April 29, 1958 L. F. MITCHELL ET AL 2,832,290

CLEANER FOR ROTARY PRINTING MACHINES

Filed Feb. 7, 1955 4 Sheets-Sheet 1

FIG.-8

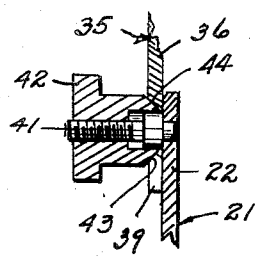
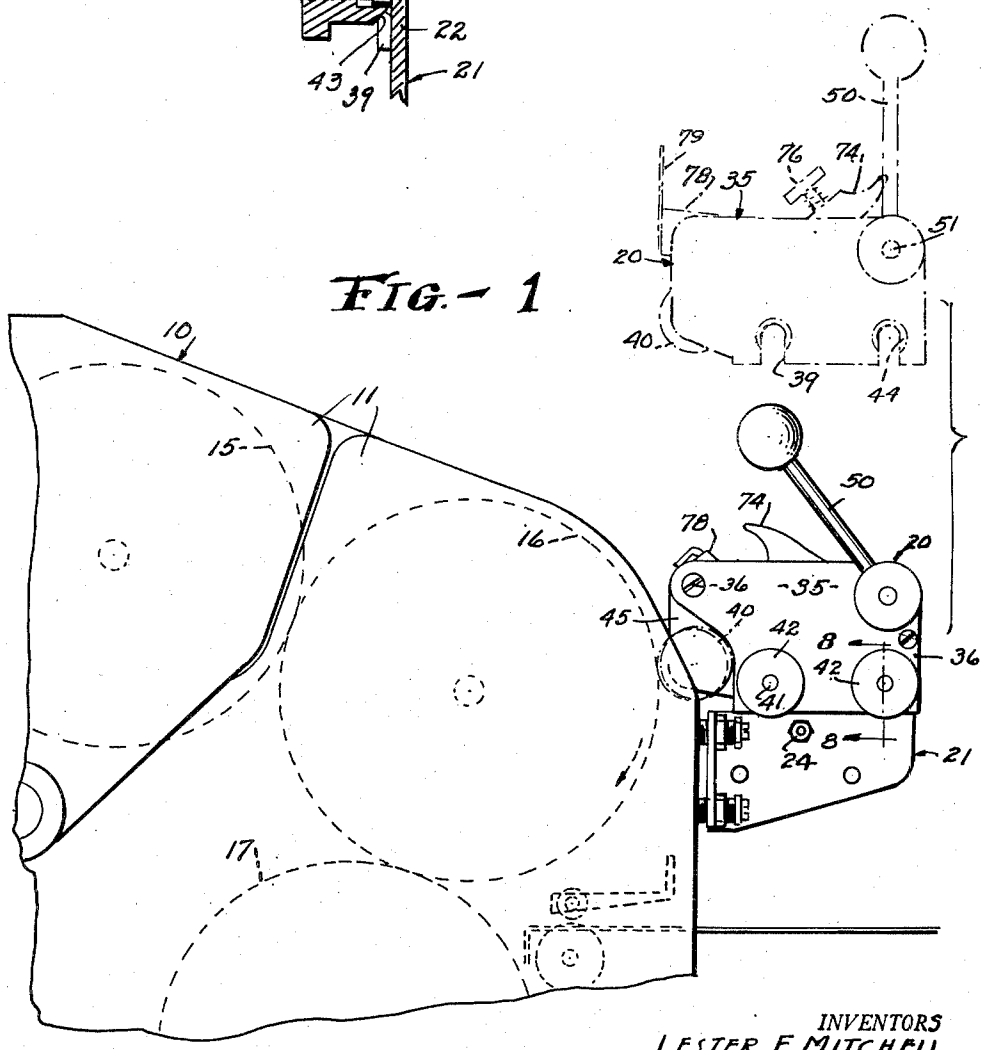


