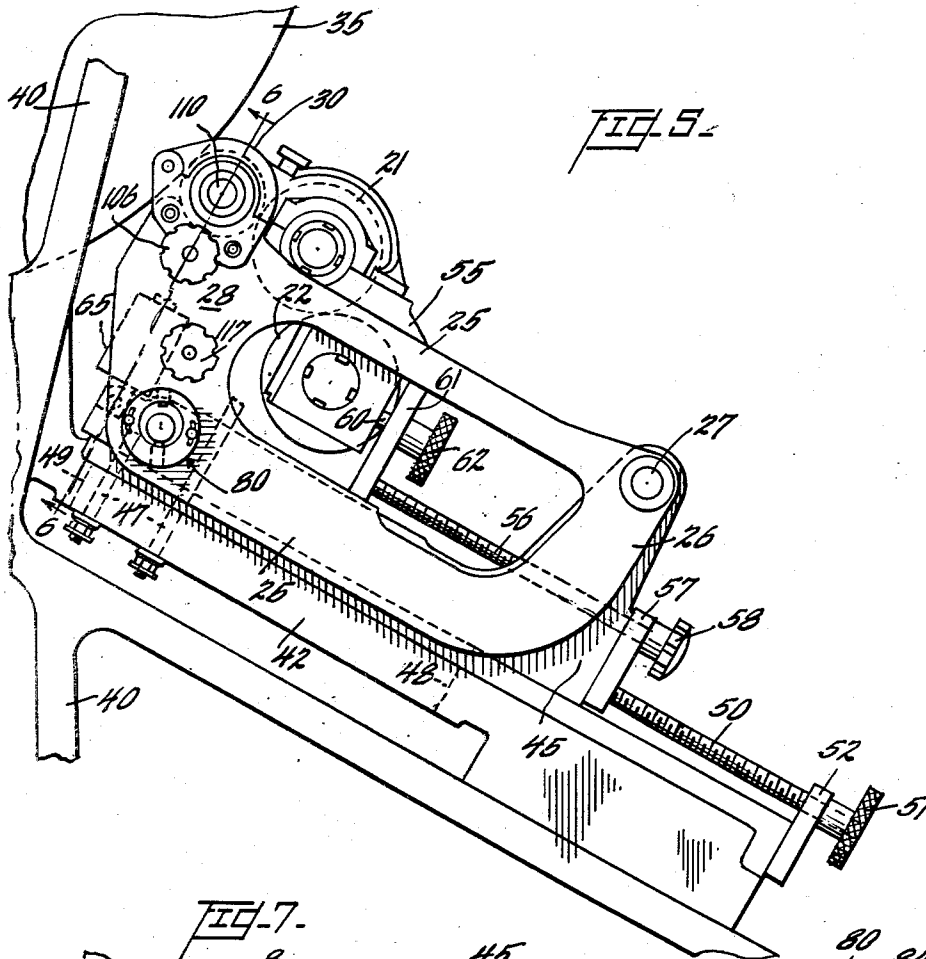
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ADJUSTABLE PLATE CYLINDER MOUNTING FOR PRINTING PRESSES

