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Continuation-in-part of application Ser. No.
650,453, June 30, 1967, now abandoned.

1,890,922	12/1932	Waller.....	101/207 X
1,904,709	4/1933	Avery et al.	101/209
1,955,752	4/1934	Lamatsch	101/349
1,995,701	3/1935	Buttner	101/350
2,017,139	10/1935	Wood.....	101/350
2,066,863	1/1937	Swanson.....	101/350
2,240,762	5/1941	Dietrich	101/350
2,256,514	9/1941	Brueshaber	101/350
2,659,342	11/1953	Taggart	118/261
2,744,464	5/1956	Harless	101/157
2,988,990	6/1961	Worth	101/350
3,229,631	1/1966	Peterson.....	101/352

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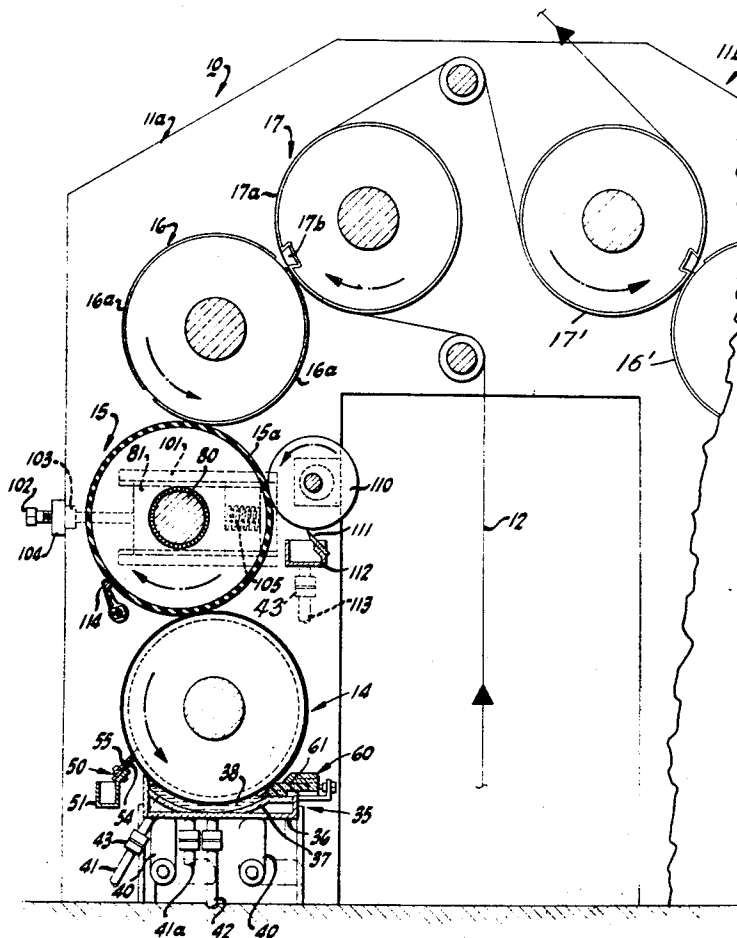
[54] **AUTOMATIC INKING SYSTEM FOR ROTARY NEWSPAPER PRINTING PRESS**
5 Claims, 10 Drawing Figs.

[52] U.S. Cl. **101/350,**
101/169, 101/208
 [51] Int. Cl. **B41f 31/06**
 [50] Field of Search **101/349-**
—352, 363, 364, 365, 206, 207, 208, 210, 157,
169; 118/261

[56] **References Cited**
UNITED STATES PATENTS

552,790	1/1896	Splithoff.....	101/352
2,122,128	6/1938	Burroughs.....	101/207 X
3,045,592	7/1962	Shearer et al.	101/350
3,073,240	1/1963	Tyma, Jr. et al.	101/210
1,092,798	4/1914	Nuttall	101/169
1,341,692	6/1920	White.....	101/349
1,788,504	1/1931	Ball	101/365

ABSTRACT: The invention relates to a rotary newspaper printing press in which there are an inking cylinder which receives ink from an ink fountain, an ink transfer cylinder, a plate cylinder and an impression cylinder. The inking cylinder preferably has an etched surface and it is provided with an ink fountain assembly that includes an ink control blade that accurately controls the thickness and uniformity of the film of ink. The ink transfer cylinder has a resilient pad to which ink is applied by the inking cylinder and which, in turn, applies a uniform film of ink to the plate cylinder. This ink transfer cylinder is provided with a clutch that automatically compensates for swelling of the pad and it is mounted so that it can be moved out of contact with the adjacent cylinders for machining, but without removing it from the press.



