

[54] **ROTARY NEWSPAPER PRINTING PRESS HAVING AUTOMATIC INTERRUPTERS FOR PRESS CYLINDERS**

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[58] Field of Search **101/228, 247, 206-209, 101/349-352, 363, 219, 139-145, 182, 185**

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[57] ABSTRACT

A rotary printing press is provided including an impression cylinder and a plate cylinder and wherein a continuous web passes between the impression and plate cylinders. Automatic means are provided to move two of the cylinders in the event of a break in the web whereby contact between all cylinders of the press is broken and damage from excessive windup of the broken web on one or more cylinders is avoided. Upon breakage of the web of paper the continuous flow of ink to the press is also stopped.

7 Claims, 2 Drawing Figures

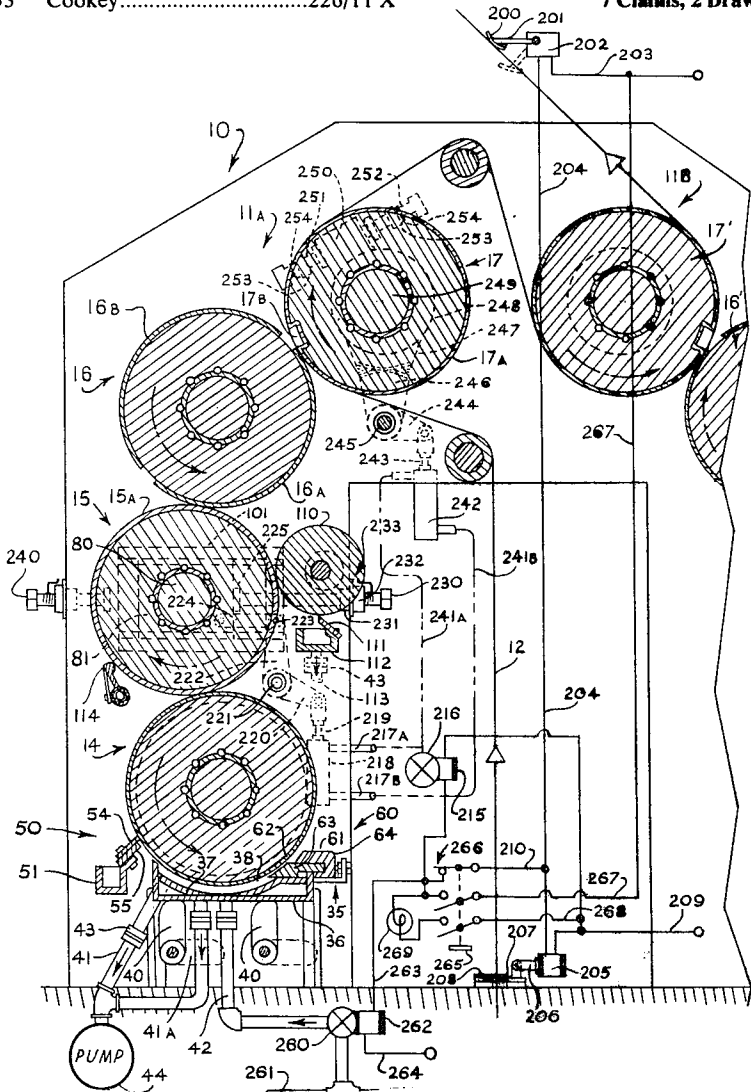
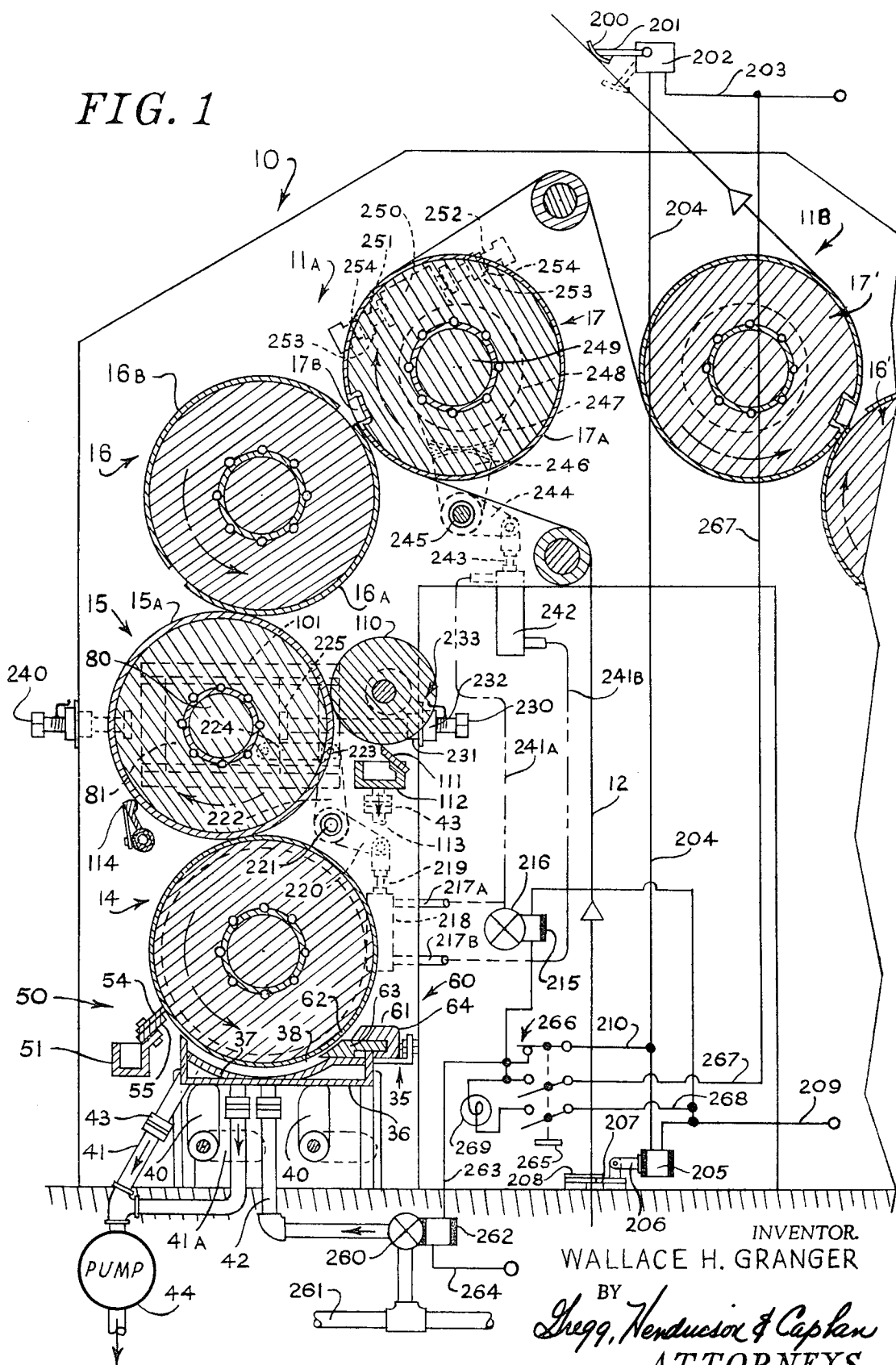


