

May 29, 1945.

A. E. LUNDBYE

2,377,089

INTAGLIO PRINTING PRESS

Filed July 15, 1941

3 Sheets-Sheet 1

Fig. 1-

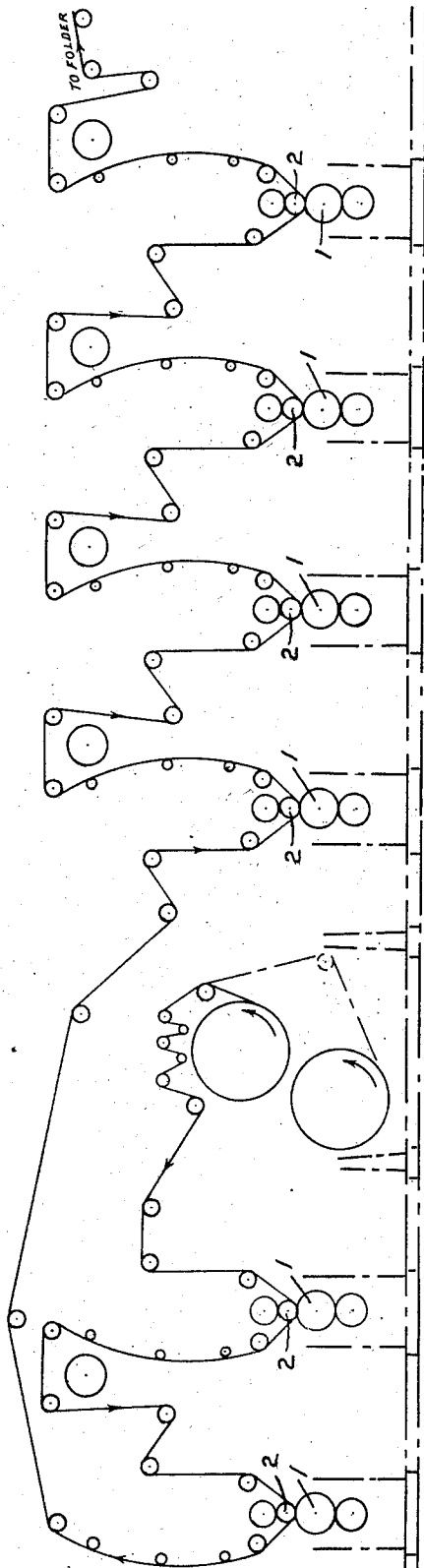


Fig. 7-

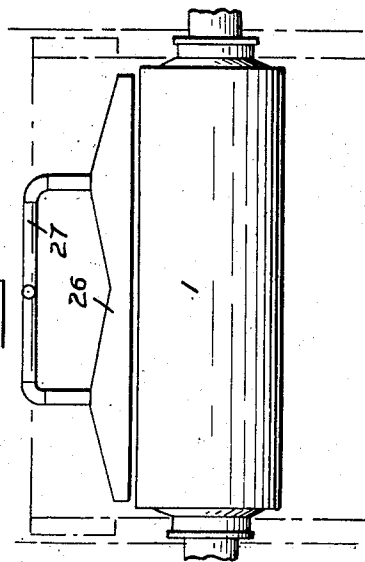
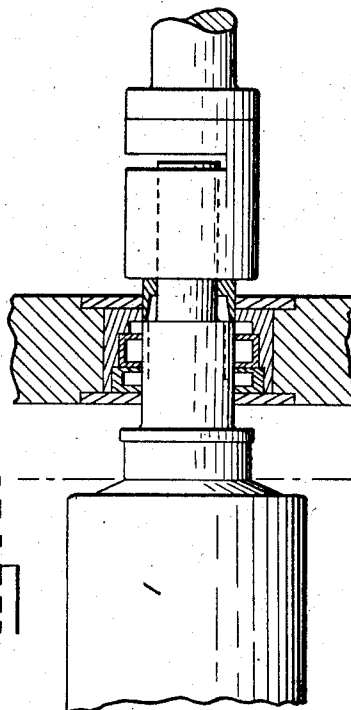


