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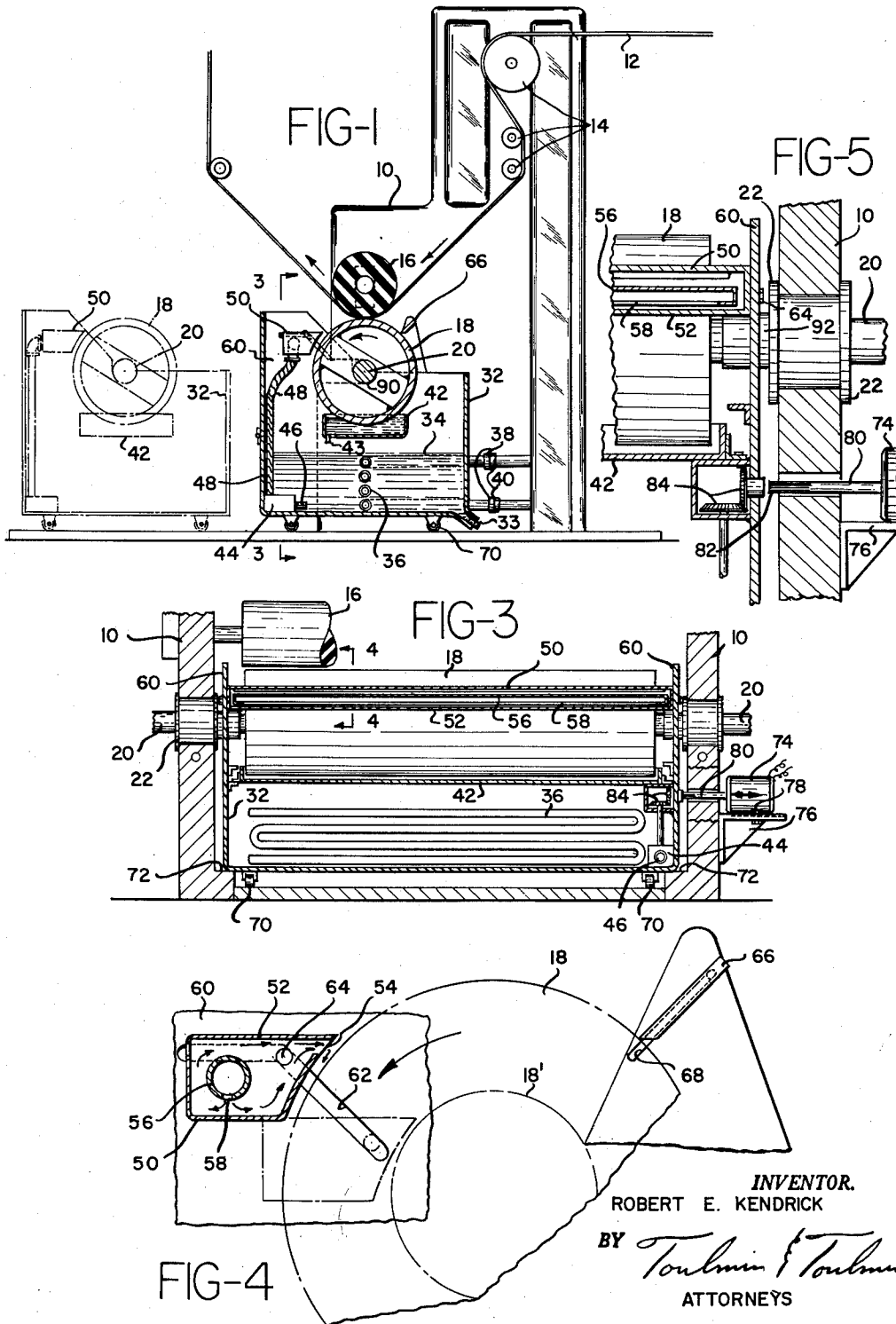
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PRINTING CYLINDER AND INK SUPPLY THEREFOR