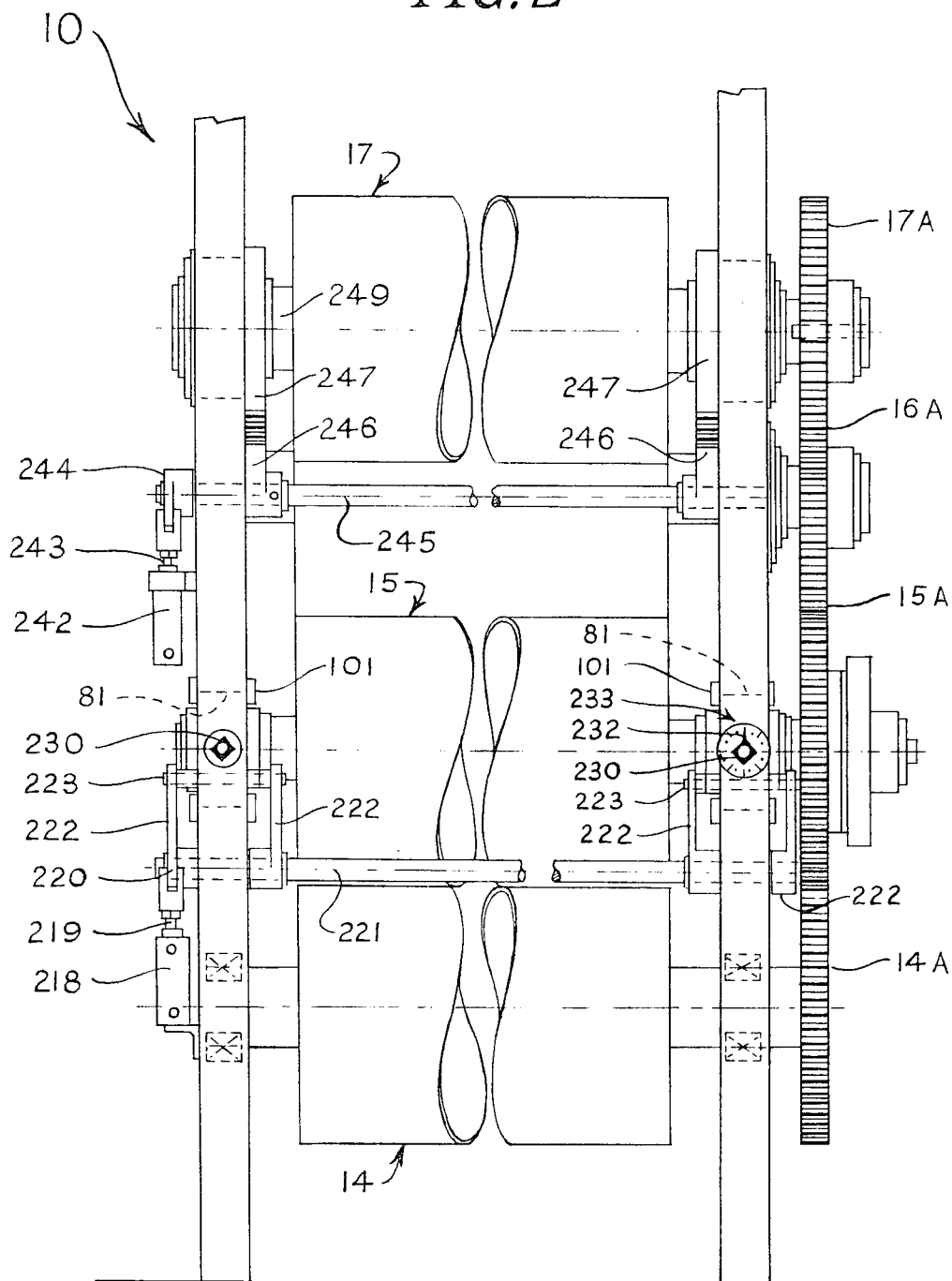
FIG. 1



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FIG. 2



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ROTARY NEWSPAPER PRINTING PRESS HAVING AUTOMATIC INTERRUPTERS FOR PRESS CYLINDERS

This invention relates to a rotary newspaper press. This application is a continuation-in-part of my copending applications Ser. No. 650,453, filed June 30, 1967, now abandoned, entitled "Rotary Printing Press Having Automatic Inking System," Ser. No. 735,388, filed June 7, 1968, now abandoned, entitled "Rotary Printing Press Having Automatic Inking System," and Ser. No. 784,599, filed Dec. 18, 1968 entitled "Rotary Printing Press Having Automatic Inking System and Automatic Safety Means."

In my copending applications above identified there is described a printing press having an automatic circulating inking system.

The present invention relates to rotary newspaper printing presses having an automatic cutoff system for stopping the press in the event that the web breaks and also of moving two of the cylinders in the press out of contact with other cylinders, to prevent the broken web when wound around one or more of the cylinders from causing damage to the press. The continuous flow of ink to the press is also cut off automatically upon breakage of the web or when the press is idle.

In this connection I make use of a web break detector which is normally employed on printing presses to detect a break in the web, to stop the press motor and to bring the press to a halt.

DESCRIPTION OF DRAWINGS

One form of the invention is shown in the accompanying drawings, in which:

FIG. 1 is a view in end elevation of a printing press embodying the principles of my invention;

FIG. 2 is a view in side elevation showing the four main cylinders of the press but with the ink fountain and other portions removed.

Referring now to the drawings, the numeral 10 designates generally a complete printing unit including a first printing couple 11a (shown in its entirety) and a portion of a second printing couple 11b which is identical to the first couple. A web 12 of paper (e.g., newsprint) passes through the couple 11a to be printed on one side and then through couple 11b to be printed on the other side.