Fig. 5-



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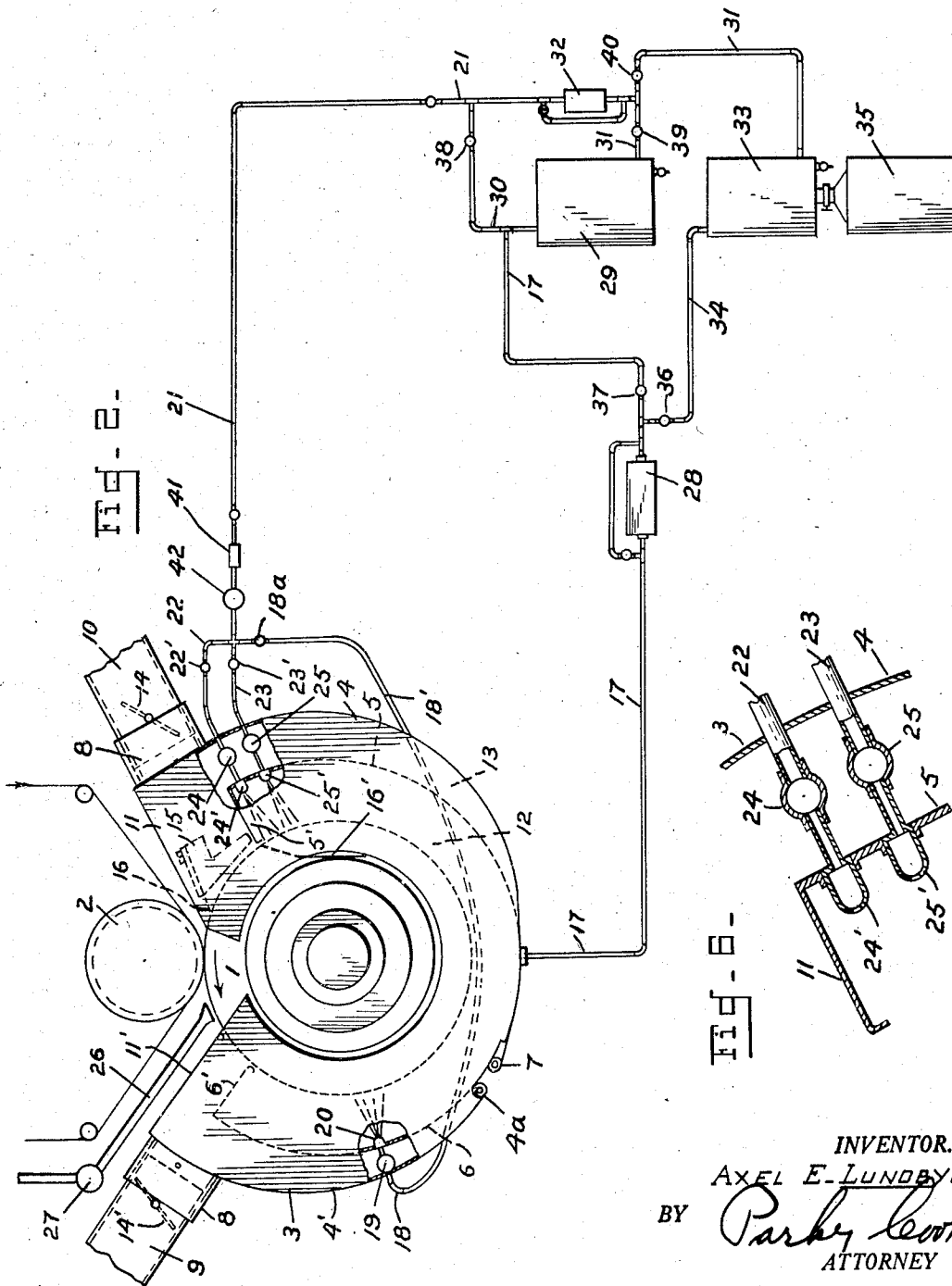
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