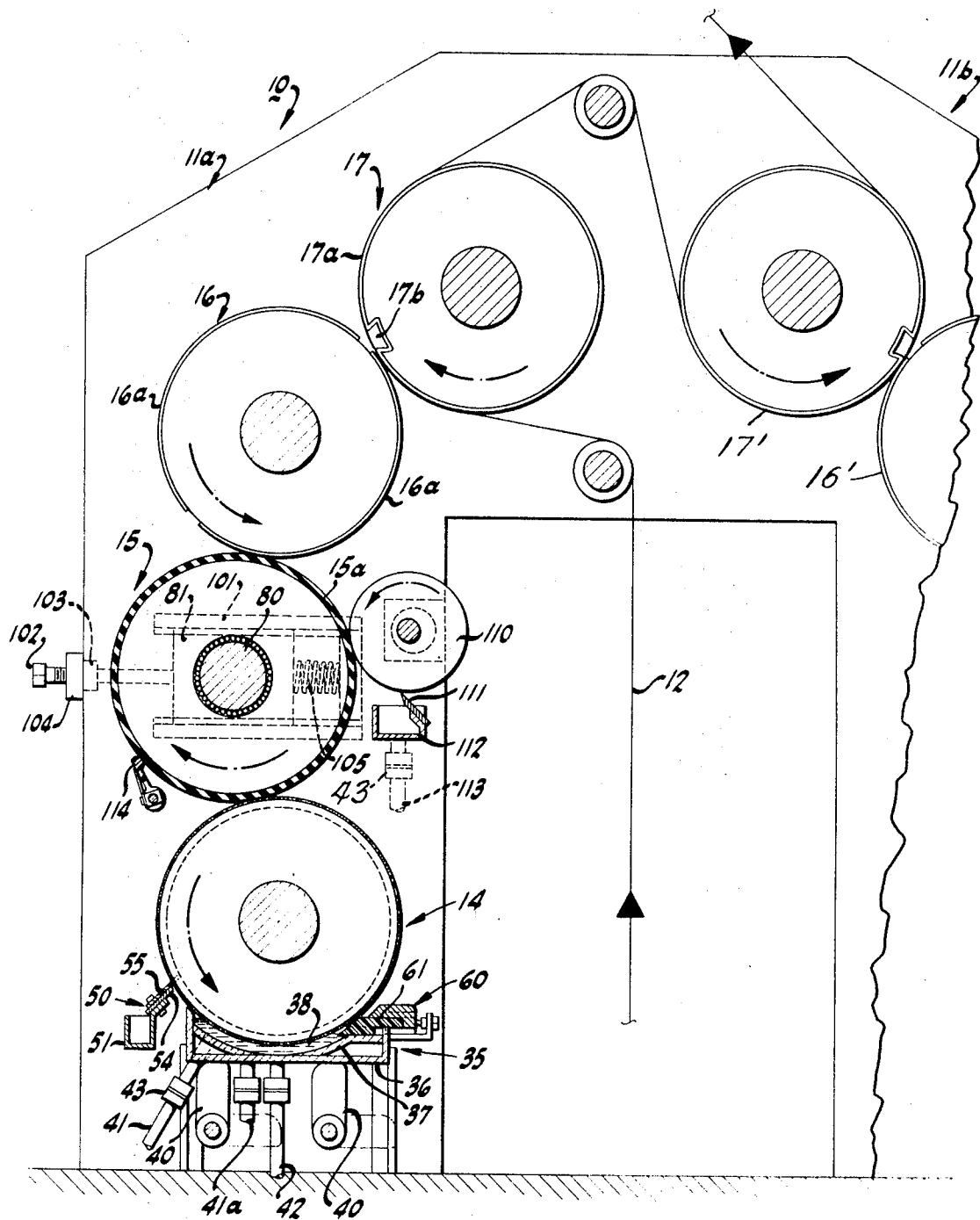
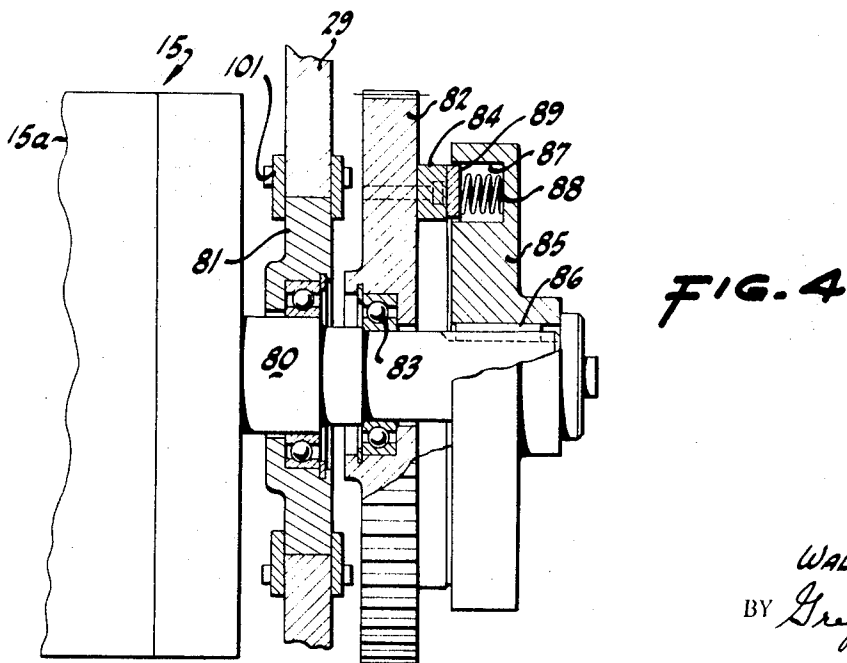
