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G. GOEBEL

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PRINTING PRESS DAMPENING ROLL CONTROL

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Fig. 1.

Inventors
George Goebel,
Dec'd.

Eibe A. Wilckens.

Counsel
Darby & Hahnmann

Attorneys
The present invention relates to a printing press damping control, being a division of the application for Printing press of George Goebel and Elbe A. Wileckens, Serial No. 103,592, filed October 1, 1936, issued June 25, 1940, as Patent No. 2.205.720.

An important object of the invention is to provide a press which will be capable of high speed production of uniformly printed sheets, all of the mechanisms of the press being so designed that sheets to be printed or lithographed will be properly fed between the cylinders and the cylinders maintained in proper position for efficient printing action.

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Another object of the invention is to provide an improved mechanism for operating the damping water seal to the plate cylinder, this mechanism being particularly intended to permit the water seal to be readily adjusted through fine stages over a wide range.

Other objects and advantages of the invention will be apparent from the following specification and drawings.

Figure 1 is a side elevation of the press;

Figure 2 is a rear view of the lower portion of the press:

Figure 3 is a longitudinal vertical sectional view on the line 3—3 of Figure 2;

Figure 4 is a longitudinal vertical sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a detail sectional view on the line 5—5 of Figure 4 showing the dampering roll cam mechanism;

Figure 6 shows the components of the dampering roll cam mechanism;

Figures 7 is a vertical sectional view on an enlarged scale showing the sheet trip means and the mechanism for controlling the positioning of the dampering roll and

Figures 8 and 9 are views similar to Figure 7 showing the sheet trip means and dampering roll control in different positions.

The construction and operation of the press may be generally described as follows:

Referring to Figure 1, the numeral 38 indicates the upper or plate cylinder of the press which receives ink from the ink form rollers generally designated by the numeral 48. Beneath the plate cylinder there is provided the intermediate or transfer cylinder 41 which is provided with a transfer blanket to receive the impression from the plate cylinder 38 and print it upon a sheet as the latter passes through the printing couple formed by the transfer cylinder 41 and the lower or impression cylinder 42. The sheet to be printed upon is fed from the feed table 43 by suitable mechanism so that in the normal operation of the press as described in said original application Serial No. 103,592, at a predetermined moment in each rotary movement of the cylinders, a sheet to be printed or lithographed should be positioned on the feed table 43. If the sheet is so positioned, it will force a trip finger 46 downwardly and the sheet trip mechanism 47 best shown in Figure 7 will thereby operate in the normal manner to maintain an automatic valve mechanism 48 controlling fluid flow circuits in such position that the fluid pressure in such circuits will support or hold the impression cylinder 42 upwardly in contact with the transfer cylinder 41, as described in said original application. However, assuming that a pair of manual valves 49 and 50 also included in the fluid flow circuits are in their normal position for the running of the press, should no sheet be on the feed table at the proper moment, the trip finger 46 will remain in the upward position shown in Figure 1, with the result that the operation of the trip mechanism 47 will be varied and the automatic valve mechanism 48 will be actuated to so change the fluid pressure flow that impression cylinder 42 will drop out of contact with the transfer cylinder 41, thereby preventing the transfer cylinder from printing upon the impression cylinder, as it would do if the two cylinders were left in normal position with no sheet passing between them.

The roll damencing mechanism of the press includes an oscillating ductor roll 51, the frequency of the oscillations of the ductor roll being adjustable through a tappet mechanism 52. The speed of rotation of the fountain roll of the damping mechanism is controlled through a variable frictional gear drive 53 shown in Figure 2.

In the following description of the press, the front is regarded as the feed table end and the rear is regarded as the side from which printed sheets emerge.

The press includes a base 60 having side plates extending upwardly therefrom, the left hand
side plate being designated 61 and the right hand side plate being designated by the numeral 62. Power is provided from a motor 63 which acts through a belt or the like 64 to drive a large pulley 65 fixed to a shaft 66 journalled in the right hand side plate 62. The shafts 70 and 71 of the transfer cylinder 41 and the plate cylinder 38, respectively, are driven from shaft 66 as described in said original application. The plate cylinder 38 is journalled in the upper portion of the side plates of the press and has no vertical movement but the shafts 69 and 70 of the impression and transfer cylinders, respectively, are journalled in boxes 72 and 73, respectively, vertically movable in the side plates of the press through the mechanism described in said original application.