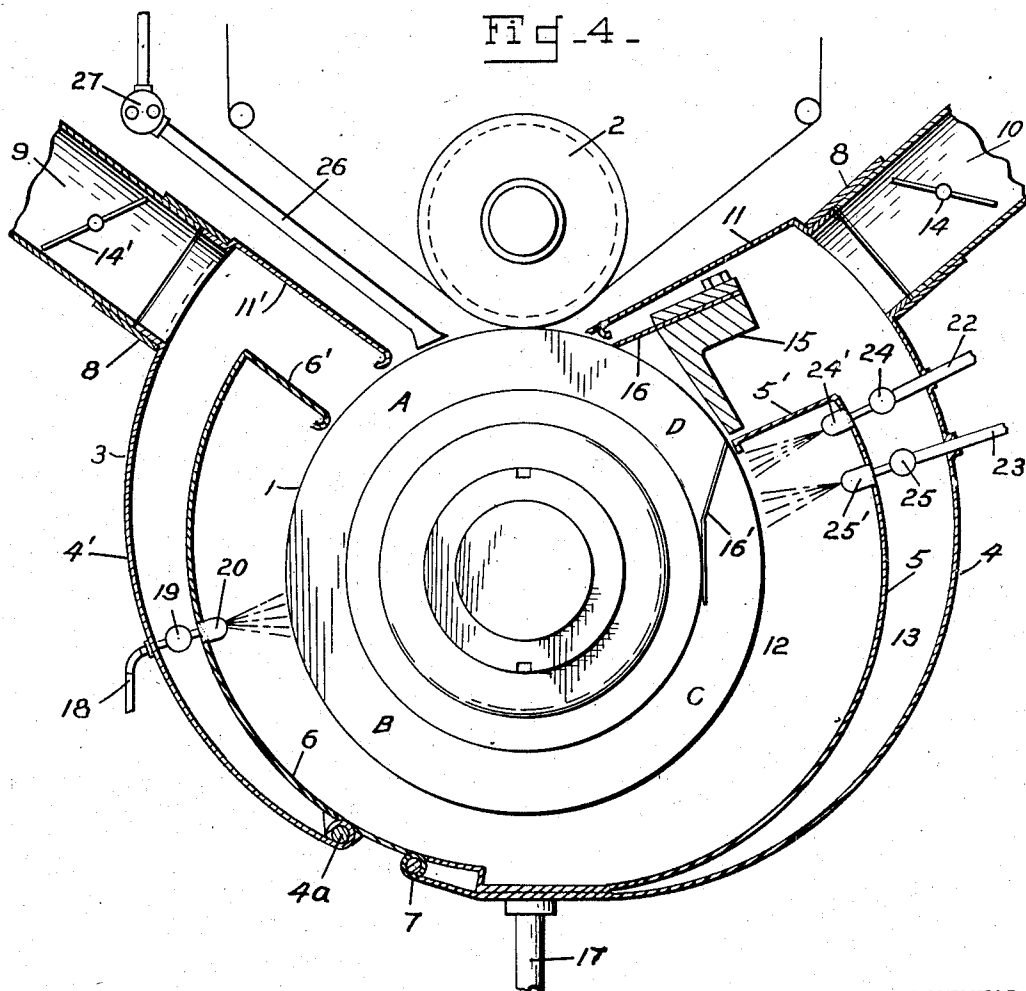
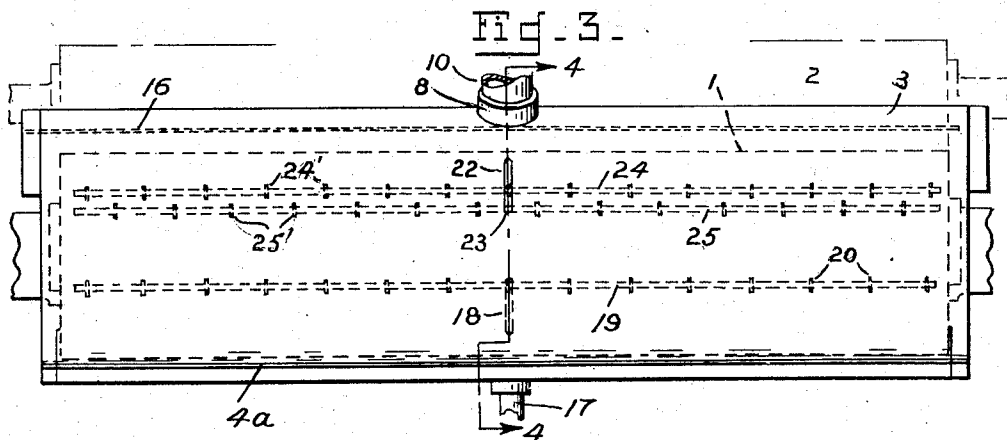
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INTAGLIO PRINTING PRESS

