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

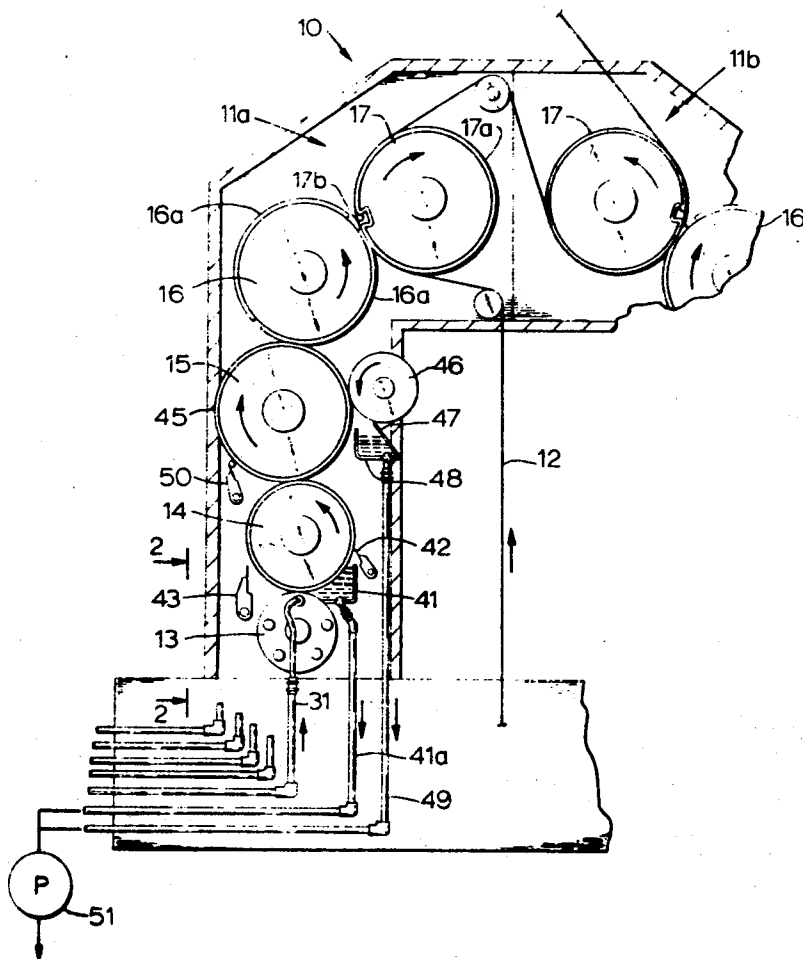
1,840,071	1/1932	Werner et al.	101/350
1,900,266	3/1933	Wood	101/363
2,240,762	5/1941	Dietrich	101/350
2,310,788	2/1943	Hummelchen	101/350
2,363,817	11/1944	Taylor	101/350
2,368,500	1/1945	Taylor et al.	101/350
2,986,088	5/1961	Chase et al.	101/350