FIG.-1



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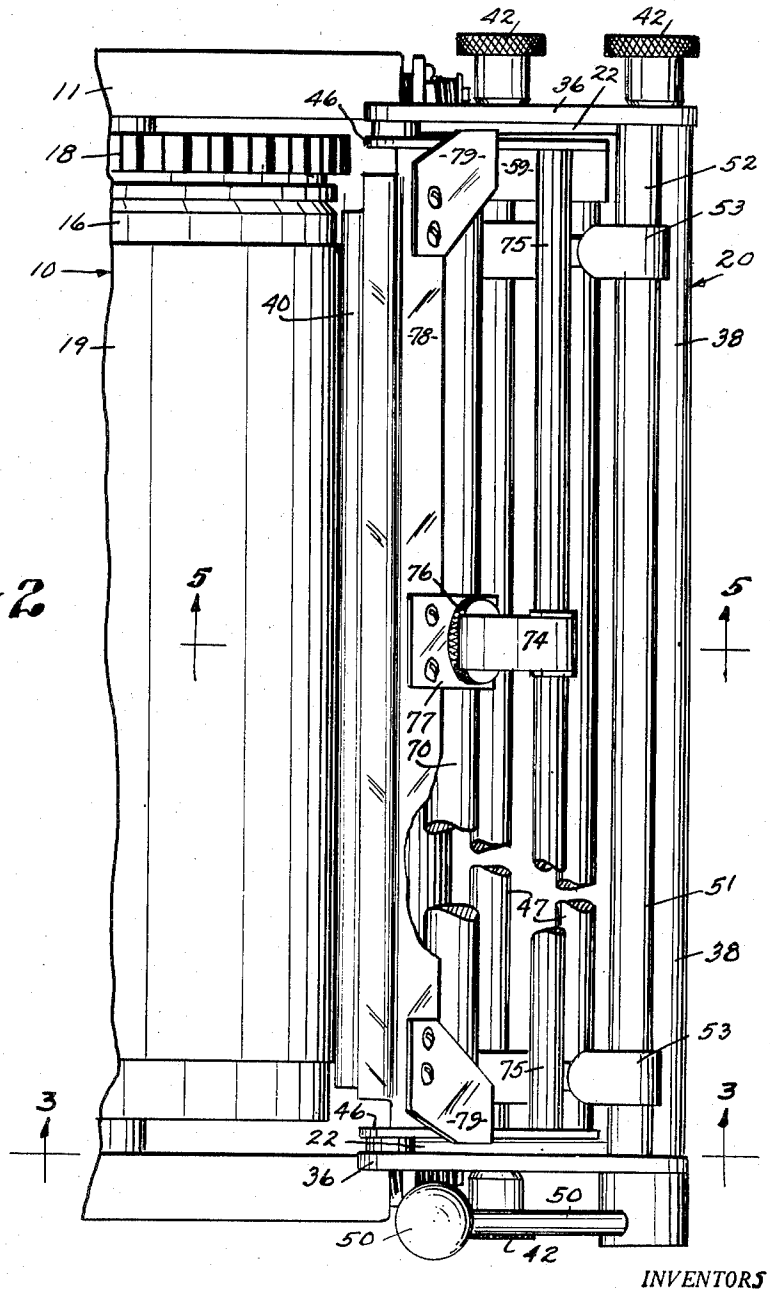

FIG. 2

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Filed Feb. 7, 1955 4 Sheets-Sheet 3