Filed July 15, 1941

3 Sheets-Sheet 3



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2,377,089

INTAGLIO PRINTING PRESS

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Application July 15, 1941, Serial No. 402,536

6 Claims. (Cl. 101—157)

My invention relates to new and useful improvements in rotary photogravure printing, and more particularly to a new and novel method of supplying ink to and for cleaning the cylinders of the press and to improved inking and cleaning mechanisms whereby the ink after a run of the press may be removed, so that a different color of ink may then be supplied without unduly slowing down the printing operations.

An object of the invention is to provide an inking apparatus that may be quickly installed in the conventional type of press and do away with the relatively heavy castings and casings that are now used to enclose or partially enclose the photogravure cylinders.

A further object of the invention is to provide an inking apparatus including a relatively light casing in which the various spray nozzles are situated; and to further provide a supply system of ink for the cylinder together with a cleaning system, which two systems are so combined that it is but the matter of a few moments to open or close certain valves, so that the circulation of ink will be stopped and a cleaning solvent forced through a part of the ink supply system to thus thoroughly clean the photogravure cylinders.

Still another object of the invention is to provide an ink spraying arrangement together with a vacuum means for removing the highly volatile vapors that will be present within the cylinder casings during the printing operation and also remove the vapors that will be present when the solvent is used for cleaning the cylinders.

Still another object of the invention is to provide an ink supply arrangement whereby the ink will be forced under pressure against the cylinder in one or several of the quadrants of the cylinder, the ink being under pressure, thus driving the air from the minute intagliated cavities on the surface of the printing cylinder to more thoroughly ink the same so as to transfer the ink from the cavities to the surface of the paper web.

Still another object of the invention is to provide a relatively light casing in which the ink supply nozzles are situated, as well as the doctor blade, which arrangement may be quickly installed in the conventional presses of to-day and to which inking arrangement may be readily connected the various pumps, ink tank, solvent tank, etc., so that the ink may be cut off, when desired, and the solvent run through the inking system, thus saving much loss of time over the arrangements now in use.

With these and other objects in view, the invention consists in certain new and novel features and combination of parts, as will be hereinafter more fully explained and pointed out in the claims.

Referring now to the drawings showing a preferred embodiment of the invention,

Fig. 1 is a diagrammatic view illustrative of a conventional rotary photogravure press showing the web of paper being subjected to the six printing cylinders;

Fig. 2 is a fragmentary end view of one of the printing cylinders, its casing and impression roller, parts being broken away for the sake of clearness; together with the novel ink supply and solvent supply system;

Fig. 3 is a longitudinal view of the printing cylinder and its casing, showing the spray headers extending axially of the printing cylinder, parts being omitted for the sake of clearness of illustration;

Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 3, showing the casing together with the ink supply nozzles and the vacuum conduits for drawing off the volatile gases, the cylinder being shown in elevation;

Fig. 5 is a fragmentary enlarged sectional view showing the conventional mounting of a printing cylinder;

Fig. 6 is an enlarged view of the headers and nozzles for supplying the ink and solvent to the printing cylinder; and

Fig. 7 is a reduced diagrammatic longitudinal view showing the hoods for drawing off surplus ink from the depressions in the cylinder after the paper has passed under the impression roller.