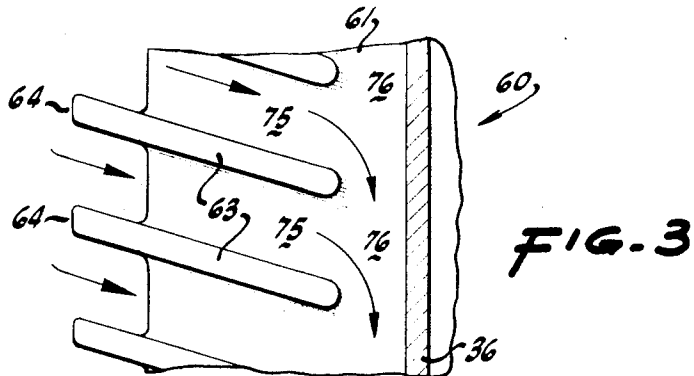
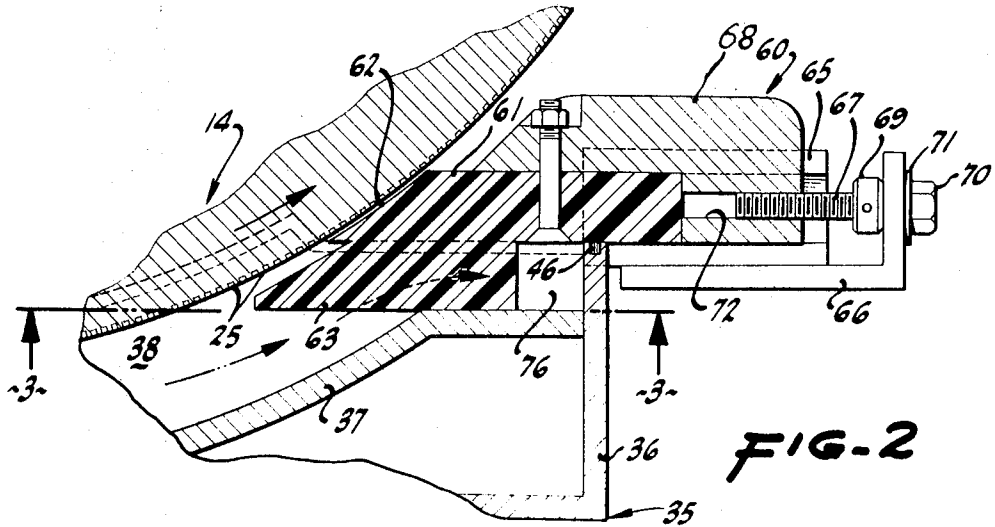