The dampening mechanism 115 (Figure 1) of the present press is of the usual construction and includes the ducor roll 51 which transfers water from the fountain roll 116 to a form roller 117 which in turn places the water upon a pair of dampening or water rolls 118. The mechanism for oscillating the water ducor roll 51 comprises an arm 61 at the lower end of the rod 120 extending downward therefrom, the lower end of the rod being guided in a sleeve 121 (Figures 4 and 7) formed integrally with a bracket 122 fixed to the side frame 61 of the press. The lower end of rod 120 bears on the upper end of a rod 123 having its upper portion guided in a slot 124 in bracket 122 for a purpose hereinafter set forth. The lower end of rod 123 is connected to a bar 125 pivoted on a stud 130 fixed to the side frame 61. The rod 123 is preferably connected to the bar 129 adjacent the free end of the latter, the free end of the bar being joined by a link 131 to a rocker arm 132 pivoted on a stud 133 fixed to a bracket 52a within the side frame 61. The opposite end of the rocker arm 132 is provided with a roller 134 adapted to contact with a cam mechanism 52 comprised of a plurality of cam rings 135 axially spaced upon and fixed to a shaft 136 journaled in brackets 52b. The shaft 136 is driven by means of a pinion 137 (Figure 4) fixed to its inner end and which meshes with a smaller pinion 138 on a shaft 139, shaft 139 having a sprocket 140 fixed thereto which is driven through a chain 141 from a sprocket provided on a sheet trip cam shaft 142, the drive of which will be hereinafter described.

Four of the cam rings 135 are preferably provided upon sheet 136, as shown in Figures 5 and 6. As shown in Figure 6, one of the cams is provided with one rise 140, the next one may be provided with two rises arranged diametrically opposite, and the third and fourth rings 135 may be provided with three and four rises, respectively, equidistantly spaced about the rings. Figure 5 illustrates how the roller 134 is mounted on a pin 141 mounted in the side frame 61 at the free end of arm 132. Roller 134 is flanged and by sliding this roller upon the pin 141, it may be positioned opposite the desired cam ring 135, being held in that position by its flanges. The selective positioning of the roller 134 will control the number of rocking motions which may be given the ducor roll 51 through the rocker arm and rods 120 and 123 upon each rotation of the press cylinders. The roller 134 is held in contact with the cam mechanism 62 by a spring 148 (Figure 4) positioned between the free end of roller arm 132 and the press base.

A readily adjustable mechanism for varying the amount of water transmitted to the plate cylinder is thus provided.

The amount of moisture placed upon the plate cylinder may be further regulated by varying the size of the water mesh. A worm wheel 151 meshing with a worm on a horizontally extending shaft 152 as shown in Figures 2 and 3 journalled in the right hand side frame 62 and in a standard 154. Near its inner end the shaft 152 has a relatively large friction disc 155 fixed thereto with which a friction driving roller 156 is adapted to engage, the roller 156 being arranged with its axis at right angles to the axis of the disc 155 and also engaging a driving disc 157 fixed to a shaft 158 journaled in standards 153 to extend parallel to shaft 152.

It will be apparent that when power is supplied to the shaft 152 at the free end of the press, the driving disc 155 will be rotated causing the driven disc 156 to be likewise rotated and thereby rotating, through shafts 152 and 150, the water fountain roll 116.

The roller 156 is journaled on a bracket 161 depending from a rod 162 extending parallel to and between the frames of the discs 155 and 156, the rod 162 being slidable in standards 153. The shaft 162 is provided with rack teeth 165 adjacent its forward end which teeth are adapted to be engaged by a pinion 166 fixed to a shaft 167 having its lower end journaled in an extension of one of the standards 153 and its upper end journaled beneath the feed table 43. The upper end of the shaft 167 is provided with a worm wheel which engages a worm as indicated at 168 on a horizontally extending shaft 169 extending through the left hand side frame 61 of the press, the shaft 169 being provided with a hand wheel 170 through which it may be rotated by the operator. It will be obvious that rotation of the hand wheel 170 will be transmitted to the gear 166 to slide the rod 161 in brackets 52b to vary the position of the roller 156 with respect to the mesh of the friction discs 157 and 155. The speed of rotation of the water fountain roller 121 may thus be regulated to a very fine degree.