The elements of couple 11a include an inking cylinder 14, an ink transfer cylinder 15 usually termed a form roller, a plate or printing cylinder 16, and an impression cylinder 17 shown with a blanket 17a and a blanket slot 17b. Each of these cylinders is suitably supported for rotation by axles or trunnions disposed in what may be termed zero clearance bearings such as preloaded tapered roller bearings. The cylinders are all mounted for rotation without play in any direction including end play. Printing cylinder 16 is shown with two plates 16a and 16b for printing separate pages. For printing of newspapers by the letter-press method it is preferred that plates 16a and 16b be nondeformable plates, e.g., low melting lead-tin-antimony alloy commonly used in rotary newspaper presses, also suitably nondeformable plastics such as Dycril (a trademark of E. I. DuPont Company). Offset printing plates may also be used.

The cylinders 14, 15, 16 and 17 have the same general overall diameter and they are driven from cylinder 16 by a train of intermeshing gears 14A, 15A, 16A and 17A, each mounted on the shaft of its respective cylinder and each having the same pitch diameter as the cylinders 14, 15, 16 and 17. The cylinder 16 is driven by the press motor (not shown) through conventional means that may include a vertical shaft and bevel gears. Inasmuch as the cylinders only rotate and none oscillate or vibrate as in other presses, there are herein employed helical or herringbone gears rather than straight cut gears. Further the ink transfer cylinder gear 15A as well as gears 14A and 16A have deeply cut teeth so that the ink transfer cylinder may be moved slightly to break contact with cylinders 14 and 16 and yet retain the gear connections, for reasons noted below.

Referring to FIG. 1, the inking cylinder 14 has ink receiving cells (not shown) formed in its surface as described in my copending applications. The cylinder 14 is provided with an ink fountain assembly 35 which includes a pan or tray 36 having a dish portion 37 spaced from the bottom of cylinder 14 and forming a shallow space 38 to receive ink. As described in my copending application Ser. No. 735,388, this tray may be sectional or it may be a single tray. The fountain assembly includes an elevator including pivoted, parallel links 40 whereby the assembly can be lifted into operative relation to cylinder 14 as shown in FIG. 1 or lowered for inspection, removal, cleaning, repair, etc. Outlet pipes 41 and 41a and inlet pipe 42 are provided, with each including a quick connect coupling member 43 to connect that part of the piping which is a permanent part of the assembly 35 with that part of the piping from and to the ink supply. Outlet pipes 41, 41a and 113 are connected to a pump 44 from whence the ink is recycled through a filter into the main ink supply tank and back to the press. Pipes 41 and 42 are in use when the press is in operation. Pipe 41a is used for draining all the ink from the fountain. Other details of the ink fountain assembly may be as described in my copending application Ser. No. 735,388. As also described in the aforesaid copending application, a baffle bar assembly 50 is provided to remove foreign matter, such as scraps of newsprint, from the inking system, such assembly comprising one or more small removable sumps 51 suitably mounted, and a baffle bar 54 adjustably mounted on a bracket 55 for setting very close to the cylinder 14, e.g., about 0.002 inch from the surface of the cylinder. Dividers may also be provided as described in the aforesaid copending application, such dividers being used in the case of a sectional cylinder printing multiple colors.

The fountain assembly also includes an ink control subassembly which is designated generally by the numeral 60. This ink control subassembly comprises an ink control blade 61, which may be made of any suitable nonmetallic material, e.g., nylon. This blade has an inner surface 62 that has the same or very nearly the same radius as the cylinder 14. Attached to or preferably formed integrally with the blade 61 are a number of guide vanes or fins 63 whose function is described in my copending application Ser. No. 735,388. The blade 61 may be adjustably mounted as described in detail in my application Ser. No. 735,388.

Continuing with reference to FIG. 1, the ink transfer cylinder 15 has an operating surface formed by resilient pad 15a, which in a typical case has a medium durometer hardness such as presently used in covering rubber rollers in printing presses. A durometer hardness of 30 or 40 or as high as 60 is suitable. This resilient pad tends to swell in use and as it swells and because the cylinder is rotated at constant rotary speed, its peripheral linear speed will increase unless compensated. For that purpose a clutch mechanism (not shown) may be used as described in the aforesaid copending application. The mounting of cylinder 15 may be as described in the aforesaid copending application.