FIG. 1

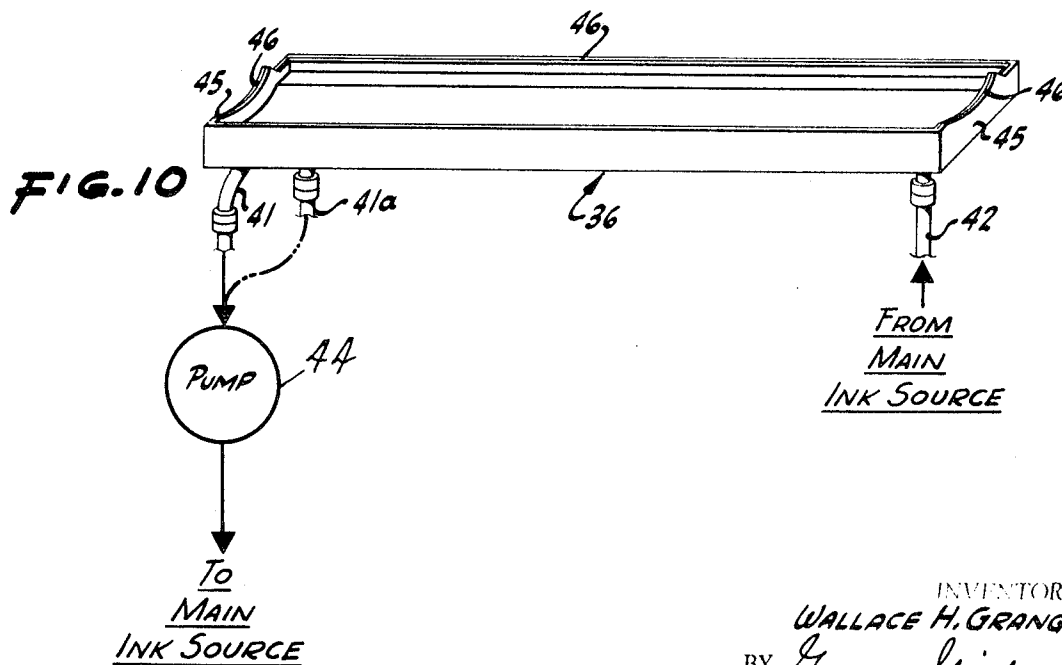
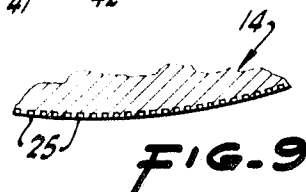
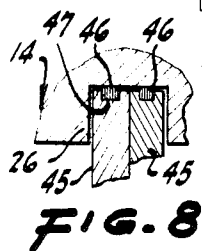
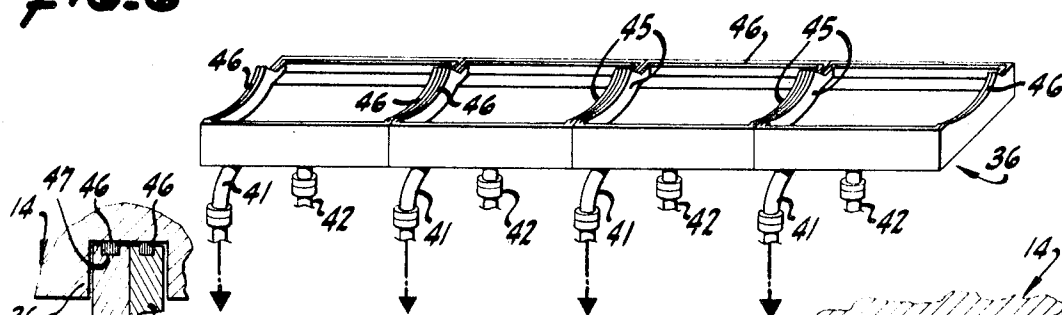
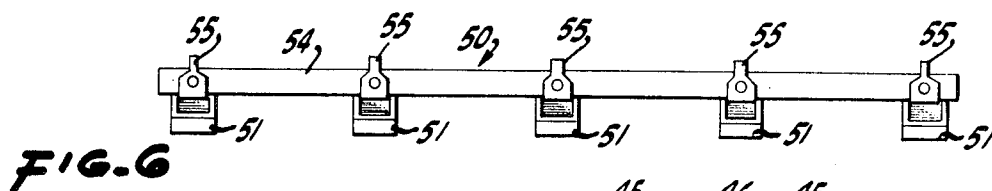
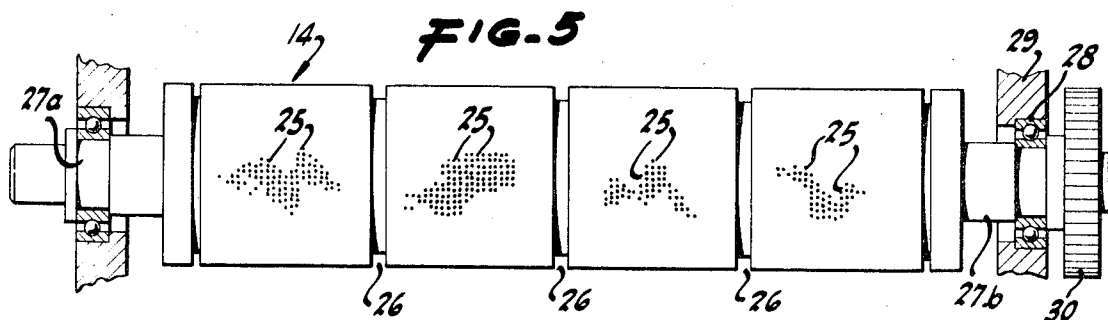
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AUTOMATIC INKING SYSTEM FOR ROTARY NEWSPAPER PRINTING PRESS