Referring now to the several views, and for the moment to Fig. 1, there is shown diagrammatically a rotogravure press with its six printing cylinders and the paper web shown as passing circuitously from the white paper rolls to the folder.

The invention relates primarily to the method of and apparatus for the inking mechanism for these several printing cylinders together with the ink supply means and the solvent supply means for washing the cylinders when it is desired to use a different color of ink or clean the cylinders.

Referring now to Figs. 2 and 4 for the moment, there is shown a printing cylinder 1, the impression roller 2, together with the longitudinally extending casing 3, that partially encircles the aforementioned printing cylinder 1. This casing 3 is preferably made from sheet metal rather than from a casting and can be substituted for the castings that are now in use on conventional rotogravure presses.

The casing consists of the outer wall or shell 4 and the inner shell 5, which walls converge and meet at the bottom of the casing. The outer wall extends farther up the cylinder than the inner wall to form a space on the one side of the cylinder for the doctor blade and holder (Fig. 4), later to be mentioned.

There is a door 6 in the one side of the casing, which extends throughout the length of the cyl-

inder, which door is pivoted, as at 7, and this door, in turn, carries an outer shell or wall 4', which is pivoted to the door, as at 4^a. These hinges must be seal-tight, because the surplus ink scraped from the cylinder might accumulate in the bottom of this casing until it passes out of the return line.

Extending about centrally from the opposite sides of the casing are the two conduits 9 and 10, which register with the outer walls of the casing, the one, 10, being located adjacent the doctor blade and the other, 9, being connected to the door shell 4' (left of Fig. 4).

Slip collars 8 are provided for these respective conduits where they connect with the casing, so that especially the door can be easily lowered when it is desired to swing the cylinder from its bearings.

The opposite upper surfaces of the outer casing adjacent the impression roller extend downwardly and inwardly, as at 11 and 11', to a plane just above the printing cylinder, so that the casing partly encloses the cylinder. Likewise, the inner wall 5 has its end 5' extending inwardly adjacent the cylinder while the door has its end 6' also extending inwardly, as may be seen from Fig. 4.

These two walls of the casing, in reality, form two separate chambers 12 and 13 coaxially of the cylinder. The surplus sprayed ink is more or less retained in the chamber 12 whereas the gases will escape and be confined in the outer chamber 13, from which they will be drawn by the conduits 9 and 10, which are connected to a vacuum pump (not shown). In these conduits 9 and 10 may be seen the butterfly valves or dampers 14 and 14' for regulating the amount of vacuum in the said casing.

The ends of the casing, of course, are closed and are provided with openings for the reception of the hubs of the cylinder, while small scraper blades 16' will be provided at the opposite hubs to contact with the cylinder to scrape any surplus ink off the ends thereof.

There may be seen the holder 15 for the doctor blade 16, which blade, of course, extends throughout the length of the cylinder to scrape the excess ink off the cylinder, the ink passing into the chamber 12 and out through the discharge pipe 17, which will be later mentioned. This doctor blade reciprocates, as is the usual arrangement in presses of this nature.

For sake of explanation, I have divided the printing cylinder into four quadrants A, B, C, and D, and it will be noticed that extending through the wall 4' and the door 6 of the casing, there is a pipe connection 18, which connects with a header 19, which extends longitudinally of the casing and from which, in turn, extend a plurality of spray nozzles 20 to supply the intagliated cavities of the cylinder with the ink.

As may be seen in Fig. 2, a supply pipe 18' extends from this pipe connection 18 over to the main ink supply line 21. From this line 21 extend the further feed pipes 22 and 23 to, in turn, supply the two headers 24 and 25, which, in turn, have a plurality of spray nozzles 24' and 25'. These headers also extend longitudinally throughout the length of the cylinder.