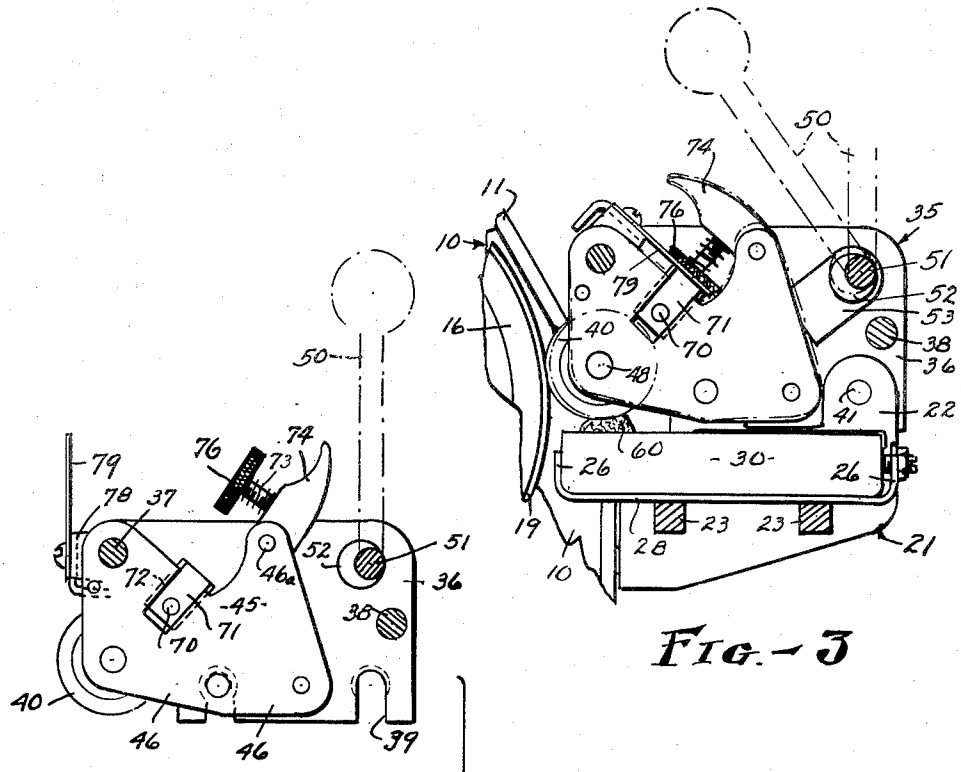

FIG. - 3

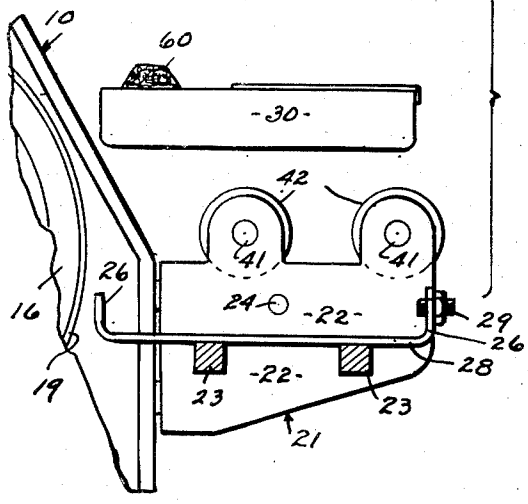

FIG. - 4

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FIG.-5

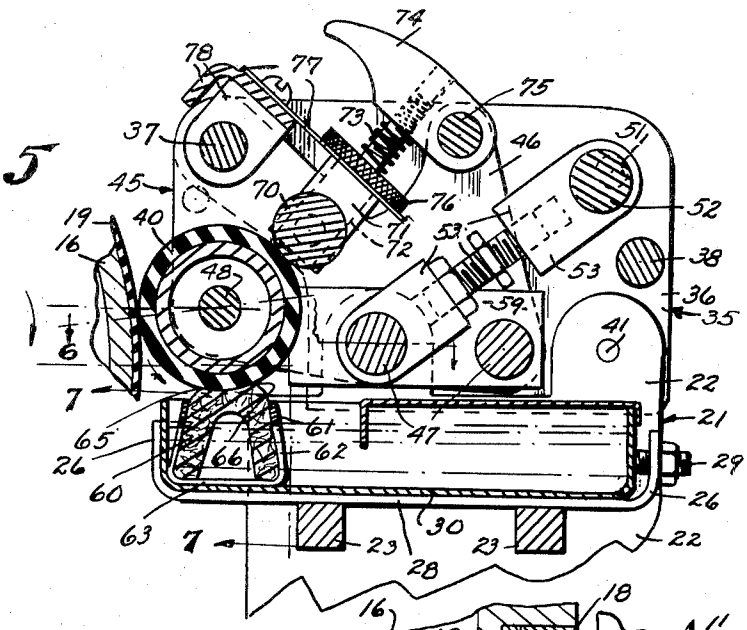


FIG.-6

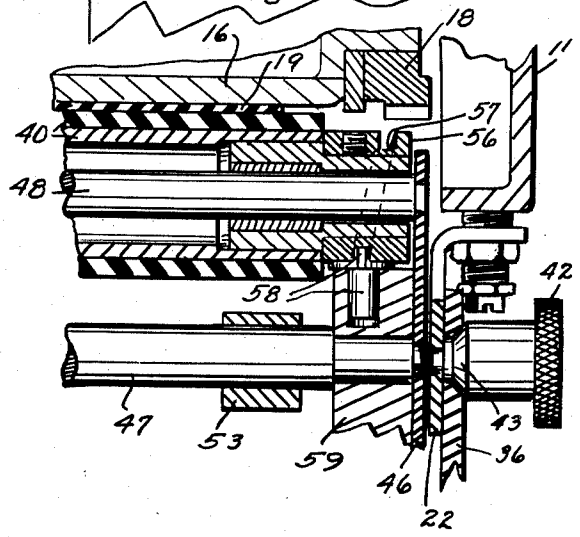
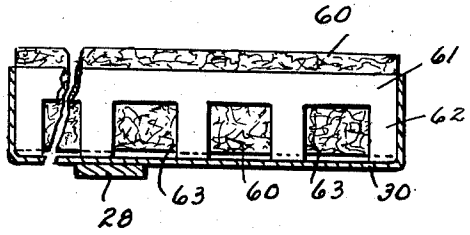


FIG.-7



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CLEANER FOR ROTARY PRINTING MACHINES

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Application February 7, 1955, Serial No. 486,478

8 Claims. (Cl. 101—425)

This invention is concerned with improvements in or relating to a device for cleaning the surface of a roll or cylinder of a rotary printing or duplicating machine, and particularly for cleaning the offset or transfer surface of a rotary planographic or lithographic type duplicating machine. These therefore are the general objects of the present invention.

Many rotary printing or duplicating machines are being used in industrial and similar establishments to make a relatively small number of imprints from each of a series of master printing plates, for the production of orders, invoices, and various other business forms. For such purpose use is made of relatively thin flexible printing plates, often made of paper having a pre-formed image thereon which is completed by a typing operation through a special inked ribbon. These printing plates are removably mounted on the master drum or cylinder of the printing or duplicating machine; supplied with an ink repellent, and ink in the usual manner; and the inked image transferred by rolling contact to an offset or transfer surface of a transfer drum. This ink image is then transferred to a work sheet which is passed between the transfer cylinder and a suitable impression drum or roller. When the desired number of imprints have been made from one printing plate, it is removed from the master cylinder, a new plate substituted therefor and