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2 Sheets-Sheet 1



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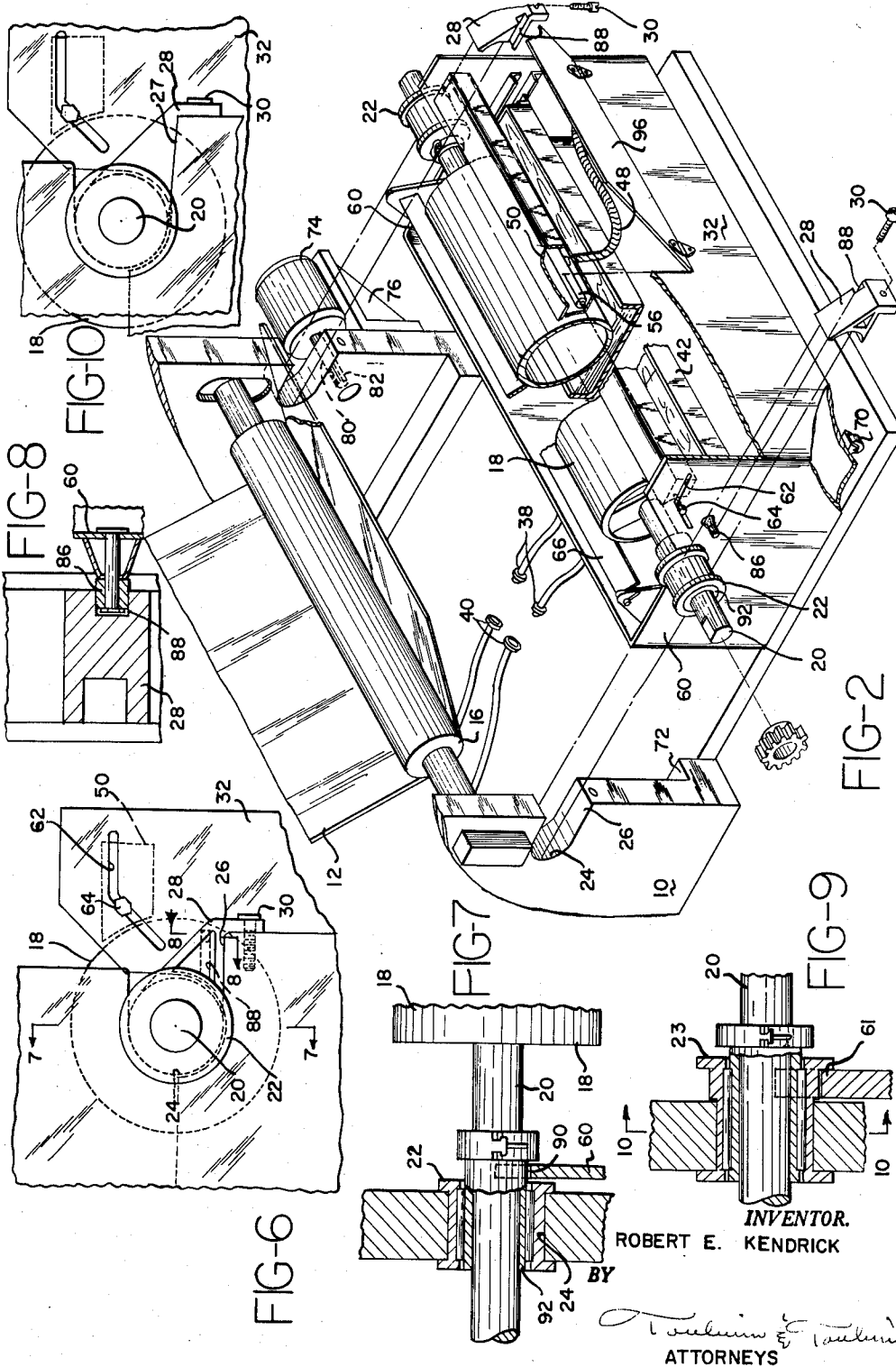
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3,094,066 PRINTING CYLINDER AND INK SUPPLY THEREFOR

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13 Claims. (Cl. 101-216)

This invention relates to printing presses and particularly to a cylinder press for printing webs and the like.

Cylinder presses are well known in the art and comprise arrangements for moving a web of material to be printed through the press and within the press the web is subjected to one or more printing operations by being brought into pressure engagement with a printing cylinder. The printing cylinder or cylinders is rotatably supported in the press frame and means are provided for supplying a printing fluid to the cylinder so that when it is brought into pressure engagement with the web, the desired printing is placed upon the web. The cylinders are detachable from the press frame so that the press can be set up for any particular printing job and so that at the end of a printing run, the cylinders can be removed therefrom relatively easily and the press set up for another run.