The driving friction disc 161 is rotated through a spur pinion 175 on its shaft 158 and, which meshes with a larger spur pinion 176 on a shaft 177, the shaft 177 carrying a smaller herring-bone pinion 178 which is driven by a larger gear 179 on the sheet trip cam shaft 142, gear 179 being driven by a herring-bone pinion 180 on a stub shaft 181 carried in the side frame 62, pinion 180 also being in engagement with and driven by the herring-bone gear 66 on the impression cylinder shaft 69.

In order to cause the impression cylinder to be dropped from the transfer cylinder in the event that a sheet is not presented upon the feed table at the proper moment and also to control the position of the dampening roll, the mechanism hereinafter described is provided.

As best shown in Figures 1 and 4, the sheet trip finger 46 is fixed upon a shaft 346 extending to the left side frame of the press and having a latch 346 extending rearwardly therefrom within and adjacent the side frame 61. As best shown in Figure 7, a trip lever 347 pivoted on
the shaft 310 is provided at its upper end with a detent 348 arranged to cooperate with the latch 346 in a manner hereinafter set forth. Trip lever 341 is bifurcated at the shaft 130, one arm 349 being provided with a roller 355 ar-
rmed to bear against a trip lever cam 351 fixed to the main cam shaft 142. The trip lever 347 is urged to the left by a spring 352 having one end fixed to the upper end of the lever and the other end suitably connected to a fixed point on the press frame, so that the roller 355 is thereby held in close engagement with the cam 351. The other arm 353 of the trip lever has a link 354 pivotally connected to its outer end, the lower end of the link being pivotally connected to one arm of a bell crank 355 which bell crank is pivoted upon a rod 356. The other arm of the bell crank 355 is connected by a link 358 with a second link 359 at a point mid-way of the latter. The ends of the second link 359 are pivotally connected to pusher arms 360 and 361, respectively, extending upwardly from the re-
spective ends of a rocker arm 362, which rocker arm is pivoted intermediate its ends upon the housing 363 of automatic valve mechanism 48.

The upper ends of the pusher arms 360 and 361 are intended to receive a roller 365 carried at the outer end of a cam follower 366 pivotally mounted on the rod 356 and having a spring 367 connected to its opposite end to draw that downwardly and thereby hold the roller 365 in contact with a pusher arm cam 368 fixed to the cam shaft 142.

The operation of the structure described above is as follows: The trip finger 46 is normally held in the tilted position shown in Figure 4 by the weight of the latch 346 but will be moved to the horizontal position shown in Figure 7 when a sheet upon the feed table is in position to bear upon the trip finger. At the moment that a sheet should be upon the feed table for delivery to the printing couple in the normal operation of the press, the upper end of trip lever 347 will be in the right hand position shown in Figure 9 by reason of the fact that the rise 351a of trip lever 341 will at that moment be beneath its arm 349. Arm 353 of the trip lever will therefore be in the position shown in Figure 9, bell crank 355 will be swung to the left and the pusher arms 360 and 361 will be swung to the left as shown in Figure 8. A sheet being present upon the trip finger 46, the finger will be in the position indicated in Figure 7 and the latch 346 will be up and out of the path of movement of the trip lever 347. Continued rotation of the trip lever cam 351 will bring its dwell 351b beneath the roller 355 of arm 349, with the result that the upper end of the trip lever 347 will swing to the left hand position shown in Figure 7. This swinging movement of the trip lever will draw the bell crank 355 from the position shown in Figure 9 to the position shown in Figure 7, pulling the link 356 to the right from the position shown in Figure 9 to that shown in Figure 7, thereby positioning the pusher arm 360 beneath the roller 355 on cam follower lever 356. Until this moment, the dwell 350 of pusher arm cam 366 has been opposite the roller 355, but immedi-
ately the trip lever 341 and bell crank 355 have been positioned as described above, the rise 350a of pusher arm cam 366 will move opposite the roller 355, forcing the roller and the cam follower lever 356 downwardly against the action of spring 358 so that the roller will be seated in the socketed upper end of pusher arm 360.

Although the pusher arms 360 and 361 have swung back and forth on their pivots on the rocker arm 362 during the foregoing action, the position of rocker arm 362 (with its right end or forward end up) has not been changed be-
cause the only downward pressure exerted by pusher arm cam 368 has been through pusher arm 360, connected to what was already the lower or left-hand end of the rocker arm.