SUMMARY OF THE INVENTION

This invention relates to a rotary newspaper printing press and is a continuation-in-part of my copending application Ser. No. 650,453, now abandoned, filed June 30, 1967 entitled "Rotary Printing Press Having Automatic Inking System."

In my copending application I have described an improved rotary printing press having an automatic inking system of improved design.

It is an object of the present invention to provide improvements upon the printing press of my copending application.

It is a particular object of my present invention to provide a rotary printing press having an automatic inking system of the type described in my copending application and including an inking cylinder having an improved means for applying ink to the cylinder.

It is another object of the present invention to provide a rotary printing press having an ink transfer cylinder for transferring ink from the inking cylinder to the plate cylinder, such transfer cylinder being capable of operation in synchronism with the inking and plate cylinders notwithstanding limited swelling of the rubber pad employed on the transfer cylinder, and which can be readily ground when such swelling becomes excessive without the need to remove the cylinder from the press.

These and other objects of the invention will be apparent from the ensuing description and appended claims.

DESCRIPTION OF THE DRAWINGS

Certain forms of the invention are illustrated by way of example in the accompanying drawings, in which:

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

FIG. 2 is a fragmentary view on a larger scale than that of FIG. 1 showing the ink control assembly employed in connection with the inking cylinder.

FIG. 3 is a view taken along the line 3-3 of FIG. 2.

FIG. 4 is a fragmentary view, partly in section and partly in elevation, of the ink transfer cylinder and a clutch arrangement employed therewith.

FIG. 5 is a plan view of the inking cylinder shown as a multi-sectional cylinder.

FIG. 6 is a plan view of the baffle blade mechanism employed with the inking cylinder of FIG. 5.

FIG. 7 is a view in perspective section of the fountain assembly employed with the cylinder of FIG. 5.

FIG. 8 is a fragmentary sectional view showing the end sealing means for the fountain assembly.

FIG. 9 is a fragmentary view of the inking cylinder showing the ink retaining cells etched into the inking cylinder.

FIG. 10 is a vertical sectional view of a portion of the ink fountain assembly identical to that shown in FIG. 7 but modified for a cylinder having only a single section.

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, and ink transfer cylinder 15, 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 on axles or trunnions. Printing cylinder 16 is shown with two plates 16a for printing separate pages, but a single plate may be used. For printing of newspapers, it is

preferred that plates 16a and 16b be nondeformable plates, e.g., the low melting lead-tin-antimony alloy commonly used in rotary newspaper presses, also suitably hard plastics such as Dycril (a trademark of E. I. duPont Company).

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 each mounted on the shaft of its respective cylinder and each having the same pitch diameter as the cylinders 14, 15, 16 and 17. Two of these gears are shown in drawings and are described below.

Referring to FIGS. 1, 2, 5 and 9, the inking cylinder 14 has ink receiving cells 25 formed in its surface. The surface of this cylinder is of a hard, durable metal such as nickel-chromium alloy or a suitably hard steel. The cells 25 are produced by etching and, as stated in my copending application, they are formed like the cells in a rotogravure cylinder. Typically there may be 100 to 200 cells per linear inch, or 10,000 to 40,000 per square inch, as in a rotogravure cylinder produced with a 100 to 200 line screen. In a rotogravure cylinder the dimensions of the cells will vary to produce tone effects, but in my cylinder the cells are preferably uniform in depth and diameter. As in the case of ink cells in a rotogravure cylinder, the ink cells 25 of my cylinder 14 may be cup or V-shaped, being wider at the top than at the bottom.