In the customary type press, the printing fluid is contained in a sump or container located at the side of the press frame and the printing fluids are pumped therefrom to a supply means associated with the printing cylinder so that a proper supply of the printing fluid to the cylinder can be had. These arrangements for supplying printing fluids or inks to the cylinders usually include a pan positioned beneath the cylinder which receives excess printing fluids or ink which run off from the cylinder and from which pan the printing fluid or ink is returned to the sump outside the press frame.

While press arrangements of this nature are satisfactory for carrying out the desired printing operations on webs, they are notably deficient to convert from one run to another. In an ordinary printing establishment having six and eight color presses, the down time due to change overs and the like can run as much as forty percent of the available time. This lost time, of course, represents a great loss of revenue from the press and ties up expensive skilled press attendants while the change over is being made.

With the foregoing in mind, it is a primary object of the present invention to provide an arrangement whereby the set up and change over time of a press of this nature can be substantially reduced, down to one-half of the time required at the present time or more.

A still further object of this invention is the provision of an arrangement whereby the portions of a press that are replaced when the press is changed over can be prepared ahead of time thus greatly reducing the amount of time to take one set of cylinders and sumps out of the press and put another set in.

In connection with the conventional type cylinder press, the amount of ink or printing fluids passing through the supply means at the cylinder is in excess of the amount of fluids that can be retained in the pan beneath the cylinder and, upon a power failure, it has been found that these pans will sometimes overflow leading to loss of ink and creating a clean off problem and, at the same time, creating a fire and explosion hazard while the ink solvents are of an explosive nature.

A still further object of the present invention, accordingly, is the provision of a sump and inking arrangement for the cylinder of a cylinder press which avoids the possibility that the ink will even overflow in the press frame thus avoiding the drawbacks referred to above.

A still further object of this invention is the provision of the combination with a printing cylinder of a sump

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that is inserted in the press frame and removed therefrom with the printing cylinder and which sump has adjustable means for supplying ink to the cylinder so that one and the same sump can be employed with cylinders of different size.

These and other objects and advantages will become more apparent upon reference to the following specification taken in connection with the accompanying drawings in which:

FIGURE 1 is a fragmentary more or less diagrammatic view showing one printing station in a cylinder type printing machine;

FIGURE 2 is a more or less perspective view of the printing station showing the cylinder and sump withdrawn from working position;

FIGURE 3 is a vertical sectional view indicated by line 3-3 on FIGURE 1;

FIGURE 4 is a fragmentary view drawn at enlarged scale and indicated by line 4-4 on FIGURE 3 showing the arrangement for supplying printing fluid or ink to the cylinder;

FIGURE 5 is a fragmentary view drawn at somewhat enlarged scale showing the manner in which the drive motor for the pump in the sump can be disengaged therefrom for removal and insertion of the sump;

FIGURE 6 is a view looking in at the end of the printing cylinder from the outside of the press frame showing the manner in which the printing cylinder is located and clamped in the press frame;

FIGURE 7 is a vertical sectional view indicated by line 7-7 on FIGURE 6 showing the manner in which the bearing on the cylinder shaft is arranged to rest on the side wall of the sump when the cylinder is removed from the press frame;

FIGURE 8 is a sectional view indicated by line 8-8 on FIGURE 6 showing a locating cam carried by the sump which is engageable by the bearing cap that holds the printing cylinder in the press frame whereby the sump is held in an accurately located position relative to the printing cylinder;

FIGURE 9 is a view similar to FIGURE 7 but shows the manner in which the side wall of the sump partially embraces the outer race of the bearing for the printing cylinder so that the sump and printing cylinder can be moved together into and out of the press frame; and

FIGURE 10 is a sectional view indicated by line 10-10 on FIGURE 9 showing how the press frame could be provided with an incline for engaging the outer race of the bearing on the cylinder shaft so as to pick up the weight of the cylinder from the sump when the sump and cylinder are inserted in the press frame.

Referring to the drawings somewhat more in detail, the frame of the press is indicated at 10 and the web to be printed is indicated at 12. This web is lead according to any conventional practice over idler rollers 14 and around a pressure roller 16 and then goes to the next printing station or to a drying station. Adjacent pressure roller 16 is the printing cylinder 18 supported rotatably in the press frame on shaft means 20.