Referring to both FIGS. 1 and 2, the trunnions 80 of cylinder 15 are rotatably carried in bearing blocks 81 which are slidable in gibs 101 with the bearing blocks mounted within the confines of the press side frames, substantially as described in my copending application Ser. No. 735,388, but with certain modifications described hereinafter.

Additional components of the ink transfer assembly comprise a metal, e.g., steel cylinder 110 to remove surplus ink from ink transfer cylinder 15 after it has made contact with printing cylinder 16, and a scraper blade 111 to remove ink from cylinder 110 to a sump 112 whence it flows by pipe 113 to the main ink reservoir separate from the press. A squeegee bar 114 is in light contact with pad 15a to eliminate the possibility of a screen effect being transferred to the printing plate.

Printing cylinder 16 has two or more printing plates 16a and 16b affixed to it to which ink is transferred by pad 15a of cylinder 15. This transfer of ink is efficient and uniform. The desired printing is accomplished on one side of web 12 as it

passes between printing cylinder 16 and impression cylinder 17, such being in the usual manner. As stated, the other side of the web is printed in couple 11b by passing between the impression cylinder 17' and printing cylinder 16' of that couple.

As thus far described, the rotary newspaper printing press of the present invention is substantially identical with that of my copending application Ser. No. 735,388.

As noted above, in the event of the breaking of the web 12, even though a conventional mechanism may be employed to stop the press, nevertheless, during the short interval of time between the breaking of the web and the stopping of the press, a considerable amount of web may be wound around the impression cylinder 17 and/or printing cylinder 16, also around cylinders 15 and 110. Cylinder 14 is protected from a web winding thereabout by the baffle bar 54. Before the press is restored to its proper operating condition by threading the web through the press, broken web wound upon one or more cylinders must be removed. This is tedious and time consuming, and if a considerable thickness of paper is wound around one or more of the cylinders it may have a damaging effect on them. Following a web break as many as 15 to 20 turns of paper may be wrapped around a cylinder and with a paper thickness of 0.003 inch this may then result in a cylinder being wrapped to an additional thickness of the order of five-hundredths of an inch. To avoid this, there is provided an automatic safety mechanism which will now be described. Web break detectors as employed herein are well known in the art and thus the following description thereof is only exemplary.

As will be seen in FIG. 1, the web 12 having been printed on both sides, proceeds upwardly and to the left (as viewed in FIG. 1) and out of the press. At a convenient position, a shoe 200 carried by a switch arm 201 pivoted on a switch 202 rests upon the web. A power lead 203 and a branch lead 204 are shown. The switch 202 is open when the arm 201 is up and closed when the arm 201 is down. The lead 204 connects to a solenoid 205 whose armature 206 is connected to a blade 207 which moves in a guide 208 transversely to the path of the web. Another power lead is shown at 209. The solenoid 205 remains in deenergized condition and the blade 207 is held in the retracted position shown in FIG. 1 as long as the switch arm 201 is held in the up position by the web 12. In the event that the web breaks, the switch arm 201 and shoe 200 drops from the up position shown in solid lines, to the down position shown in broken lines, thereby closing switch 202 and energizing the solenoid 205. Therefore, the armature 206 causes the blade 207 to move forwardly (to the left as shown in FIG. 1) thereby severing the web. [In this event, the press motor (not shown) will also be stopped by suitable circuit means (not shown)].

A branch lead 210 connects to a solenoid 215 which controls a two-way valve 216 supplied with hydraulic fluid under pressure from a suitable source (not shown), for example, the hydraulic system of the press. The valve 216 is connected by pipes 217a and 217b to the upper and lower ends, respectively, of a double-acting hydraulic cylinder 218. The rod 219 of the cylinder 218 is connected to a lever 220 which rotates a shaft 221. The shaft 221 is connected by a lever 222 and pin-and-slot linkage 223 to a link 224. The link 224 is connected to the bearing block 81. In normal retracted position, as shown in FIG. 1, the bearing block 81 is held against the enlarged end 225 of bolt 230 extending through a bore in the frame and threaded through a nut 231 welded or otherwise suitably affixed to the framework of the machine. A locknut 232 is threaded on the bolt 230 outside the frame.