As shown in FIG. 5 the cylinder 14 may be sectional (in this instance there are four sections and it is formed with circumferential slots or grooves 26 separating the sections from one another and separating the end sections from the end portions of the cylinder. Trunnions 27a and 27b are shown which are rotatable in bearings 28, carried by housing 29. The trunnion 27b, where it projects from the housing also carries a gear 30 which is one of the train of gears referred to above. The pitch diameter of the gear 30 is the same as the diameter of the cylinder 14. It should be pointed out that all of the aforesaid gears are located outside the housing 29 and that they run in an oil bath (not shown).

Referring to FIG. 1, an ink fountain assembly 35 is there shown including a pan or tray 36 having a dished portion 37 spaced from the bottom of cylinder 14 and forming a space 38 to receive ink. This tray may be sectional as in FIG. 7 for a sectional cylinder 14 as shown in FIG. 5, or it may be a single tray as shown in FIG. 10, for a cylinder which is not sectional. At this point, it should be noted that a sectional cylinder 14 such as that shown in FIG. 5 is intended to print different colors across the cylinder, each section of the cylinder having applied to it an ink of a color different from the inks applied to adjacent sections.

Continuing with reference to FIG. 1, 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. Inlet and outlet pipes 41, 41a and 42 are provided each including a 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. Pipe 42 is the inlet pipe. Pipe 41 and pipe 41a are the outlet pipes and each of these outlets is equipped with quick connect valves and may be connected through an outlet pump 44 to the main ink source. 41 is in use when the press is in operation. 41a is used for draining all the ink from the fountain. The outlet hose can be used in either location.

Referring now to FIGS. 7, 8 and 10, the adjacent end walls 45 of sectional trays 36 shown in FIG. 7 (or the end walls 45 of single trays 36 shown in FIG. 10) are fitted into the respective circumferential slots 26 of cylinder 14. Each of these end walls has an annular seal 46 such as felt seated in an annular groove 47 which is in contact with the base of the respective groove 26. The front and rear walls are also provided with extensions of the grooves 47 and are fitted with similar felt seals. By this means each section of the cylinder 14 is sealed from adjacent sections and the ends of the inked portions of the cylinder (whether sectional or not) are sealed from the extremities of the cylinder. Also, the front and rear of the tray or trays are

sealed. The oil in the oil base ink serves as a lubricant for the material of the seals.

Referring now to FIGS. 1 and 6, a baffle blade assembly 50 is provided to remove foreign matter, such as scraps of newsprint, from the inking system. Such baffle blade assembly comprises small removable sumps 51 suitably mounted. Baffle blade 54 is set very close to the cylinder 14, for example about 0.002 inch from the surface of the cylinder. Dividers 55 are also provided, one for each slot 26. These dividers project into the respective slots 26 and serve to prevent transfer of ink from one section to the other and to the end portions of the cylinder. Ink divider plates 55 are not used where a single ink fountain is used with a single color.

Referring now to FIGS. 1, 2 and 3, 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 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 below. The inner ends 64 of the fins 63 are set further back from the cylinder 14 than the control blade 61, as best shown in FIG. 2. The blade 61 is adjustably mounted as follows: The blade 61 is carried by a relatively massive metal casting 68 which extends the length of the cylinder 14. At each end this casting has an end portion (not shown) which is slidably mounted in a channel 65 which is fixed (e.g., bolted or welded) to the framework of the machine. To each such channel is affixed a bracket 66 which carries a screw 67. The screw 67 is rotatable in the bracket but is held against axial movement by its head 70 and a ring 69. A micrometer scale 71 is also provided. The screw 67 is threaded into a tapped hole 72 in the casting. By turning the screw 67 at both ends of the casting 64 the position of surface 62 of blade 61 in relation to the cylinder 14 can be accurately adjusted and the spacing can be read off the micrometer scale 71.