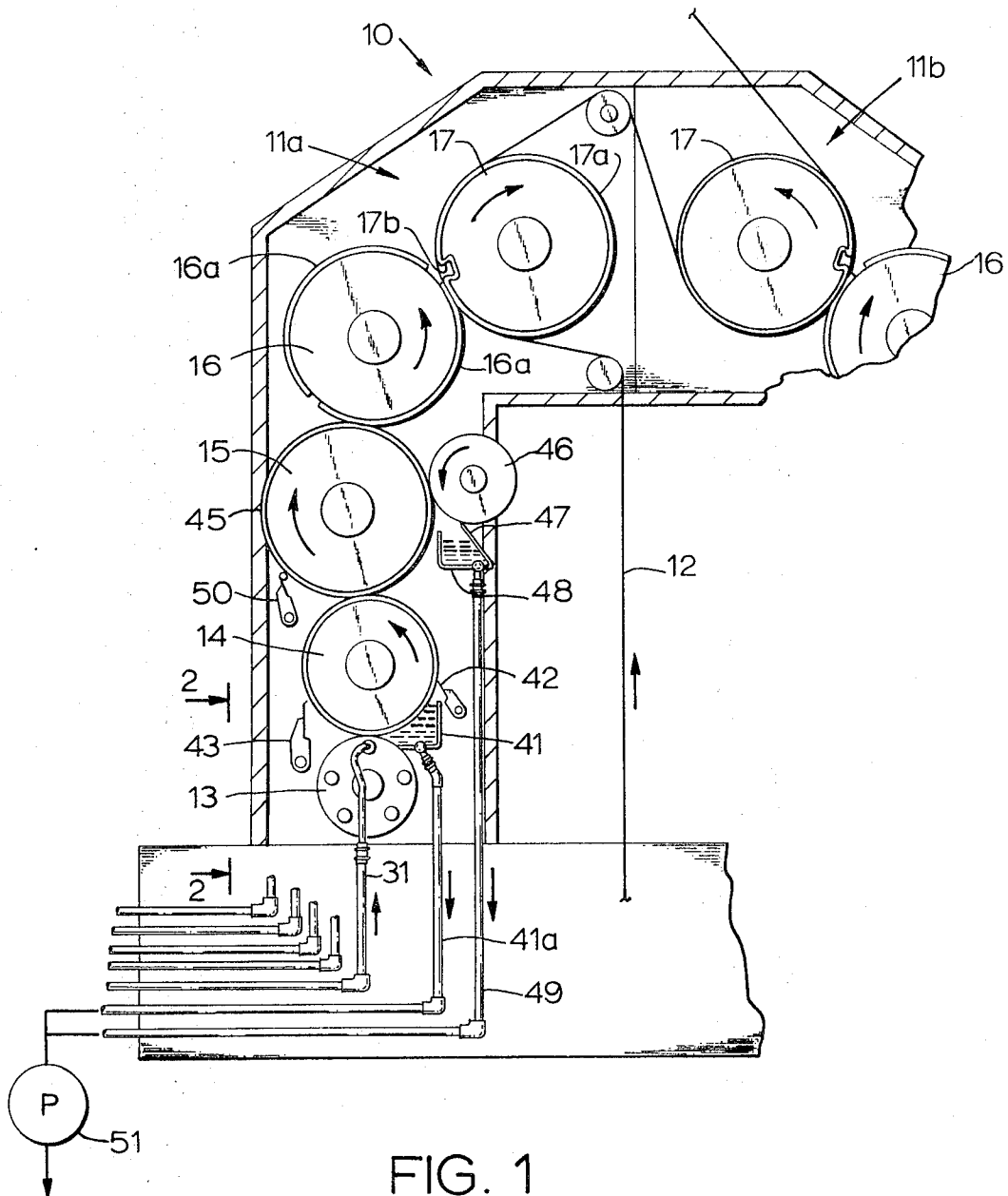
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[54] **SIMPLIFIED CIRCULATING INKING SYSTEM
FOR ROTARY NEWSPAPER PRINTING PRESS**
7 Claims, 5 Drawing Figs.

[52] U.S. Cl. 101/350,
101/366, 101/210
[51] Int. Cl. B41f 31/06,
B41f 31/08
[50] Field of Search 101/350,
351, 356, 357, 363, 364, 365, 366, 207, 208, 210
[56] **References Cited**
UNITED STATES PATENTS
1,580,829 4/1926 Lengel 101/350

ABSTRACT: An improved inking system for rotary newspaper printing press employs a single inking cylinder with small cells in the surface thereof to continuously transfer a controlled amount of ink from a rotatable ink dispensing cylinder to a resiliently covered ink transfer cylinder that is in rolling contact with a printing cylinder. Excess ink is continuously removed from the inking cylinder and surplus ink is continuously removed from the ink transfer cylinder after contact with the printing cylinder for continuous return to a main storage tank or ink reservoir to be filtered and recycled. No vibrating drums or rollers are employed.





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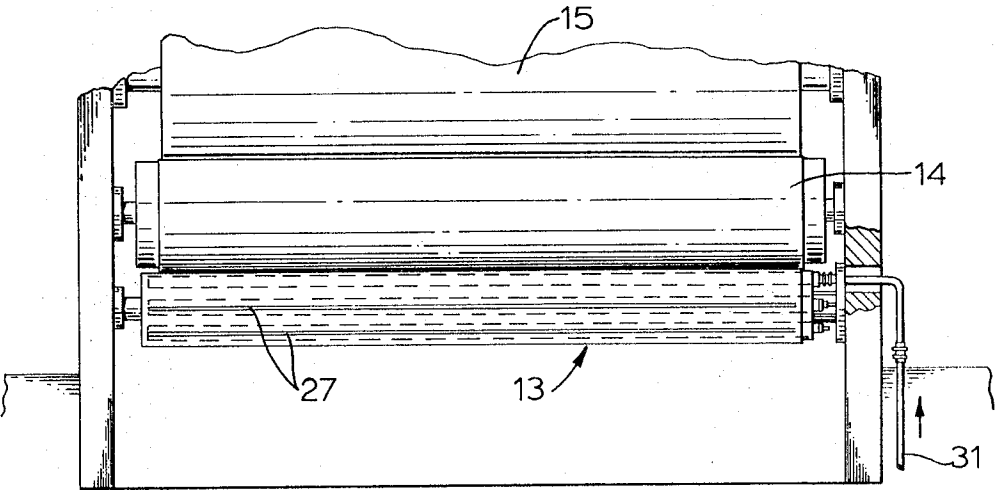