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3 Sheets-Sheet 2



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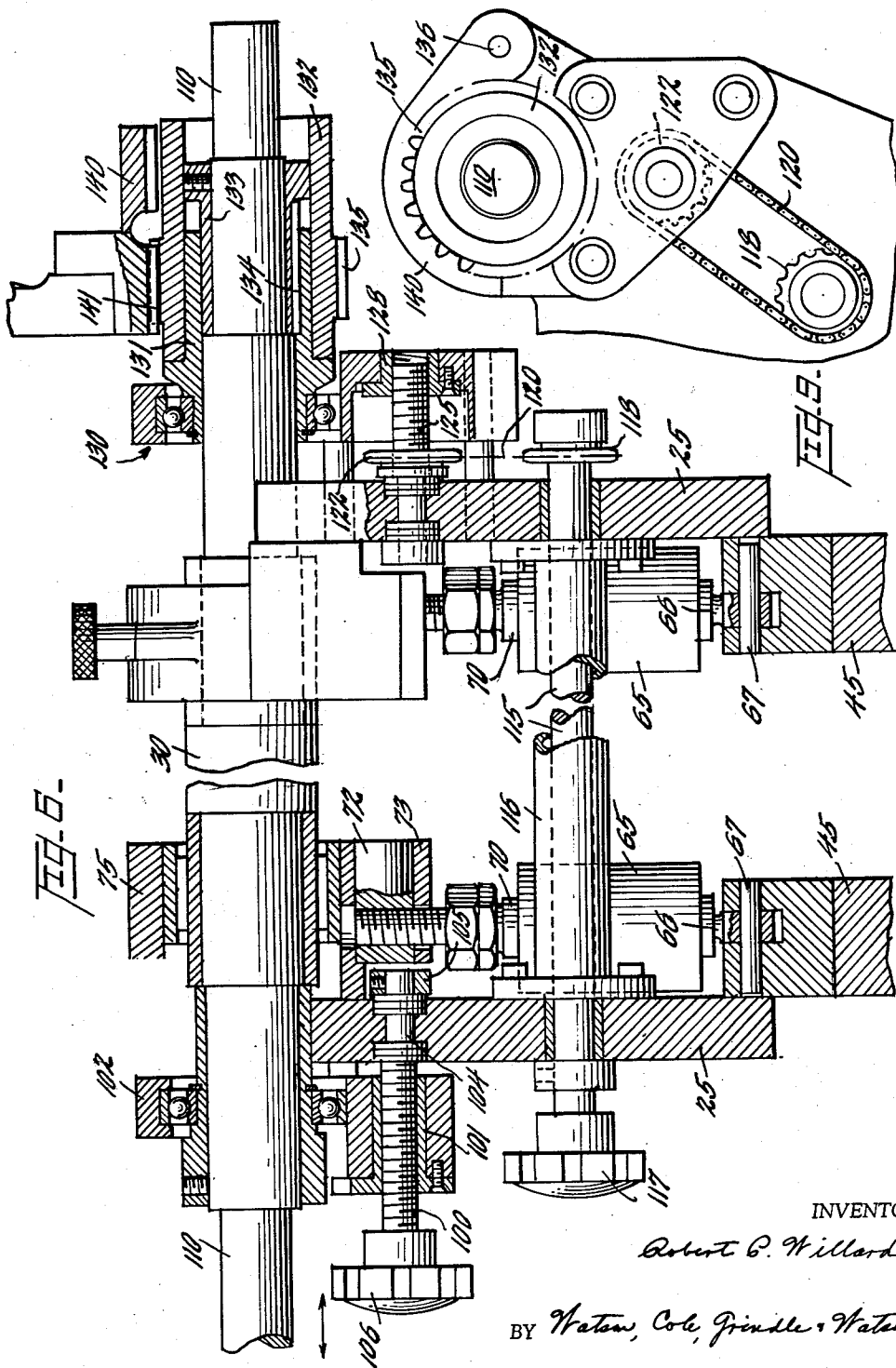
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ADJUSTABLE PLATE CYLINDER MOUNTING FOR PRINTING PRESSES

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3 Sheets-Sheet 3



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1

2

3,190,218 ADJUSTABLE PLATE CYLINDER MOUNTING FOR PRINTING PRESSES

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1 Claim. (Cl. 101—247)

This invention relates to printing presses and more particularly to means for moving plate cylinders to and from the impression cylinder and the ink rolls, both for going on and off impression and for the accommodation of plate cylinders of different sizes.

The general object of the invention is to provide a novel and improved press embodying features associated with the mounting of the plate cylinders which will not only facilitate the accurate and precise positioning of the plate in operative relation to the impression cylinder and the ink rolls, but will also eliminate the problem of excessive vibration that has come to be associated with printing stations of this type now in use.

The invention is particularly advantageous when its principles are applied to a central impression cylinder type of press where say four printing stations are employed, two above and two below the diameter of the impression cylinder. In prior art devices the lower stations have been particularly subject to excessive vibration due to the weak support afforded the plate cylinder during operative contact with the impression cylinder, as will be pointed out further in the present specification.

Other objects and features of novelty, including novel mounting details and associated means for effecting both axial and rotative adjustments of the plate cylinder, will be apparent from the following specification when read in connection with the accompanying drawings in which certain embodiments of the invention are illustrated by way of example.