Referring now to FIG. 3, it will be seen that the fins 63 are at a slant of the axis of cylinder 14 and therefore form slanting flow passages 75 leading to a longitudinal passage 76 which is parallel to the axis of the cylinder 14. The passage 76 runs the length of the tray, or the length of its tray section. By this means ink is pumped by the rotational motion of the inking cylinder 14 through the passage 75 to the passage 76 and therealong to thus move the viscous news ink from an inlet end of the fountain to an outlet end thereof for maintaining a uniform supply of ink along the entire length of the cylinder or along the entire length of each section of the cylinder.

Referring now to FIG. 4, the ink transfer cylinder 15 has a surface formed by a resilient pad 15a. Typically this pad has a medium durometer hardness such as presently used in covering rubber rollers in printing presses, a durometer hardness of 30 or 40 being suitable. This resilient pad tends to swell and as it swells, and because the cylinder 15 is rotated at a constant rotary speed, its peripheral linear speed will increase unless compensated. A clutch mechanism for such compensation will now be described.

Trunnion 80 of cylinder 15 is carried in a bearing block 81. At the outer, projecting end of trunnion 80 is mounted a gear 82 whose pitch diameter is the same as that of other such gears on other cylinders, but the gear 82 is mounted on a bearing 83 so as to be rotatable on the trunnion 80. A thrust plate or ring 84 is affixed to or formed as part of the gear 82. At the outermost end of the trunnion 80 is a clutch disc 85 keyed at 86 to the trunnion and formed at intervals with sockets 87 in each of which a spring 88 is lodged. Each such spring is compressed between the base of its socket and a pad or a ring 89. By this means a frictional drive is provided between the gear 82 and the cylinder 15. Therefore if the pad 15a swells and the cylinder 15 tends to run at a peripheral, linear speed exceeding that of the adjacent cylinders 14 and 16, a drag develops which is transmitted to the clutch mechanism just described.

This will cause slippage of the clutch and will slow down the cylinder 15 until its peripheral, linear speed is equal to that of the adjacent cylinders 14 and 16.

Whenever the swelling of pad 15a becomes excessive it is desirable to stop the machine and to grind the pad 15a to its original diameter, equal to that of cylinders 14 and 16. It will be understood that "equal diameters" refers to effective operating diameters, e.g., in the case of cylinder 15, the operating diameter with the pad 15a. To facilitate this operation and to avoid the need to remove cylinder 15 from the press, a slidable mounting is provided, as shown in FIG. 1. The bearing block 81 is slidable in gibs 101. A screw 102 bears against the outer side of the block 81 and it is threaded through a nut 103 fixed to the housing and is locked in adjusted position by a lock nut 104. A spring 105 is compressed between the rear squeegee of the frame of the machine and the block 81. By turning screw 102 to retract it, the spring 105 will move the block 81, and with it the cylinder 15, outwardly sufficiently to break contact with the adjacent cylinders 14 and 16 and to be in a convenient position for access to a portable grinding machine. After pad 15a has been ground to its original diameter the screw 102 is turned to move the block 81 and with it the cylinder 15 back into proper position wherein the cylinder 15 contacts cylinders 14 and 16. There is, of course, a similar mounting assembly at both ends of the cylinder 15. The head of screw 102 is fitted with micrometer markings (not shown) to facilitate adjustment of block 81 to hold cylinder 15 in precise inking position and also in precise position for regrounding.

Additional components of the ink transfer assembly comprise a metal, e.g., steel cylinder 110 to remove excess 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. A squeegee bar 114 may be in light contact with pad 15a to eliminate the possibility of a screen effect being transferred to the printing plate.

Printing cylinder 16 has one or more printing plates 16a 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.

My printing press thus illustrated greatly simplifies construction and operation due to the reduction in moving parts. Vibrating ink drums, intermediate gearing, reduction gearing, vibrating inking rollers and the adjustable roller sockets in which they are mounted are eliminated. Ink misting in the pressroom is reduced. Power requirements are reduced. Keyboards for controlling the proper manual adjustment of the ink film column by column are eliminated. Vibration noise is lowered, thereby protecting and preserving the hearing of pressroom personnel. The ink fountain assembly 35 applies ink uniformly to inking cylinder 14; the clutch mechanism associated with ink transfer cylinder 15 compensates for swelling of pad 15a; and the mounting of cylinder 15 facilitates grinding the pad 15a.