another set of imprints made. However, before imprints can be made from the second master printing plate, the offset or transfer surface of the duplicating machine must be cleaned to remove any traces of ink which were applied thereto by the previous printing plate. Heretofore, it has been the general practice for the operator to apply an ink solvent to the offset surface with a saturated sponge or rag, following which the operator wiped the surface with a "clean" cloth to complete the cleaning operation. Such methods of cleaning the offset surfaces are slow, inefficient, and are dangerous to the health and safety of the operator as the ink solvents are inflammable. After one cleaning operation has been accomplished, the cloth used for the final wiping is seldom if ever clean, indeed its condition is usually such that traces of ink remain on the offset surface. Accordingly, it has been the practice of most operations to pass several cleaning sheets through the machine to remove ink remaining thereon after the "cleaning" operation above described. The cleaning sheets are discarded. Such operations are time consuming and costly as the number of "cleaning sheets" used may exceed the number of sheets imprinted from the printing plates. Mechanical cleaning devices have been proposed, tried, and found wanting. For the most part such devices have been slow, inefficient, and the results of their use have been far from satisfactory. At the present time the cleaning is accomplished by hand in the old dangerous and inefficient manner. Accordingly an object of the present invention is to provide a cleaning mechanism which will efficiently and economically clean the offset or transfer surfaces of the

cylinders of lithographic or similar printing or duplicating machines. Further object of the present invention is the provision of a cleaning device which may be attached to existing machines without difficulty.