In the drawings:

FIGURE 1 is a schematic view in elevation of a prior art device showing the means employed for adjusting the printing head and its plate cylinder to and from the impression cylinder and the inking rolls, in a stack type printing station;

FIGURE 2 is a similar view showing diagrammatically the novel arrangement of a similar stack type station afforded by the present invention;

FIGURE 3 is a digrammatic view in elevation of one-half of the installation of a prior art device for use in connection with a large central common impression cylinder as for multi-color work;

FIGURE 4 is a similar view showing the opposite half of an installation of the same type but involving my novel pivoted head arrangement;

FIGURE 5 is a more detailed view in side elevation of a printing station embodying the principles of the present invention;

FIGURE 6 is a transverse sectional view taken on line 6—6 of FIGURE 5;

FIGURE 7 is an enlarged detail view of a device for limiting the adjustment movement of the plate cylinder assembly;

FIGURE 8 is a sectional view taken on line 8—8 of FIGURE 7; and

FIGURE 9 is a fragmentary view in side elevation as seen from the right-hand side of FIGURE 6.

In printing presses of the type illustrated and described herein there have always been problems resulting from vibration and "bounce" arising from the particular constructions of the printing stations. The type of press to which the invention is applied is usually an all-size press and must be designed to accommodate the fairly wide

range of plate cylinder diameters. This requires that there be some means of adjusting the relative positions of the plate cylinder, impression cylinder, and inking rolls to accommodate larger or smaller plate cylinder diameters. In addition, the plate cylinder must at times be moved away from the impression cylinder and the inking rolls simultaneously. During the printing operation of course it has to be in good operative contact with both.

To meet all of the above conditions and still have a rigid mounting for the plate cylinder has been a difficult design problem. It is not easy to obtain both the rigidity of the plate cylinder mounting necessary for good printing, and the ability to make all of the adjustments required, in one design.

In FIGURE 1 of the drawings there is illustrated a more or less conventional stack type printing station, the plate and inking devices being mounted upon a pedestal 10. The impression cylinder is shown at 12 and the on and off positions of the plate cylinder indicated at 14 and 14A respectively. The impression cylinder 12 is of course fixed and rotatably mounted in the frame as by means of the shaft or axle indicated diagrammatically at 15, and the web W is shown passing between the impression cylinder 12 and the plate cylinder 14. The plate cylinder 14 is supported by a head 16, the head having a vertical post or bar 17 which is adjustably received within a socket 18 in the top of the angle portion 19 of the pedestal 10. The inking devices represented generally by the reference character 20 may comprise the ink cylinder 21 which is generally of the knurled surface type and the rubber ink roll 22.

Now in this prior art construction, for larger or smaller diameter plate cylinders, the pedestal is moved to or from the impression cylinder and the ink rolls are moved to or from the plate cylinder. It will be noted that with the plate cylinder set up for operation in the printing position the head 14 settles down solidly on the end of the pedestal bracket 10.

In the dotted line position of FIGURE 1 the plate cylinder is shown shifted into non-printing position in the conventional set-up. This is accomplished by raising the head up from the pedestal on the short stub shaft 17. This of course causes the plate cylinder to move away from contact with both impression cylinder 12 and the ink cylinder 21.

The major weakness of the conventional arrangement herein shown is that there is clearance between the stub shaft holding the head and the pedestal itself. This must be so if the head is free to move relative to the pedestal. Furthermore, the head which carries the plate cylinder is relatively light in weight and does not have enough mass to dampen any vibratory movement of the plate cylinder. The result is that particularly as the press becomes older there is excessive play or lost motion between the head carrying the plate cylinder and the pedestal itself. This results in poor printing and limited speed of operation.

By contrast, there is shown in FIGURE 2 of the drawings in quite diagrammatic fashion one embodiment of the present invention wherein the pedestal bracket 25 is of a general U-shaped configuration having a rearward arm 26 pivoted at 27 to the press frame and an opposite arm 28 which carries the plate cylinder 30. The impression cylinder is indicated at 12 and the web at W and the inking system at 20, 21, and 22 as in the former figure.

There is no plate carrying head here, but the plate 30 mounted in journals at 32 on the arms 28, pivots about the point 27, and can move from the solid line impression position to the dotted line off-impression position indicated at 34.

Thus, the head and the pedestal formerly employed have been consolidated into one solid piece of material and this relatively massive construction is pivoted for the purpose of throwing the plate cylinder on and off impres-

3

sion or to raise the plate from both the impression and ink cylinders.

The advantage of this construction is that there has been eliminated the joint and sliding fit between the head and the pedestal. The mass of material supporting the plate has been increased from that which was a relatively small amount comprised in the head to the mass of the entire pedestal. There has been substituted for the former sliding stub shaft in the top of the pedestal, a closely fitting pivot point which can be set up and adjusted very precisely.