As will be seen in FIGURE 2, each shaft means 20 of printing cylinder 18 has thereon an antifriction bearing comprising an outer race 22 that is receivable in a correspondingly shaped recess 24 at the rear end of a horizontal ledge 26 formed on press frame 10. When the printing cylinder is put in place in the press, a bearing cap 28 is bolted to the press frame as by cap screw 30 and with one of these bearing caps 28 at each end of the printing cylinder, the printing cylinder accurately and rotatably supported in the press frame but in such a manner that it can easily be detached from the press frame and removed therefrom for replacement by another cylinder.

According to the present invention, there is provided a sump 32 for receiving the printing fluid or ink 34 for being supplied to the printing cylinder 18. This sump, in distinct contrast to conventional practices, is located within the press frame and directly beneath the pertaining printing cylinder so that no overflow of ink can occur and so that any excess ink supplied to the printing cylinder can readily drop back to the sump. This sump may have a conventional heat exchange coil 36 therein having connectors 38 for connection with the other connectors 40 for a supply of fluid to the heat exchange element. Sump 32 has a drain fitting 33 of a conventional nature.

Located within the sump is a pan 42 into which the lowest part of the printing cylinder dips. This pan normally receives the excess printing fluid supplied to the cylinder and from the pan the ink drops from drain 43 back into the sump.

The sump is also provided with a pump 44 with an inlet 46 and an outlet 48. The outlet leads upwardly to an applicator 50 which, as will be seen in FIGURE 4, comprises a closed compartment 52 having an arcuate side adjacent cylinder 18 that is provided with a slot 54 extending the length of the printing cylinder. The outlet 48 from pump 44 is in the form of a flexible conduit and connects with a conduit 56 extending lengthwise of compartment 52 and provided with openings or a slot 58 extending along the bottom thereof.

It will be evident that printing ink or printing fluids can be supplied from pump 44 through flexible conduit 48 to conduit 56 and flood compartment 52 so that the printing fluids or ink will be supplied to the surface of the cylinder. The arrangement of conduit 56 insures that the ink supply will be properly distributed throughout the compartment and will insure a uniform supply of ink to the surface of the printing cylinder.

The applicator is mounted between the spaced side walls 60 of the sump which are provided with slots 62 to receive the bolts 64 by means of which the applicator is secured to the sump side walls. Slot 62 comprises one portion extending substantially radially of the printing cylinder and this is provided to permit the applicator to be adjusted in the sump to bring it into proper relation with different sizes of printing cylinders. In FIGURE 4, for example, the applicator is shown adjusted relative to about the smallest and about the largest cylinders 18' and 18, respectively that would be employed.

Slot 62 also has a horizontal upper portion and this permits the applicator to be retracted backwardly from the printing cylinder so the cylinder can be readily removed from the sump without any interference from the applicator.

As is customary, there is also a doctor blade 66 positioned adjacent the cylinder at a point just ahead of where the cylinder engages the web being printed and this doctor blade controls the quantity of ink carried by the cylinder to the web. The doctor blade 66 is also adjustably mounted between the side walls 60 of the sump as by means of the slots 68 provided in the said side walls.

According to the present invention, the sump is provided with rollers 70 so that it can be rolled readily from working position in the press frame to retracted position as indicated in dot-dash outline in FIGURE 1. When the sump is in working position, the bottom wall at the sides of the sump engage the flat surfaces 72 in the press frame and this serves to support and locate the sump in the press frame and to prevent movement thereof on account of vibration or on account of accident.

This is illustrated in FIGURE 3 which also shows that the drive motor 74 for pump 44 is mounted on a platform 76 carried by the frame 10 of the press. Bolt means 78 attach the motor to the platform and permit the motor to be moved inwardly and outwardly so that the drive shaft 80 of the motor can have its splined end part 82 disengaged from bevel gearing 84 when the sump is to be removed from the press frame. When the sump is placed in the press frame and is located therein, inward move-

ment of motor 74 will again connect drive shaft 80 therewith the bevel gearing so that a driving connection with the pump is again had.