Other objects and advantages of this invention will become more apparent from the following description of an embodiment of the invention which is illustrated in the accompanying drawings in which:

Fig. 1 is a side view of the improved cleaner attached to a rotary printing machine of the lithographic or planographic type, portions only of the printing machine being illustrated;

Fig. 2 is a plan view of the improved cleaner as attached to the printing or duplicating machine, the scale being somewhat larger than that of Fig. 1;

Fig. 3 is a vertical transverse section through the cleaner, the plane of the section being indicated by the lines 3—3 of Fig. 2;

Fig. 4 is a sectional view, similar to Fig. 3, but illustrating certain units of the cleaner separated from the base section thereof to facilitate cleansing of the cleaner itself;

Fig. 5 is a vertical transverse section of the cleaner on a scale larger than that of either Figs. 2 to 4, the plane of the section being indicated by the lines 5—5 of Fig. 2;

Figs. 6 and 7 are sectional details, the planes of which are indicated by the correspondingly numbered lines of Fig. 5; and

Fig. 8 is a sectional detail, the plane of which is indicated by the line 8—8 of Fig. 1.

In the drawings an offset printing machine of the planographic or lithographic type is generally indicated at **10** as comprising a pair of vertically extending side plates **11** spaced apart by suitable cross frame members, not shown. The printing machine includes a master cylinder **15**, an offset or transfer cylinder **16**, and an impression cylinder or roller **17**, all of which are rotatably journaled between the frame plates **10** and are driven from a suitable source of power through gearing including the gear **18**, shown in Fig. 2 as secured to the offset cylinder **16**. Suitable ink repellent and ink applicators, not shown, are provided to ink the image of a printing plate **12** encircling the master cylinder **15**. The inked image is transferred by rolling contact from the plate to the offset surface of the transfer cylinder **16** and from there to the work sheet in the usual manner.

This invention is not concerned with the particular details of the printing or duplicating machine, accordingly, the brief description above given should be found sufficient. However, it may be pointed out that the transfer surface of such a machine is generally provided by a relatively thin flexible blanket made of sheet rubber or other similar material. Such an offset or transfer blanket is indicated at **19** in the drawings and is secured in position on the offset cylinder in any well known manner. The offset cylinder **16** generally is positioned so that its surface is accessible for cleaning, either from the front or the rear of the machine. This is true in the machine illustrated.

The cleaner, with which the present invention is particularly concerned, is generally indicated at **20** and comprises a base frame unit **21** including a pair of end plates **22** spaced apart by suitable cross frame members such as the bars **23**. The end plates **22** are each flanged outward to provide vertically extending flanges **26** which receive suitable bolts **27** for readily attaching and aligning the cleaner to the frame plates **10** of the rotary printing or duplicating machine. The particular form of these flanges may be varied to suit various types or models of printing machines, or they may be identical for all machines, in which case a suitable adaptor may be interposed between the flange **26** of the cleaner and

the machine frame. The bars 23 of the frame unit 21 carry a pair of brackets 28 which removably support an elongated receptacle or pan 30. The pan 30 is adapted to contain a supply of cleaning fluid such as an ink solvent and is restrained against lateral movement by a pair of adjustable set screws 24 carried by respective end plates 22. Similar set screws 29, carried by upturned ends 31 of the brackets 28, clamp the receptacle 30 against upturned ends 32 at the opposite ends of the brackets.