The position of the bolt 230 and of its enlarged inner end 225 may be adjusted (and when adjusted, it is locked in place by means of the locknut 232) so that, when the bearing block 81 is brought into contact with the enlarged head 225 it will be in proper, operating tangential contact with the cylinders 14 and 16, and 110. (It will be understood that certain elements such as the bolt 230, the cylinder movement linkage, etc., are duplicated, there being one on each side of the machine. The cross-shaft 221 connects the linkage at both ends of the

cylinder 15. See FIG. 2. For simplicity, only one of each pair of elements is described.) There is also provided indicating means 233 in the form of a pointer and micrometer dial associated with the bolt 230 to show the exact setting of the inner end 225 thereof.

In the event of breakage of the web 12, the solenoid 215 is energized and shifts the valve 216 to its opposite position so that the hydraulic fluid enters through the pipe 217b and leaves through the pipe 217a, thereby moving the rod 219 upwardly from the position shown. This moves the bearing block 81 to the left (as viewed in FIG. 1) and with it the cylinder 15, thereby breaking contact of cylinder 15 with cylinders 14, 16 and 110. This movement is limited by a second adjustable screw 240 mounted in the framework and also being provided with an enlarged inner end 225', locking nut 232' and indicating means 233'.

At this point it should be noted that in my copending application Ser. No. 735,388, a spring is provided for the purpose of pushing the bearing block 81 and the cylinder 15 out of contact with the cylinders 14, 16 and 110. That function is performed in the present invention by the hydraulic system shown in FIG. 1, including the valve 216, the cylinder 218 and the various mechanical linkages shown. Whenever it is desired to move the cylinder 15 out of contact with the cylinders 14, 16 and 110 for the purpose of grinding it (necessitated by swelling of the cover 15a) the switch arm 201 may be moved to its down position, thereby purposely effecting the desired movement of cylinder 15 in the manner described. Note that cylinder 15 is actually only moved a very short linear distance so that the cylinder gear 15A still engages plate cylinder gear 16A so that cylinder 15 remains in driven relation to cylinder 16.

The valve 216 also controls a hydraulic system for moving the impression cylinder 17 out of contact with the driving plate cylinder 16 in the event of breakage of the web. Such mechanism will now be described.

As will be seen, hydraulic lines 241a and 241b connect the valve 216 with a second double-acting hydraulic cylinder 242 having a rod 243 connected to a lever 244 fixed to a cross-shaft 245. The shaft 245 is fixed to a gear segment 246 which meshes with a gear segment 247 forming part of an eccentric 248 mounted on the shaft or trunnion 249 of the cylinder 17. The same gear segments may be provided at each end of the shaft 245 but only one hydraulic cylinder is required.

Pressure is normally supplied to the upper end of the cylinder 242 through the line 241a to hold the rod 243 in its down position. This acts to hold a boss 250 on eccentric 248 in contact with a screw 251 and to hold cylinder 17 in contact with cylinder 16. In the event that there is a breakage of the web, the flow of pressure will be reversed and will enter the bottom of cylinder 242 through line 241b and leave the top of the cylinder through line 241a. This will cause the rod 243 to ascend and through the mechanism just described, pivot the cylinder 17 out of contact with the cylinder 16. Such movement is limited by a screw 252. As will be seen, screws 251 and 252 are threaded through nuts 253 attached to the frame of the machine and they are provided with locknuts 254. Pads are provided on the inner ends of the screws 251 and 252 to engage the boss 250. These screws are therefore adjustable and their heads have a pointer cooperating with micrometer markings to indicate adjusted screw positions. When the web 12 is restored and the shoe 200 rests on the web, the cylinder 17 will be pivoted back to its normal operating position in contact with cylinder 16.

Although a hydraulic system is shown for moving the press cylinders, other means such as pneumatic means or solenoids may be employed.

A further safety feature is also shown in FIG. 1 and will now be described. The ink supply pipe 42 which supplies a continuous flow of ink to the ink fountain is connected through a valve 260 to the main ink supply line 261. The valve 260 is operated by a solenoid 262 which is normally deenergized but is energized through leads 263 and 264 when the web breaks

and switch 202 is closed. When the solenoid is thus energized, it closes valve 260 and cuts off the supply of ink to the ink fountain. The continuous flow of ink resumes when solenoid 262 is again deenergized.