FIGURES 3 and 4 give a realistic comparison between the prior art devices and the mechanism afforded by the present invention when applied to a large common central impression cylinder as for multi-color work. Some of the color stations are located below the center of the large impression drum 35 while others are located above it; for example, for the moment considering FIGURES 3 and 4 in combination, the first color station may be indicated at A, the second color station at B, the third color station at C, and the fourth color station at D. Stations A and D are of course above the axis of the cylinder and stations B and C below. In the case of stations A and D it is necessary to lower the plate cylinder into contact with both the drum and the ink roll whilst in the case of stations B and C the plate cylinder is raised from idle position to come into contact with the impression cylinder and the ink roll.

Now examining the separate illustrations of the prior art and of the present invention, it is important to note that there is particularly a serious weakness at color station B, because to raise the plate cylinder to printing position the head must be raised from the pedestal and this removes the head from its steady rest upon the pedestal and results in a shaky flimsy construction. This points up the defect of the prior art arrangements more emphatically.

Now for color stations C and D of FIGURE 4 where the pivoted pedestals of the present invention are employed, this construction permits the plate cylinder 30 in position D to swing downwardly into printing position, and in the case of color station C the pedestal swings the plate cylinder 30 upwardly to printing position. In each case, the arrangement has the advantage of pivoted pedestal rigidity and one station should print as well as the other. This is in contrast to the condition in stations A and B where although the plate cylinder 14 at station A is brought down into printing position on top of the pedestal, the cylinder in position B must rise up to contact and leave a gap with a subsequent loss of rigidity.

Now for a more specifically detailed example of the practice of the invention, reference is had to FIGURES 5-9 of the drawings. The station illustrated is the equivalent of station C of FIGURE 4. The impression cylinder or drum is still indicated by the reference numeral 35 and the press main frame is shown at 40. The plate cylinder indicated at 30 is carried by the swinging pedestal comprising the side frames or brackets 25 having the forward or distal portions 28, the rearward portions 26, and the arcuately formed pivot means 27. The knurled ink roll is indicated at 21 as in the earlier diagrammatic figures and the rubber ink roll at 22.

Certain adjusting means which will be readily understood are shown whereby the supporting means for the various rolls may be moved to any degree necessary to secure the proper operative contact. The main frame 40 includes a diagonally arranged slide bracket 42 which provides a guide track for the entire inking and plate cylinder assembly, the base portion of which is designated 45. This base is adjustably secured in position on the inclined slide bracket 42 as by means of the bolts 47. These bolts extend through an elongated slot in the base portion 42, the boundaries of which are indicated at 43 and 49. When the bolts 47 are loosened, rotation of the screw shaft 50 by means of the hand knob 51 will

4

cause the supporting base member 45 to move along the slide bracket 42 to the desired position, the shaft 50 being threaded through the bracket 52 rising from the base bracket 42.

Similarly, a sub-base member 55 is adjustable along the main base member 45 by a similar screw arrangement indicated at 56, threaded through the bracket 57 and operated by the hand knob 58. This will cause the two inking rolls to be adjusted back and forth upon the main support. A further refinement comprises means for adjusting the rubber roll 22 itself. This is accomplished by means of the screw shaft 60 threaded through the bracket 61 and operated by the knob 62. Thus, the various rollers of the ink station may be readily adjusted one with respect to the other.

Now the plate supporting brackets or frames 25 forming the pedestal straddle the base frames 45, these frames being of course repeated on both sides of the press as clearly indicated in FIGURE 6. The means for moving the plate cylinder bracket 25 and thus shifting the plate cylinder to and from contact with the impression cylinder 35 and the ink cylinder 21 are the air or hydraulic cylinders 65. A stem 66 projects from the bottom of each of the cylinders and is pivoted upon the pintle 67 carried by the associated frame 45. The hydraulic piston rods 70 extending from the upper ends of the cylinders 65 are adjustably threaded through a cylindrical pin 72 which is rotatably received within the cylindrical member 73 fixed to the plate cylinder shaft bearing 75.

When pressure fluid is supplied to the cylinders 65 the pistons (not shown) move upwardly and extend the piston rods which serves to raise the plate cylinder to operative contact with the impression cylinder 35 and the ink cylinder 21. Upon reduction of the pressure of the fluid the cylinder and its supporting bracket 45 can return to their lower idle positions.