A main frame unit 35 is removably mounted on the base frame 21 and carries a cleaner roll 40. The main frame 35 includes a pair of end plates 36 which are spaced apart by cross frame members, such as the rods 37 and 38. The main frame plates 36 have slots 39 extending upwardly from their lower edges which embrace respective pins 41, the inner ends of which are secured to respective end plates 22 of the base frame unit 21 and project outward therefrom. When the main frame is in position, the upper ends of the slots 39 rest on the pins 41 and the side plates 35 thereof lay outside the corresponding plates 22 of the base frame 21.

The main frame is removably retained in position on the base frame 21 by knurled nuts 42 which threadingly coact with the pins 41. The inner end of each nut 42 is provided with a conical boss-like formation 43 which coacts with a mating conical surface 44 in the nature of a counter-sink formed in respective frame plates 22. Accordingly, the main frame 35 may be readily removed by loosening the nuts 42 until their innermost conical ends are free from the respective seats 44, following which the main frame may be lifted free from the base frame 21 as indicated in Fig. 3.

The cleaner roll 40 which removes ink from the surface of the transfer cylinder 16 is supported by the main frame 35 for movement to and from the surface to be cleaned. As shown, the roll 40 is mounted in a supplemental frame 45 which includes a pair of end plates 46 spaced apart by suitable cross frame members such as rods 47, the ends of which are secured to respective plates 46. The supplemental frame 45 is pivotally mounted on the rods 37 of the main frame which passes through the upper ends of the supplemental frame plates 46. The cleaner roll 40 is mounted on a rod 48, the ends of which are secured to the supplemental frame plates 46. The rod 48 is parallel with and spaced below its pivot rod 37, and when the cleaner is in position on a printing machine this rod is parallel with the axis of the offset or transfer cylinder 16. The arrangement is such that the swinging of the supplemental frame 45 about its pivot rod 37 moves the roll 40 into and out of rolling contact with the surface to be cleaned, namely, the transfer surface of the cylinder 16.

The supplemental frame 45 may be swung to position the roll 40 at the will of the operator by means of a manually operable lever or handle 50. As shown in Figs. 1 to 4 inclusive, the lever 50 is secured to the outer end of a rod 51, the ends of which are journaled in the frame plates 36 of the main frame 35. The mid-portion 52 of the rod 50 is eccentric relatively to its end portions and is interconnected by a pair of extensible links 53 with one of the cross frame rods 47 of the supplemental frame 45. Any suitable means may be provided to limit either the throw of the lever 50 or the swinging movement of the supplemental frame 45, however, the arrangement is such that as the roll 40 moves from one position to another the axis of the eccentric portion 52 of the rod 51 passes from one side to the other, of a plane passing through the axis of the pivoted portions of such rod and the axis of the frame rod 47 to which the other end of the links 53 are secured. The extensibility of the links 53 permit the adjustment of the contact pressure between the roll 40 and the surface of the transfer cylinder 16.

The cleaning roller 40, as heretofore mentioned, is mounted for rotation and axial movement on its shaft or rod 48. The roller 40 is provided with a surface formed of rubber or rubber-like material and is of a hardness of from thirty to sixty as measured by a Shore A durometer and preferably from three to six tenths that of hardness of the offset blanket with which it is used. It has been found that the hardness of this surface is critical inasmuch as it is desirable that the roll be frictionally driven by the offset surface of the transfer roll 16 to remove ink therefrom. The roller 40 is journaled on the shaft or rod 48, and is moved axially thereof consequent upon its rotation. For this purpose one end of the roller 40 is provided with a bushing 56 having an annular cam slot 57 which is engaged by a pin 58 mounted in a relatively fixed position in a block 59 secured to the adjacent end plates 46 of the supplemental frame 45.

Ink remaining on the offset blanket 16 is transferred to the cleaner roll 40 as the latter is driven thereby. Such ink is removed from the roll 40 by a solvent charged wiper 60. This wiper, as shown in the drawings, comprises an elongated strip of absorbent material, such as felt, fabric, molleton, or the like which is saturated with liquid ink solvent. In the embodiment shown, the wiper 60 in cross section is shaped like an inverted U and its base is held in wiping contact with the cleaner roll 40.