As will be seen in FIGURES 2, 6, and 8, the sump is provided with a locating cam or roller 86 adapted for engagement by a notch 88 in the pertaining bearing cap 28 so that after the cylinder is in place in the press frame and the sump is correctly located relatively thereto, the placing of the bearing caps in position to hold the cylinder in the press frame will also hold and locate the sump in the press frame.

The side walls 60 of the sump are arranged with an arcuate portion 90 that engages the inner race 92 of the antifriction bearing on the shaft of the printing cylinder. When the cylinder is in the press frame, the inner race can turn freely relative to the side walls of the container, but upon releasing the printing cylinder from the press frame, and moving the cylinder outwardly, the weight of the cylinder is transferred to the side walls 60 of the sump and the cylinder is thereafter carried by the sump into and out of the press frame.

This arrangement permits the removing from the press frame of the cylinder and the entire inking unit pertaining thereto so that in a single operation, the previous setup at each printing station is removed in its entirety.

Similarly, the described arrangement permits a printing cylinder which is to be placed in the press to be made up ahead of time with the sump pertaining thereto and the ink supply so that immediately upon removing one cylinder and its sump, the replacement cylinder and its sump can be put in place in the press and the press will be ready for operation and adjustment immediately.

It will be appreciated that the foregoing operation can readily be carried out with the lighter printing cylinders without any other devices being employed in the operation. For extremely heavy cylinders, however, it would be preferable to employ the conventional truck arrangement which receives the weight of the printing cylinder from the press frame. In this case, the sump would not be required to support the weight of the printing cylinder but would nevertheless be inserted into the press frame and removed therefrom together with the press cylinder.

Substantially the same construction would be employed with the side walls of the container at least partially embracing the shaft means for the printing cylinder or the bearings thereon so that the sump would move with the printing cylinder. The conventional trucks employed at the present time for removing the printing cylinders from the press frame would be satisfactory in connection with the practice of the present invention upon removal of any cross braces in the trucks that would interfere with the movement of the sump into the truck simultaneously with movement of the cylinder from the press frame to the truck.

It is also feasible that with heavy cylinders, the side walls of the sump could be made much heavier, as indicated at 61 in FIGURE 9, so that the sump would be capable of supporting the weight of the printing cylinder. This view also shows how the outer race 23 of the antifriction bearing on the cylinder shaft could be extended so as to become that portion engaged by the side wall of the sump.

In cases where relatively heavy cylinders were employed, it might be desirable to provide a slight incline as at 27 in the press frame so that the inserting of the sump and the printing cylinder in the press frame would cause the weight of the cylinder to be transferred to the press frame so that the cylinder could be accurately located in the press frame.

The sump according to my invention could also comprise an access door 96 hinged to one wall of the sump which could be tilted back to gain access to the sump for cleaning purposes or to supply ink or the like thereto.

From the foregoing, it will be evident that by the prac-

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tice of my invention, printing cylinders and sumps pertaining thereto could be made up ahead of time and inserted in a press frame in one single easily carried out and relatively rapid operation thus greatly reducing the setup time for the press. Similarly, when it came time to tear down a press set up, the printing cylinders and their pertaining sumps could just as readily and just as rapidly be removed from the press frame. This would greatly reduce press down time and would also tie up expensive press operators for the shortest length of time and permit the cylinders and sumps to be assembled and prepared by lower cost labor and during the time that the press was operating on another run.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

I claim:

1. In a printing press; a press frame, a printing cylinder rotatably mounted in the press frame and detachable from the press frame, a sump for printing fluids in the frame beneath the cylinder, means in the sump including a pump for conveying printing fluids to the cylinder, said cylinder having shaft means by which it is supported in the press frame, and said sump having side walls extending upwardly to the region of said shaft means, said cylinder and sump being removable from the press frame substantially as a unit and said side walls being adapted for receiving the shaft means on the cylinder for supporting the cylinder when it is removed from the press frame, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

2. In a printing press; a press frame, a printing cylinder, shaft means on the printing cylinder detachably connected to the frame to support the cylinder rotatably in the frame, a sump in the press frame beneath the cylinder for containing printing fluids, a pump in the sump, an ink applicator carried by the sump adjacent the cylinder and connected with the outlet of the pump so the pump can supply printing fluids to the applicator and the applicator can supply the printing fluid to the cylinder, said sump having side walls extending upwardly to the region of said shaft means and said side walls being adapted for engaging said shaft means and supporting the cylinder when the cylinder and sump are withdrawn from the press frame, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