It is obvious that considerable accuracy must be provided in the limits of the movement of the bracket 25 and the plate cylinder 30 particularly to afford proper rolling contact with the two cylinders with which it is associated, and this accurate gauging of the limits of movement is effected by the device indicated generally at 80 in FIGURES 5, 7 and 8 of the drawings. This device is located at the forward leg 28 of the plate cylinder bracket 25 near the curved bottom portion or bight of the U-shaped bracket or pedestal configuration and comprises an eccentric ring or sleeve 82 which has a cylindrical portion 83 entering an opening in the portion 28 of the bracket 25. The flange portion 84 of the member 82 is threaded to receive the stop or abutment pins 85 and 86, these pins being held in accurately adjusted positions by means of the set screws 87 and 88. Projecting from the inner base bracket 45 is the stud 90 which is received within the central opening of the member 82 and is adapted to be abutted by the stop pins 85 and 86 in the respective opposite positions of adjustment of the cylinder bracket 25. The eccentric ring 82 may be rotatably adjusted to vary the position of the stop devices by loosening and re-setting the clamp screws 93 and 94 which pass through the arcuate slots 95 and 96 in the ring.

Provision is made for certain necessary adjustments to the plate cylinder with respect to the supporting brackets 25 in connection with its axial position and its rotative position. Viewing particularly FIGURE 6 of the drawings, it will be seen that a screw shaft 100 is threaded through a sleeve 101 which is in fixed relationship with the shaft bearing 102. The inner end of the shaft is rotatively supported as at 104 by one of the brackets 25 and longitudinal movement is prevented by the nut 105 carried by the inner end of the shaft. A knob 106 serves to manually rotate the shaft to shift the plate cylinder and its shaft 110 in an axial direction.

For rotatively adjusting the plate cylinder a transverse shaft 115 is provided which extends all the way across the station through a tubular casing 116 from one bracket

5

25 to the other. A hand knob 117 is provided at one end of the shaft and the other end carries a sprocket 118 which drives a chain 120 which in turn rotates a sprocket 122 fixed to a screw shaft 125 which is mounted for rotation but against longitudinal movement within the supporting frame 25 at the far end of the press.

This screw shaft 125 is threaded into a sleeve 128 which is rigid with the shaft bearing installation designated generally by the numeral 130. Along with this assembly is the bushing 131 which is rigid with the outer sleeve 132, on which is formed a helical gear 135 and which is also splined as at 134 to an inner sleeve 133, which is rigid with the plate cylinder shaft 110.

To effect rotary adjustment of the plate cylinder during actual operation of the press, the sleeve-like members 131 and 132 are moved axially of the cylinder shaft by operation of the hand wheel 117 and the interconnecting mechanism previously described. Lateral motion of the helical gear teeth 135 in mesh with the helical main drive gears, suggested at 140 and 141 results in a rotary adjustment of the plate cylinder gear 135 relative to the gears 140 or 141. This rotary adjustment is transmitted to the plate cylinder 30 through splined connections as indicated at 134 and the sleeve 133. The alternative use of drive gears 140 or 141 depends upon whether the operator is using 10 diametral pitch plate cylinder gearing or 1/4" circular pitch gearing.

Although the principles of the invention have been applied to a letter-press type of machine, they may also be embodied in an offset press where a blanket cylinder is brought into and out of rolling contact with the impression cylinder and a plate cylinder.

It is understood that various changes and modifications may be made in the embodiments of the invention illustrated and described herein without departing from the scope of the invention as defined by the following claim.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

In a rotary printing press, in combination, a main frame, an impression cylinder rotatably supported upon said main frame in a basically fixed position, a bracket carried by said main frame, a plate cylinder and an inking cylinder both supported solely by said bracket, means

6

on said bracket for adjustably supporting said inking cylinder at a point where it is parallel with and spaced from said impression cylinder a distance less than the diameter of said plate cylinder, a bearing pedestal having one end pivoted from a rearward portion of said bracket at a point more remote from the impression cylinder than is said inking cylinder, whereby said pedestal is long enough to extend past the inking cylinder from said pivot point to its distal end, a bearing for said plate cylinder carried at the distal end of said pedestal and fixed against radial movement with respect to said pedestal, and means operative between said pedestal and said bracket for swinging said pedestal by purely pivotal movement toward and from a position of substantially simultaneous operative contact of the plate cylinder with both said impression cylinder and said inking cylinder, each pedestal comprising a pair of laterally spaced frame members closely embracing the ends of said inking cylinder, said pedestal frame members being U-shaped, the pivot points and the plate cylinder bearings being disposed respectively at the ends of the arms of the U-shaped frame members, and abutment means limiting the relative movement between said bracket and said pedestal, said abutment means disposed within the bight portions of said U-shaped pedestal frames.

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