In the event that no sheet is present upon the feed table 43 at the proper moment, that is, at the moment that trip lever 347 begins to swing to the left, its movement in that direction will be stopped at the position shown in Figure 8 by the engage-
ment of detent 348 with latch 346. The roller 365 on trip lever 347 will thereby be held out of engagement with trip lever cam 351 and the pusher arm mechanism will be held towards the left (Figure 8) so that the pusher arm 361 will remain in the path of movement of cam follower roller 365. When the pusher arm cam 366 has rotated sufficiently far to bring its rise 366a against the roller 365, roller 365 will then be moved downwardly into the socketed upper end of pusher arm 361, causing the rocker arm 362 to be swung in a clockwise direction to the position indicated in Figure 8, thereby changing the position of the automatic valve mechanism 43 in the manner set forth in said original appli-
cation Serial No. 103,502 to cause the impression cylinder 42 to drop and the ink form rollers 40 to move away from the plate cylinder.

On the next cycle of operation of the trip lever 347, this lever will be swung slightly to the right from the position shown in Figure 8 by reason of the fact that in the first stage of the cycle the rise 351a of trip lever cam 351 will come beneath the roller 350. The latch 346 of trip finger 46 will thus be momentarily released from the detent 348 and if a sheet is then placed upon the feed table 43, the trip finger will be depressed and its latch moved upwardly. As a result, the trip lever 347 will be free to swing to the left or in a coun-
ter-clockwise direction on its axis 350, drawing the pusher arm 360 to the left to the position shown in Figure 7. When the rise 356a of pusher arm cam 366 comes in contact with the cam follower roller 365, the pusher rod 360 will be pressed downwardly, causing the rocker arm 362 to be rotated in a counter-clockwise direction from the position shown in Figure 8 to that shown in Figure 7. Because of this, the position of the valves of valve mechanism 48 will be reversed as described in said original application, with the result that the impression cylinder 42 will move up against the transfer cylinder and the form rolls 40 will return to contact with the plate roll.

It will be understood from the above that in the normal running of the press, with a sheet being positioned at each proper moment upon the trip finger 46, the trip lever 347 will cause the pusher arms 360 and 361 to be swung upon their pivots on the rocker arm 362 and shown in Figure 7 to that shown in Figure 9, and the reverse, but without changing the position of the rocker arm 362, any change in position of the rocker arm depending upon which pusher arm is in alignment with the cam follower roller 365 when the rise 356a of cam 366 moves into contact with that roller.
In order to prevent the trip finger 46 from affecting the movement of trip lever 347 under certain circumstances, a manual control cam 370 (Figure 7) is arranged for rotation into the path of movement of these two elements, cam 370 being fixed to a stub shaft 371 journalled in the side frame 61 of the press and having an operating handle 372 fixed to its outer end, which handle is provided with a pointer to cooperate with a dial plate on the side plate of the press. A spring stop member 373 cooperates with indentations on one surface of the cam to hold the cam in adjusted position.

Cam 370 includes a flat surface 374 which, during the normal operation of the press, when operating handle 372 and the cam 370 are in intermediate position shown in Figures 1 and 4, is just below the lower end of the path of movement of a lateral extension 375 of latch 346, permitting the latch to swing downwardly far enough to engage detent 348 should no sheet be present upon the feed table 43 at the proper moment.

If it is desired to lock the trip finger 46 in downward position so that it will lie flat upon the feed table 43 regardless of whether a sheet is positioned upon that table, the operating handle would be moved in a counter-clockwise direction (Figure 1), thereby swinging the outer end of the flat portion 374 of cam 370 upwardly and beneath the plate 375 on latch 346, holding the latch up and the trip finger 46 down. In this position, the trip lever 347 will move backwardly and forwardly without contacting with the latch.

In some instances, it is desirable to lock the trip lever 347 to the right so that it may not swing into contact with the latch 346. Such operation is obtained by turning the operating handle 372 to its limit position in a clockwise direction, at which time the outer end 376 of the cam 370 will contact with a lateral projection 371 on the trip lever 347, holding that lever in its extreme right hand position and so that its arm 343 will not contact with the trip lever cam 381.

With this setting, the trip lever 347 will not swing and therefore the valves of the automatic valve mechanism 46, if they were at the position shown in Figure 8, will not be changed from that position, or, if at their other position, will move to the position shown in Figure 8.

The feed of damping water to the plate cylinder 38 will also be discontinued by the action of the sheet trip mechanism resulting from the lack of a sheet on the feed table and the resultant clockwise swinging of rocker arm 362.