The wiper 60 is removably mounted in a channel-like retainer or trough 61, the upwardly extending sides 62 of which converge toward each other, to form a support which retains the wiper in position against the roller 40. This retainer is positioned in the pan 30 and is provided with suitable openings 63 which permit direct contact between the wiper and a supply of liquid ink solvent retained in the pan 30. The wiper 60 is positioned with its lower portion submerged in such solvent, and its upper portion extending thereabove and contacting the bottom surface of the roller 40. Due to capillary attraction the ink solvent rises in the wiper and saturates it throughout.

In the embodiment shown it has been noted that as the roll 40 is rotated in the direction of the arrow of Fig. 5, much of the ink charged solvent at the leading area of contact 65 between the wiper 60 and the roll 40 appears to be removed in a manner similar to that of a squeegee and appears to gravitate or flow to the pan 30, while the comparatively ink free solvent in the pan rises more rapidly in the trailing edge and leg 66 of the wiper than when the roll 40 is stationary. This is believed to create a flow of solvent in the wiper which prevents an excessive accumulation of ink therein and greatly lengthens its life. Ink solvent remaining on the surface of roll 40 after it passes the wiper 60 is removed by a roll 70. The ends of this roll are journaled in respective bearing boxes 71 which are slidably mounted for movement to and from the axis of the roller 40 in respective guideways 72, formed in the end plates 46 of the supplemental frame 45. The roller 70 is pressed against the roll 40 by an adjustable tensioning screw 73 carried by a lever 74 pivoted as at 75 to a cross frame member 46*a* of the supplemental frame 45. The screw 73 is threadingly mounted in the lever 74 and is provided with an enlarged head 76 which seats on a flat spring 77 carried by a bracket 78 which is pivoted on the frame rod 36*a*. A similar flat spring 79 is mounted on each end of this bracket to coact with a respective bearing block 71 and urge the latter toward the axis of the roll 40. The engagement of the spring 77 with the enlarged head 76 of the adjusting screw 73, the axis of which is offset from the axis of the pivotal connection between the lever 74 and the rod 46*a*, is such that the tension on the parts reacts to retain the lever 74 in its active position shown in Fig. 5, but at the same time permits the lever 74 to be readily swung by the operator to an idle position shown in Fig. 4, whereupon the bracket 78 may be swung counterclockwise to the idle position therein indicated. The roll 70 is then free from

tension and may be removed to permit access to the roll 40.

We claim:

1. In a device for cleaning ink from a cylinder of a printing machine, a frame adapted to be secured to a printing machine, a rotatable cleaning roll having a non-absorptive rubber surface mounted in said frame for swinging movement to and from rolling contact with the surface of a cylinder to be cleaned, a receptacle for cleaning fluid mounted in said frame below said roll, an absorbent member carried by said receptacle and having one portion thereof extending into fluid carried by the receptacle and another portion thereof extending upward out of such fluid and contacting said roll to transfer cleaning fluid thereto, a hard surfaced roller mounted in said frame above said receptacle and movable to and from rolling contact with said roll, resilient means urging said roller into contact with said roll to regulate the fluid on the roller, and manually operable means to swing the cleaning roller into and out of rolling contact with the surface to be cleaned.

2. In a device for cleaning ink from the periphery of a printing machine cylinder, a frame adapted to be secured to the printing machine, a rotatable roller having a non-absorptive surface mounted in said frame for movement to and from the surface to be cleaned, a receptacle for cleaning fluid mounted in said frame below said roller, a fluid absorbent transfer member mounted in said frame beneath said roller and adapted to transfer fluid from said receptacle to said roller, said member comprising an elongated strip of fluid absorbent material, means to support said strip with its longitudinal mid-portion in wiping contact with said roller and out of the fluid in said receptacle and with both of its longitudinally extending edges projecting downward into the fluid in the receptacle and spaced from each other.

3. A cleaning device according to claim 2, wherein the supporting means for said absorbent strip comprises an inverted channel shaped member made of non-fluid absorbent material, said member having a base adapted to rest in said receptacle and a pair of spaced upwardly extending longitudinal flanges converging toward each other and adapted to embrace the depending longitudinal edges of said absorbent strip, and wherein said flanges are perforated to permit fluid in the receptacle to contact said absorbent member.