At the end of a run when the press is stopped for a considerable period of time, e.g., overnight, it is desirable to stop the ink supply and also to pivot the cylinders 15 and 17 out of contact with their various adjacent cylinders so as to avoid a set in the cylinder surfaces. This is accomplished by manual operation of pushbutton 265 which opens one set of contacts of a switch 266 and closes two sets of contacts. Power is supplied through lead 267 to solenoid 215 to operate valve 216 and move cylinders 15 and 17 out of contact and through leads 267 and 268 to a signal lamp 269 to signify the condition of the press; also through leads 263 and 264 to solenoid 262 to close valve 260 and shut off the supply of ink.

To those familiar in the art, it is apparent from the foregoing that safety means are provided to eliminate possible damage to the press, the printing plates thereon, the impression cylinder packing and the resilient covering of the ink transfer cylinder upon breakage of the web of paper. Also the circulating ink system is activated when the press is operating and deactivated when the press is at rest—all automatically or by manual control means. This system automatically moves the ink transfer cylinder into proper position for printing and out of operative position upon breakage of a web. Also the ink transfer cylinder can be shifted away from contact with other cylinders and into proper position for regrinding whenever it is desirable to machine the ink transfer cylinder back to prime size. The gear drive on all revolving cylinders including the single ink transfer cylinder makes it possible to use the printing couple as a lathe for rotating the ink transfer cylinder when in grinding position, the grinding mechanism to be a simple portable fixture that can readily be bolted to pads provided on the press frames. Thus the ink transfer cylinder which is rather heavy can be reground without removal from the press. When the ink transfer cylinder is to be reground the means for shifting the cylinder to grinding position is provided by the same hydraulic system that controls all safety functions either automatically or by manually operated pushbutton stations.

It will therefore be apparent that automatic safety means are provided to improve the operation of a rotary newspaper printing press.

What is claimed is:

1. A rotary newspaper printing press comprising an impression cylinder and a printing cylinder adapted to have a web of paper passed therebetween for printing thereon, an inking cylinder picking up a thin uniform film of ink thereon from an ink fountain, a single ink transfer cylinder having a resilient pad thereon engaging said inking cylinder and said plate cylinder for transferring ink to the plate cylinder, said impression cylinder, printing cylinder and ink transfer cylinders each having the same working diameter and all being gear driven at the same angular velocity, said ink transfer cylinder being

5 mounted by tapered preloaded roller bearings in a bearing block, means mounting said bearing block for linear movement along a single line toward and away from said inking cylinder and plate cylinder outward of the press, adjustable stop means disposed to engage said bearing block at adjustable positions at opposite ends of movement thereof for fixing operating and retracted positions of said ink transfer cylinder, a web break detector adapted to engage said web of paper and to produce a signal upon web breakage, and actuator means 10 operated by said signal for moving said bearing block away from said press to separate said ink transfer cylinder from said inking cylinder and plate cylinder to terminate the transfer of ink between all cylinders of the press upon web breakage.

2. The printing press of claim 1 further defined by means 15 pivotally mounting said impression cylinder, adjustable stop means setting the ends of travel of said pivotal mounting means, and said power actuating means being operable by said web-break detector signal to pivot said impression cylinder away from said plate cylinder whereby all press cylinders are disengaged upon a web break so that cylinder damage by a web end winding about a cylinder is precluded.

3. The printing press of claim 1 further defined by said actuator comprising a double acting hydraulic piston connected to move said ink transfer cylinder between said operating position and retracted position and to hold the cylinder in the position to which it is moved.

4. The printing press of claim 2 wherein the press is also provided with manually operable bypass means for bypassing said sensing means and actuating said operating means to move the respective cylinders out of contact.

5. The printing press of claim 4 including ink supply means for the press

said ink supply means including a shallow ink fountain holding a small amount of ink, an ink feed pipe to said fountain, and a control valve in said feed pipe operable in response to a web break actuating signal from said sensing means to shut off the supply of ink and said manually operable bypass means being also operable to operate said control valve to shut off ink supply when the press is idle.

6. The rotary printing press of claim 1 further defined by the ink transfer cylinder being held in operating position by means of a single micrometer calibrated adjustment screw positioned in contact against the inner side of each cylinder bearing block, said bearing block being held in operating position by pressure means actuated automatically or by manual means.

7. The rotary printing press of claim 1 further defined by the ink transfer cylinder being held in operative position for regrinding the surface thereof by means of a single micrometer calibrated adjustment screw positioned in contact with the outer side of each cylinder bearing block, said bearing block being held in such position by pressure means actuated automatically or by manual means.

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