Thus, I have an ink supply for the cylinder in the quadrant B and two more diametrically opposite in the quadrant D. The ink is under relatively high pressure, so that the air will be driven from the intagliated cavities and so that

the ink, in turn, will properly fill the cavities to make the proper impression on the paper web.

Control valves 22' and 23' are provided for regulating the amount of flow to the headers 24 and 25, and likewise there is a control valve 18^a in the line 18' for controlling the amount of ink supplied to the header 19.

Now extending between the outer face 11' of the casing and the impression roller 2, there is the vacuum hood 26, which may be of the shape as shown in Fig. 7, which extends throughout the length of the cylinder and which will be connected to a vacuum pump line 27 to still further draw any surplus ink from the intagliated cavities on the surface of the printing cylinder.

Thus, there are means for supplying the ink under pressure to opposite quadrants of the cylinder; a doctor blade for scraping the cylinder; vacuum means for withdrawing the volatile gases from the hoods or casings about the cylinder; and an additional hood connected with a vacuum line for still further drawing surplus ink from the cylinder.

Having thus described the printing cylinder and its accompanying inking mechanism, reference is now made to Fig. 2 to show the manner in which the ink is supplied to the spraying nozzles and also to show the manner in which solvent can be supplied to the printing cylinder for cleaning the same with but little loss of time.

The discharge pipe 17 from the bottom of the casing 3 extends to a suction pump 28, and from this pump, the return pipe extends to the ink supply tank 29 through the pipe 30, which latter extends into the top of the tank 29 and also connects with the main feed line 21.

If this ink tank 29 is located in a plane below that of the casing 2 of the cylinder, the surplus ink may flow by gravity to the tank 29, but if located above the plane, the pump 28 will be provided.

Leading from the ink tank 29 is a portion of a feed line 31, which is coupled to the main feed pump 32 and also extends to a solvent tank 33.

The main feed pump 32, it will be seen, is connected to the main feed line 21, so that ink may be pumped from the tank 29 up to the main feed line 21 and then to the aforementioned headers 19, 24, and 25.

Extending from the return pipe 17 just beyond the suction pump (to the right) is a by-pass line 34, which leads to the top of the solvent tank 33. Below the solvent tank 33 is a further tank 35 for the ink settlings that are present in the solvent when passing through the system.

In the by-pass line 34, there may be seen the cut-off valve 36, and likewise in the return line 17, just past the pump 28, is another cut-off valve 37. There is also a safety valve 38 in the line 30 adjacent the feed line 21.

Leading from the ink tank 29 in the line 31, there is another cut-off valve 39 and one just past the pump coupling, as at 40. In the main pressure line 21 near the outside of the casing may be seen a strainer valve 41 and a pressure gauge 42.

Now presume that the press is running and the ink is to be circulated through the system to supply the printing cylinder. The valve 39 will be opened and the valve 40 in the line 31 to the solvent tank closed. The ink will then be drawn from the tank 29 and forced up the main feed

line 21. Thus, the ink will travel through the strainer and pressure valves to the two headers 24 and 25 and also through the line 18' to the header 19 and thus be sprayed on the printing cylinder.

The excess ink about the cylinder will be drawn or flow down the discharge pipe 17, through the pump 28 past the open valve 37, the valve 36 being closed, and return to the tank 29. Thus, the ink will continue to circulate as long as the main feed pump 32 is in operation. The various means for adding pigments and solvents, etc., are not shown, as they form no specific part of the present invention.

Now when it is desired to cut off the ink supply and pass the solvent through the system and out through the spray nozzles against the rotating cylinder, the valve 37 just beyond the pump 28 will be closed and the valve 36 in the line 34 will be opened, which line extends into the solvent tank 33. The valve 40 in the line 31 will be opened while the valve 39 leading from the ink tank will be closed and the solvent will be drawn up through the feed line 21 by the main feed pump 32 to the headers and sprayed over the cylinder. After washing the cylinder, it will flow back through the return line 17, through the return pipe 34, back to the solvent tank. The ink settlings, of course, will pass down from the solvent tank into the tank 35, which may be removed and emptied.