4. A cleaning device according to claim 2, wherein said absorbent member extends entirely across said receptacle and projects to the bottom thereof, thereby dividing the receptacle into two compartments.

5. A cleaning device according to claim 2, wherein said resilient means is pivoted to said frame and is movable about its pivot into and out of engagement with opposite ends of said roller, an arm pivotally mounted on said frame, a member adjustably mounted on said arm, and adapted to engage and tension said resilient means against said roller, said arm being movable to swing said last-named member into and out of active position without changing the relation of said member relative thereto.

6. In a device for cleaning ink from the cylindrical surface of a rotary printing machine, a main frame adapted to be secured to a printing machine, a receptacle for a supply of liquid ink solvent removably mounted in said frame, a second frame mounted on said first named frame and having cross frame members extending transversely above said receptacle, a releasable connection between said frames, a supplemental frame pivotally mounted in said second frame, a cleaning roller rotatably mounted in said supplemental frame with its axis parallel with the surface to be cleaned, manually controlled means interconnecting said second and supplemental frames to swing the supplemental frame and cleaning roller as a unit to and from the surface to be cleaned, said supplemental frame having a pair of open-ended guideways extending from the exterior thereof toward said roller, a hard-surfaced roll removably mounted in said guideways and movable therein to and from the surface of said roller, resilient means to move said roll toward said roller, and absorbent means removably mounted in said receptacle to transfer solvent to said roller, and wherein the second and supplemental frames may be removed as a unit from the first named frame to permit access to said receptacle and to said absorbent member.

7. In a device for cleaning ink from the cylindrical surface of a rotary printing machine, a main frame adapted to be secured to a printing machine, a receptacle for liquid ink solvent removably mounted in said frame, an elongated liquid absorbent member carried by said receptacle having a portion thereof projecting above the receptacle and another portion thereof extending into the receptacle and adapted to be submerged in the fluid therein, a second frame mounted on said first named frame and having cross frame members extending transversely above said receptacle, a releasable connection between said frames, a supplemental frame pivotally mounted in said second frame, a cleaning roller rotatably mounted in said supplemental frame with its axis parallel with said absorbent member and with the surface to be cleaned, manually operable means to move the supplemental frame and cleaning roller as a unit to and from contact with the surface to be cleaned, a hard-surfaced roll removably mounted in said supplemental frame and movable therein to and from the surface of said roller, resilient means carried by said supplemental frame and coacting with said roll, means to resiliently urge it into contact with said roller, said last-named means including an adjustable member carried by said supplemental frame and bodily movable into and out of an active position to permit removal and restoration of said roll without altering the adjustment of said member.

8. In a device for cleaning ink from the cylindrical surface of a rotary printing machine, a main frame adapted to be secured to a printing machine, a receptacle for liquid ink solvent removably mounted in said frame, an elongated liquid absorbent member carried by said receptacle having a portion thereof projecting above the receptacle and another portion thereof extending into the receptacle and adapted to be submerged in the fluid therein, a second frame mounted on said first named frame and having cross frame members extending transversely above said receptacle, a releasable connection between said frames, a supplemental frame pivotally mounted in said second frame, a cleaning roller rotatably mounted in said second frame, means interconnecting said shaft and said supplemental frame to move the supplemental frame and cleaning roller into and out of rolling contact with the surface to be cleaned, an operating handle carried by said shaft, said supplemental frame having a pair of open-ended guideways extending from the exterior theerof toward said roller, a hard surfaced roll having its ends rotatably mounted in said guideways and movable therein to and from the surface of said roller, an elongated plate formed of spring metal pivotally mounted on said supplemental frame and engaging the ends of said roll, adjustable means releasably engaging said plate intermediate its ends to tension the plate to resiliently urge it into contact with said roller, said last-named means being releasable to permit withdrawal of said roll without changing the adjustment of said adjustable means.

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