3. In a printing press; a press frame, a printing cylinder, shaft means extending from opposite ends of said cylinder engageable with the press frame for rotatably supporting the cylinder in the press frame, a sump in the press frame beneath the cylinder, an applicator adjustably carried by the sump adjacent the cylinder, a pump in the sump having its outlet connected to said applicator operable for pumping printing fluids from the sump to the applicator for the supply of the printing fluids to the cylinder, said sump having side walls extending upwardly to the region of said shaft means and at least partially embracing said shaft means, and said cylinder and sump being retractable from the press frame simultaneously and in the same direction and said side walls supporting the cylinder by engagement with said shaft means when the cylinder and sump are withdrawn from the press frame, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

4. In a printing press; a press frame, a printing cylinder, shaft means extending from opposite ends of said cylinder engageable with the press frame for rotatably supporting the cylinder in the press frame, a sump in the press frame beneath the cylinder, an applicator adjust-

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ably carried by the sump adjacent the cylinder, a pump in the sump having its outlet connected to said applicator operable for pumping printing fluids from the sump to the applicator for the supply of the printing fluids to the cylinder, said sump having side walls extending upwardly to the region of said shaft means and at least partially embracing said shaft means, and said cylinder and sump being retractable from the press frame simultaneously and in the same direction and said side walls supporting the cylinder by engagement with said shaft means when the cylinder and sump are withdrawn from the press frame, said applicator being adjustable radially of the cylinder to adapt the sump and applicator to cylinders of different size and said applicator also being retractable away from the cylinder to provide clearance for removing the cylinder from the sump, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

5. In a printing press; a press frame, a printing cylinder, shaft means extending from opposite ends of the cylinder for supporting the cylinder in the press frame, bearings on the shaft means having outer races adapted for engagement with the press frame, a sump beneath the cylinder, said sump having side walls extending upwardly to the region of said shaft means and at least partially embracing the shaft means, an ink applicator adjustably carried between said side walls, a pump in the sump having its outlet connected with said applicator for supplying ink from the sump to the applicator, bearing caps detachably connected with said frame engageable with the said outer races for retaining the cylinder in place in the press frame, and means carried by the sump engageable with said bearing caps for locating the sump in the frame, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

6. In a printing press; a press frame, a printing cylinder, shaft means extending from opposite ends of the cylinder for supporting the cylinder in the press frame, bearings on the shaft means having outer races adapted for engagement with the press frame, a sump beneath the cylinder, said sump having side walls extending upwardly to the region of said shaft means and at least partially embracing the shaft means, an ink applicator adjustably carried between said side walls, a pump in the sump having its outlet connected with said applicator for supplying ink from the sump to the applicator, bearing caps detachably connected with said frame engageable with the said outer races for retaining the cylinder in place in the press frame, and means carried by the sump engageable with said bearing caps for locating the sump in the frame, said side walls of the sump engaging the said outer races of the bearings on the shaft means when the sump and cylinder are withdrawn from the press frame to support the cylinder on the sump, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

7. In a printing press; a press frame, a printing cylinder, shaft means extending from opposite ends of the cylinder for supporting the cylinder in the press frame, bearings on the shaft means having outer races adapted for engagement with the press frame, a sump beneath the cylinder, said sump having side walls extending upwardly to the region of said shaft means and at least partially embracing the shaft means, an ink applicator adjustably carried between said side walls, a pump in the sump having its outlet connected with said applicator for supplying ink from the sump to the applicator, bearing caps detachably connected with said frame engageable with the said outer races for retaining the cylinder in place in the press frame, and means carried by the sump engageable with said bearing caps for locating the sump in the frame, said pump having drive means including a splined connector extending laterally through one of the side walls

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of the sump, and their being a drive motor movably carried by the press frame adapted for engagement and disengagement with said splined connector, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

8. The combination, for use in a printing press, of a sump adapted for being placed in the press frame beneath a printing cylinder, said sump having side walls extending upwardly to about the level which the printing cylinder occupies in the press frame, an ink applicator adjustably carried by the side walls, a pump in the sump, a flexible connection from the pump outlet to said applicator, a doctor blade also adjustably carried between said side walls, and said side walls being adapted for receiving and supporting a printing cylinder located between said applicator and said doctor blade, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