Thus, it will be seen that the ink may be circulated and re-circulated to supply the cylinder with the ink for printing, while on the other hand it is but the matter of a few moments to open and shut several valves to cut off the ink and bypass a solvent around the ink tank and into the headers for the spray nozzles, as just explained.

It is well understood that it is often desirable to use a different color of ink and it is essential that the old ink be entirely removed before supplying a different color of ink to the printing cylinder. With the arrangement above set forth, the usual time is considerably lessened and the cleaning done in a more efficient manner.

From the foregoing, it will be seen that I have provided an ink feed means including the casing and headers together with a vacuum means for withdrawing the volatile gases and a vacuum means for drawing off excess ink. Also, I have provided a method of and apparatus for quickly changing over from an ink feeding system to a solvent feeding system, so that the printing rollers may be cleaned with but little loss of time.

It will be understood that I have only explained and shown the inking and spraying arrangement as applied to one of the printing cylinders, but it will readily be understood that the feed and return lines will extend in the same manner to and from all of the cylinders to the solvent and ink tanks, as described.

It will further be understood that many slight changes and additions may be made without departing from the spirit and scope of the invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. Rotary intaglio printing mechanism comprising a rotary intaglio printing cylinder, means to apply a web thereto to receive a printed impression, a casing enclosing a major portion of the cylinder and extending about the periphery

thereof with first and second edges each adjacent the web applying means, means spaced apart within the casing for applying ink to the cylinder at sufficiently high velocity to drive the air from the intagliations in the cylinder, and means within the casing and at either end thereof for applying a vacuum to the cylinder.

2. Rotary intaglio printing mechanism comprising a rotary intaglio printing cylinder, means to apply a web thereto to receive a printed impression, a casing enclosing a major portion of the cylinder and extending about the periphery thereof with first and second edges each adjacent the web applying means, means within the casing for applying ink to the cylinder, a compartment at one end of the casing, doctor mechanism in the compartment, and means to subject the compartment to a vacuum.

3. Rotary intaglio printing mechanism comprising a rotary intaglio printing cylinder, means to apply a web thereto to receive a printed impression, a casing enclosing a major portion of the cylinder and extending about the periphery thereof with first and second edges each adjacent the web applying means, means within the casing for applying ink to the cylinder, a first compartment at one end of the casing, a second compartment at the other end of the casing, doctor mechanism in the first compartment, and means to subject the compartments to a vacuum.

4. Rotary intaglio printing mechanism comprising a rotary intaglio printing cylinder, means to apply a web thereto to receive a printed impression, a casing enclosing a major portion of the cylinder and extending about the periphery thereof with first and second edges each adjacent the web applying means, means spaced apart within the casing for applying ink forcefully to the cylinder, a first compartment at one end of the casing, a second compartment at the other end of the casing, doctor mechanism in the first compartment, and means to subject the compartments to a vacuum.

5. A method of printing comprising subjecting the surface of a rotating intaglio printing cylinder to a vacuum to remove surplus ink components therefrom, subsequently moving the surface into an enclosure and applying ink thereto forcefully to drive the air from the intagliations in said cylinder, thereafter moving the surface through the enclosure while laden with ink so applied, again forcefully applying ink to the surface to completely fill the intagliations therein, subjecting the ink-laden surface to a vacuum, wiping excess ink from the surface and immediately removing the same from the last-named vacuum, and applying a web to the cylinder to make a printed impression thereon.

6. A method of printing comprising moving the surface of a rotating intaglio printing cylinder into an enclosure and applying ink thereto forcefully to drive the air from the intagliations, thereafter moving the surface through the enclosure while laden with ink so applied, again forcefully applying ink to the surface to completely fill the intagliations therein, subjecting the ink-laden surface to a vacuum, wiping excess ink from the surface and immediately removing the same from the vacuum, and applying a web to the cylinder to make a printed impression thereon.

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