This throw-out of the damping roll 51 will be due to the fact that (as shown in Figure 7) the right hand end of rocker arm 362 has a link 379 connected thereto, the upper end of link 379 being joined to one arm of a bell crank 360 pivoted on a cross rod 362 extending beneath the feed table. The opposite arm of bell crank 380 has a pin 383 extending laterally therefrom upon which normally bears the notched end 384 of a trip 385 which trip is pivotally carried adjacent the upper end of the lower rod 123 in association with connection to the water ductor roll 51. When the rocker arm 362 is moved from the position shown in Figure 7 to that shown in Figure 8, and assuming that trip 385 is in the position shown in Figure 9, the bell crank 380 will be swung in a counter-clockwise direction, causing its pin 383 to pivot the trip 385 to swing the lower rod 123 to the left, as shown in Figure 8, thereby disrupting the operating connection from the water ductor operating cam 52 to the water ductor roll 51. The swinging movement of rod 123 to the left will be limited by the slot 124 in bracket 122 in which its upper end moves.

The water ductor roll is so arranged that when the operating connection has been broken, it will fall rearwardly (to the left in Figure 1) against the water cylinder 117, holding the upper rod section 120 in downward position.

In the course of the operation of the cam 390 is provided adjacent the rod 123 as shown in Figure 7, cam 390 being fixed to a stub shaft 391 journalled in the side frame 61 of the press, the shaft 391 having an operating handle 392 fixed thereto as shown in Figure 1. Cam 390 is provided with a lateral projecting pin 393 and a rise 394. A spring latch member 395 is positioned adjacent one surface of the cam to engage notches therein to hold the cam in adjusted position. When the press is in normal operation, the operating handle 392 will be so positioned that a pointer provided thereon will be in alignment with a left-hand reading on a cooperating dial and the cam 390 will be so positioned that the water ductor roll will be normally operated but will be subject to discontinuance of operation because the latch 395 will be in the position shown in Figure 9 and in the path of movement of pin 393 on bell-crank 390. As described above, should no sheet be positioned on the sheet trip finger 46 at the proper moment, the pin 393 will exert pressure on latch 395 to swing rod 123 to the left to temporarily discontinue damping water feed.

Movement of operating handle 392 and its shaft 391 in a clockwise direction (Figures 1 and 7) from normal position will cause the pin 393 on cam 390 to be moved upwardly and beneath the latch 395, moving the latch to the position shown in Figures 4 and 7, so that the latch 395 will be above the path of movement of the pin 393 on bell crank 390. With this arrangement, the feed of damping water will not be interrupted, regardless of movement of the bell crank 390 and its pin 393.

Rotation of the cam 390 in a further clockwise direction from the above position will swing the pin 393 against the lower rod 123 of the ductor roll connection, moving that rod from beneath the upper rod 120 so that the drive to the ductor roll 51 will be entirely discontinued.

All matter disclosed but not claimed herein is claimed either in said original Goebel and Wickleins application, Serial No. 103,592 or in our application for Printing press roll structures filed of even date herewith which is also a division of our original application.

We claim:

1. The combination in a printing press, of a printing couple, a water fountain, means to transmit water from said water fountain to an element of said printing couple, means to actuate said last-named means including a pair of rods having their ends normally in abutment, and means to move one of said rods out of abutment with the other.

2. The combination in a printing press, of a printing couple, a water fountain, means to transmit water from said water fountain to an element of said printing couple, means to actuate said last-named means including a pair of rods having their ends normally in abutment, means to guide one of said rods for reciprocable
movement, the other rod being pivotally mounted so that it may be swung out of alignment with said first rod, means to limit the swinging movement of said second rod, and means to move said rods from abutting engagement and to restore them to such engagement.

3. The combination in a printing press, of a printing couple, means to deliver sheets thereto, a water fountain, a movable roll to transmit water from said fountain to an element of the printing couple, means to move said roll, said last-named means including a pair of longitudinally aligned members arranged for reciprocatory motion, and means to move one of said members out of alignment with the other operated in accordance with the delivery of sheets to the printing couple.

4. The combination in a printing press, of a printing couple, a water fountain, means to transmit water from said water fountain to an element of said printing couple, means to actuate said last-named means including a pair of rods having their ends normally in abutment, means to guide one of said rods for reciprocable movement, the other rod being pivotally mounted so that it may be swung out of alignment with said first rod, means to limit the swinging movement of said second rod, and sheet controlled means to move said rods from abutting engagement and to restore them to such engagement.

HELENE GOEBEL,
Administratrix of George Goebel, Deceased.

EIBE A. WILCKENS.