In newspaper printing presses of present design, where plate cylinders are used in conjunction with impression cylinders, the film of ink is controlled by manual means, requiring the service of pressmen on all printing units every time the printing plates are changed, to properly adjust the ink for each column of printing on the printed page. My invention supplies a film of ink of proper density automatically regardless of the type of makeup in the different pages of the newspaper or whatever is being printed on the press, thus saving time and labor. Because the density and evenness of the ink film are always controlled automatically, no adjustment of the ink film is necessary while the press is in operation. All of these advantages are made possible by my invention which substantially reduces the cost of press manufacture and also results in

substantial savings in power, paper, press maintenance and labor costs.

My invention eliminates the necessity for complex means presently in use for controlling the proper flow of ink between the main ink source and the printing cylinder. The use of such devices as manually controlled ink pump boxes, wherein a series of small ink pumps, each one equipped with a means for manual adjustment, are properly positioned to accommodate the proper flow of ink to each column of each page of printed matter, such as a page in a newspaper or magazine or periodical, or devices requiring the use of electrical impulses, manually controlled, for adjustment of the proper flow of ink to each column of each page of printed matter are eliminated, further reducing the manufactured cost of the printing press, and simplifying the press operation.

In all present day newspaper pressrooms, it is common practice to consider many of the first printed newspapers of any edition to be waste because the ink is not properly set by the pressmen until many newspapers have been delivered from the folder of the press. Through the use of my invention the first completely printed copies of a newspaper, magazine, or periodical delivered from the folder of the press will be prime copies because the entire inking system of the printing press is automatically controlled.

While I have described one embodiment of my invention, modifications thereof may be readily devised without departing from the spirit of my invention, and it is to be understood that such modifications come within the scope of the appended claims.

Although my invention relates mainly to newspaper-type rotary printing presses, it is not to be limited to newspaper-type rotary printing presses; it is also applicable to rotary-type printing presses using any type of thin, hard, nondeformable printing plates.

I claim:

1. An improved inking system for a rotary newspaper printing press having a plate cylinder, an impression cylinder and an ink fountain, comprising an inking cylinder in operative relation to the ink fountain to pick up a film of ink on the cylinder's surface as it rotates partially submerged in the fountain, an ink control blade disposed longitudinally of the inking cylinder adjacent the surface thereof on the side leaving the fountain, said ink control blade having a surface adjacent the inking cylinder that is cylindrical with the radius thereof substantially the same as that of the inking cylinder and said blade being disposed with the upper edge thereof closer to the inking cylinder than the lower edge, means mounting said blade

for adjustable movement toward and away from the surface of said inking cylinder and including a pair of micrometer screws located one at each end of the blade to establish the thickness of ink film on the cylinder, means providing a continuous flow of ink through said ink fountain, a single ink transfer cylinder having a resilient cover and mounted for rotation in rolling contact with said inking cylinder and said plate cylinder for transferring ink from said ink cylinder to said plate cylinder, and gear drive means rotating said cylinders and including means maintaining the peripheral speed of said ink transfer cylinder the same as that of the plate and inking cylinders.

2. The inking system of claim 1 further defined by the underside of the ink control blade being provided with fins extending outwardly of the cylinder and toward a first cylinder end to define first passages therebetween for ink flow, means defining a second passage longitudinally of the cylinder outwardly of said fins from the cylinder and communicating with said first passages, ink outlet means from said fountain at the first end of said cylinder and ink inlet means to said fountain at a second end of said cylinder whereby cylinder rotation pumps ink through said first passages between said fins and along said second passage to establish a continuous ink flow through the fountain between inlet and outlet thereof.

3. The inking system of claim 1 further defined by said ink fountain being in sealing relation with said ink control blade, means defining a plurality of fins beneath said blade in said fountain in contact with ink in the fountain with said blades extending outwardly of said cylinder and skewed toward a first cylinder end to define first passages therebetween for ink flow as urged by cylinder rotation, means including said blade and said fountain defining a second passage longitudinally of said cylinder outwardly of said fins from said cylinder and communicating with said first passages, ink outlet means from said fountain at the first end of said cylinder and ink inlet means to said fountain at a second end of said cylinder whereby cylinder rotation pumps ink through said first passages between said fins and along said second passage to establish a continuous ink flow through the fountain between inlet and outlet thereof while preventing ink overflow from the fountain.

4. The inking system of claim 3 further defined by said ink inlet means including quick disconnect means communicating with the bottom of said fountain and said ink outlet means including quick disconnect means communicating with a side of said fountain above said inlet connection.

5. The inking system of claim 1 further defined by said ink control blade being fixedly mounted in adjustable position.