9. The combination, for use in a printing press, of a sump adapted for being placed in the press frame beneath a printing cylinder, said sump having side walls extending upwardly to about the level which the printing cylinder occupies in the press frame, an ink applicator adjustably carried by the side walls, a pump in the sump, a flexible connection from the pump outlet to said applicator, a doctor blade also adjustably carried between said side walls, and said side walls being adapted for receiving and supporting a printing cylinder located between said applicator and said doctor blade, said side walls having recesses therein for receiving shaft means extending from opposite ends of the cylinder to support the cylinder on the side walls without longitudinal movement, said sump having rollers moveably supporting the sump for movement in a direction at right angles to the axis of rotation of said cylinder.

10. The combination, for use in a printing press, of a sump adapted for being placed in the press frame beneath a printing cylinder, said sump having side walls extending upwardly to about the level which the printing cylinder occupies in the press frame, an ink applicator adjustably carried by the side walls, a pump in the sump, a flexible connection from the pump outlet to said applicator, a doctor blade also adjustably carried between said side walls, and said side walls being adapted for receiving and supporting a printing cylinder located between said applicator and said doctor blade, said side walls having recesses therein for receiving shaft means extending from opposite ends of the cylinder to support the cylinder on the side walls without longitudinal movement, said sump having supporting roller means to permit it to be moved readily into and out of the press frame, and said sump also having means co-operating with the elements of the press frame for locating the sump in the press frame in a direction at right angles to the axis of rotation of the cylinder.

11. The combination, for use in a printing press, of a sump adapted for being placed in the press frame beneath a printing cylinder, said sump having side walls extending upwardly to about the level which the printing cylinder occupies in the press frame, an ink applicator adjustably carried by the side walls, a pump in the sump, a flexible connection from the pump outlet to said applicator, a doctor blade also adjustably carried between said side

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walls, and said side walls being adapted for receiving and supporting a printing cylinder located between said applicator and said doctor blade, said applicator comprising a housing extending in the longitudinal direction of the cylinder and having an arcuate wall on the cylinder side which is closely adjacent a cylinder carried in the sump, aperture means in said arcuate wall near the top for the direct supply of ink to the cylinder, a conduit extending axially through said housing and having aperture means along the bottom thereof, and the said flexible connection leading from the pump outlet being connected to said conduit.

12. The combination, for use in a printing press, of a sump adapted for being placed in the press frame beneath a printing cylinder, said sump having side walls extending upwardly to about the level which the printing cylinder occupies in the press frame, an ink applicator adjustably carried by the side walls, a pump in the sump, a flexible connection from the pump outlet to said applicator, a doctor blade also adjustably carried between said side walls, and said side walls being adapted for receiving and supporting a printing cylinder located between said applicator and said doctor blade, said applicator comprising a housing extending in the longitudinal direction of the cylinder and having an arcuate wall on the cylinder side which is closely adjacent a cylinder carried in the sump, aperture means in said arcuate wall near the top for the direct supply of ink to the cylinder, a conduit extending axially through said housing and having aperture means along the bottom thereof, and the said flexible connection leading from the pump outlet being connected to said conduit in about the middle thereof.

13. The combination, for use in a printing press, of a sump adapted for being placed in the press frame beneath a printing cylinder, said sump having side walls extending upwardly to about the level which the printing cylinder occupies in the press frame, an ink applicator adjustably carried by the side walls, a pump in the sump, a flexible connection from the pump outlet to said applicator, a doctor blade also adjustably carried between said side walls, and said side walls being adapted for receiving and supporting a printing cylinder located between said applicator and said doctor blade, said applicator comprising a housing extending in the longitudinal direction of the cylinder and having an arcuate wall on the cylinder side which is closely adjacent a cylinder carried in the sump, aperture means in said arcuate wall near the top for the direct supply of ink to the cylinder, a conduit extending axially through said housing and having aperture means along the bottom thereof, and the said flexible connection leading from the pump outlet being connected to said conduit in about the middle thereof, the said side walls being slotted generally radially of the axis of the cylinder and said ink applicator being connected with the said side walls by means of said slots for adjustment of the applicator toward and away from the cylinder.

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