FIG. 2

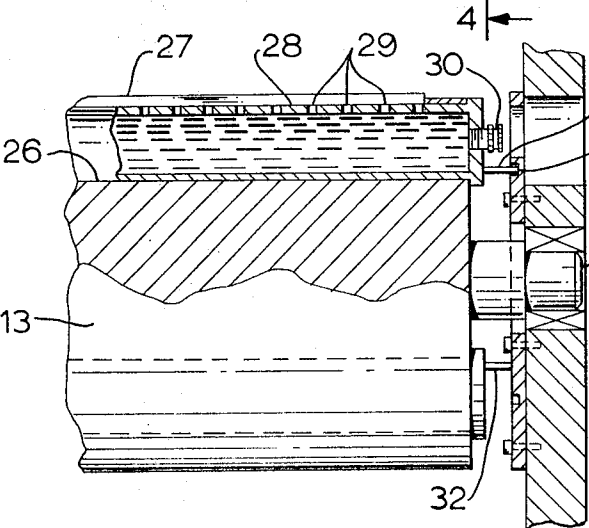


FIG. 3

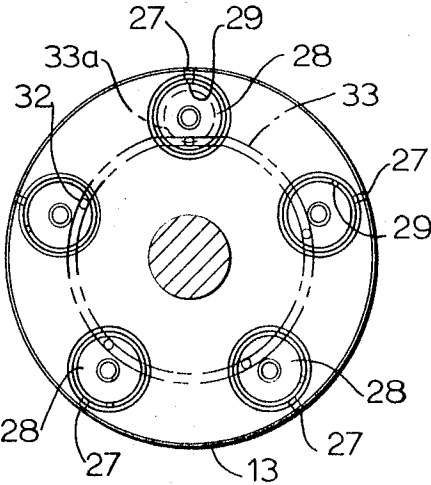


FIG. 4

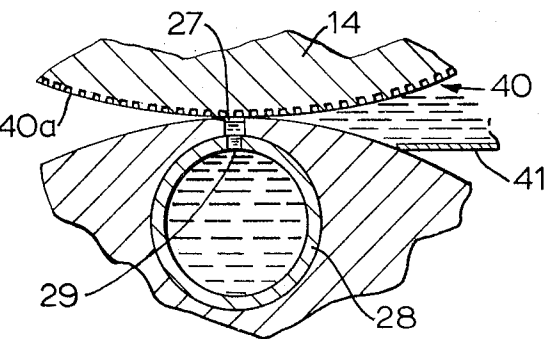


FIG. 5

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SIMPLIFIED CIRCULATING INKING SYSTEM FOR ROTARY NEWSPAPER PRINTING PRESS

This is a continuation of my copending U.S. Pat. application Ser. No. 650,453 filed in the U.S. Pat. Office on June 30, 1967 and now abandoned.

In rotary printing presses such as those presently in use for printing newspapers, ink is transferred from an ink reservoir to a plate or printing cylinder by means of an assortment of drums or rollers, the drums or rollers being vibrated to ensure a uniform application of ink. There are serious disadvantages in this type of ink transfer including, among other things, the complexity of the ink transfer mechanism and the need to print a considerable number of papers at the start of a run while making adjustments, such initial papers being of inferior quality and being wasted. Other disadvantages (set forth hereinafter) include "ink misting" from the large number of rotating and vibrating drums and rollers and the return of dirty ink to the plate cylinder.

It is noted that news ink has an oil base and is quite viscous, somewhat like molasses, with a viscosity of the order of four to five Poises, as distinguished from very thin volatile analine or flexographic inks. Also, newsprint is one of the lowest grades of printing paper, being loosely and openly fibered without sizing, not calendered and very soft and absorbent. Newspaper printing is accomplished by the newsprint absorbing the news ink. Consequently, the problems of printing and ink distribution in a rotary newspaper printing press differs materially from other fields of printing.

It is an object of the present invention to improve upon rotary printing presses, especially those used in the printing of newspapers by the provision of a circulating inking system of simplified structure.

An object of my present invention is the provision of a printing press in which the inking system is more advantageously disposed than in previous printing presses.

Another object of my invention is the provision of a printing press which may be operated in a more economical and expeditious and safer manner than has previously been accomplished.

Another object of this invention is the provision in a rotary printing press of an automatic means for transferring a uniform film of ink from the ink source to the printing cylinder.

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

One form of my invention is illustrated by way of example in the accompany drawings in which:

FIG. 1 is a view in end elevation of one printing couple with its cover plate removed, such FIG. also showing a fragment of the mating couple;

FIG. 2 is a view in side elevation and partly in section as seen along the line 2-2 of FIG. 1 but with the cover plate removed, such view showing the ink dispensing cylinder, the inking cylinder and a portion of the ink transfer cylinder;

FIG. 3 is a fragmentary view similar to that of FIG. 2 but on a larger scale and limited to, and illustrating certain details of the ink dispensing cylinder;

FIG. 4 is a view in end elevation, taken along the line 4-4 of FIG. 3; and

FIG. 5 is a fragmentary view in transverse cross section showing the operative relationship of the ink dispensing and inking cylinders.

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. Where several colors are employed in printing, or where for any other reason the web is to be printed in steps or stages, other similar printing units will be employed in tandem, all in a manner which is well known in the art.

The elements of couple 11a include an ink dispenser cylinder 13, an inking cylinder 14, an 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 the cylinders being suitably supported for rotation on axles or trunnions by means of preloaded roller bearings to preclude play in the mounting. The cylinders 14, 15, 16 and 17 are continuously rotated in synchronism by driving gears attached to the cylinders for direct tangential rotation thereof. The cylinder 13 remains stationary except for occasional manual rotation to bring another supply of ink (e.g., an ink of a different color) into position for use. Printing cylinder 16 is shown with two plates 16a disposed around the cylinder for printing separate pages, but a single plate may be used.

Referring to FIGS. 1 to 4, cylinder 13 is mounted in the frame on trunnions 25 and it has peripheral, longitudinal passages 26 formed in it, each of which has an open ink dispensing slot 27 and which receives a tube 28 formed with ink dispensing holes 29. A standard fitting 30 in one end of each tube 28 is adapted to receive a standard mating fitting of a supply tube or hose 31. The fittings 30 and 31 are of known type and may include a normally closed valve which opens when the two fittings are coupled. Whenever it is desirable to change from one ink to another, the cylinder 13 is rotated to bring the appropriate tube 28 into registry with inking cylinder 14. In so doing, a pin 32 projecting from the adjacent end of the respective tube 28 moves in a generally circular cam slot 33 and this pin turns the respective tube 28 to register its ink passages 29 with the slot 27 when the pin reaches the flat segment 33a of the cam slot 33. Correspondingly the tube 28 that is moved out of registry is rotated so that its passages 29 are rotated out of registry with the respective slot 27. Alternatively, these adjustments may be made manually.

The inking cylinder 14 plays an important role in my invention. It has a surface 40 (see FIG. 5) which is etched or otherwise formed to provide a multiplicity of small, shallow cells 40a. These cells 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 40a of my cylinder 14 may be cup or V-shaped, being wider at the top than at the bottom.

As shown in FIG. 5, ink is supplied directly to the etched surface 40 of cylinder 14 with the excess ink being deposited into sump 41 wherefrom it flows by pipe or hose 41a to the main ink reservoir or tank (not shown) for recycling. A doctor blade 42, pivotally mounted and under suitable pressure, bears against the surface 40 after it has been inked to prevent undue buildup of ink. A knife 43 is set close to, but not in contact with, cylinder 14 to remove foreign matter such as newsprint.

By this means only the cells 40a are filled with ink and a precise control over the quantity of ink delivered to transfer cylinder 15 is exercised, therefore providing a uniform film of ink on the transfer cylinder 15.

Transfer cylinder 15 has a resilient pad 45 affixed as by vulcanization, to its surface. The entire surface of the cylinder 15 is covered. Suitable materials for this covering are rubber of medium durometer hardness, such as is presently used for covering rubber rollers in printing presses. A durometer hardness of 30 is suitable.

The thickness of pad 45 may vary, a thickness of one-half inch being suitable. This pad picks up the ink from the cells 40a of inking cylinder 14. As stated, the film of ink so provided on pad 45 is uniform. A cylinder 46 removes surplus ink from ink transfer cylinder 15 after it has made contact with printing cylinder 16, and scraper blade 47 removes ink from cylinder 46 and deposits this ink in a sump 48 whence it flows by pipe 49 to the main ink reservoir (not shown) for recycling.

A round faced bar 50 is in light contact with pad 45, as shown, to eliminate the possibility of a screen effect being transferred to the printing plate. Also a pump 51 may be connected to the ink return lines 41a and 49 to pump surplus and excess ink back to the tank or reservoir.

Printing cylinder 16 has one or more printing plates 16a affixed to it to which ink is transferred by pad 45 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, gearing, vibrating inking rollers and the adjustable roller sockets in which they are mounted are eliminated. Power requirements are reduced. Keyboards for controlling the proper manual adjustment of the ink film column by column are eliminated. Vibration noise is lowered. Ink misting in the pressroom is reduced, thereby preserving the hearing and protecting the health of pressroom personnel. Furthermore, my circulating inking system provides the plate or printing cylinder with fresh clean ink for each impression.

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, all ink fed into the inking system must necessarily remain in the inking system until used up by the printing plates. My invention supplies a film of prime ink of uniform 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 constant and 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 reservoir (not shown) through the ink distribution system to the plate 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 firm letterpress printing plates or firm

wraparound printing plates.

I claim:

1. In a rotary newspaper printing press comprising a printing cylinder having a hard firm printing plate thereon and an impression cylinder cooperating with the printing cylinder to print on a web of paper passed between such cylinders, and also having circulating ink supply means fed from an ink reservoir, the improvement which comprises ink transfer means for transferring ink from said supply to said printing cylinder, said ink transfer means comprising a rotary inking cylinder having a surface supplied with ink by the ink supply means and formed with a multiplicity of small cells to receive the ink, and a rotary ink transfer cylinder between the inking cylinder and the printing cylinder and in rolling contact with both said cylinders, said ink transfer cylinder having the same working diameter as said printing and impression cylinders and having a resilient surface adapted to absorb ink from the cells of the inking cylinder and to transfer the ink as a uniform film in a direct line to the printing cylinder, and ink removal means comprising a rotatably mounted metal cylinder engaging said ink transfer cylinder over the length thereof and located circumferentially thereabout from said printing cylinder in the direction of rotation of the ink transfer cylinder and a scraper blade engaging said metal cylinder and directing surplus ink back to said ink reservoir for recycling.

2. The rotary printing press of claim 1 further defined by a doctor blade disposed against said inking cylinder toward said transfer cylinder from said ink supply means in the direction of rotation of said inking cylinder for removing excess ink from said inking cylinder, and a knife disposed closely adjacent said inking cylinder over the length thereof toward said ink supply means from said ink transfer cylinder in the direction of rotation of said inking cylinder and out of communication with said ink supply means for removing foreign particles from the inking cylinder to prevent deposition thereof in said ink supply.

3. The rotary printing press of claim 1 further defined by the axes of said inking cylinder, ink transfer cylinder and printing cylinder lying substantially in the same upright plane.

4. The rotary printing press of claim 1 further defined by a round face bar in light nonrotating contact with the ink transfer cylinder across the working surface thereof and located between the inking cylinder and the printing cylinder in the direction of rotation of the ink transfer cylinder.

5. The rotary printing press of claim 1 further defined by all rotatable cylinders being mounted in preloaded tapered roller bearings that are made adjustable to a working clearance that is nil.

6. The rotary printing press of claim 1 further defined by means establishing a continuous passage of ink into and out of the inking system, said outgoing ink leaving the inking system at two points and said ingoing ink entering the inking system at one point.

7. In a rotary newspaper printing press comprising a printing cylinder having at least one printing plate thereon and an impression cylinder having resilient press blankets extending thereabout to print on a web of newsprint passed between said cylinders, and also having ink supply means, the improvement which comprises ink transfer means for transferring ink from said supply to said printing cylinder, said ink transferring means comprising a rotary inking cylinder having a surface supplied with ink by the ink supply means and formed with a multiplicity of small shallow cells to receive the ink, a rotary ink transfer cylinder between the inking cylinder and the printing cylinder and in rolling contact with both of said cylinders, said ink transfer cylinder having a resilient surface completely encircling same adapted to absorb ink from the cells of the inking cylinder and to transfer the ink as a uniform film to the printing cylinder, and the ink supply means comprising a rotatable cylinder having a plurality of peripheral, longitudinal ink holding receptacles, each adapted when brought into registry with the inking cylinder, to supply ink to the inking cylinder, said rotatable cylinder being rotatable to bring any of said ink holding receptacles into such position of registry.