March 10, 1942. E. F. DUDLEY 2,275,514

INK FOUNTAIN STRUCTURE

Filed May 8, 1939 3 Sheets-Sheet 1

Fig. 1

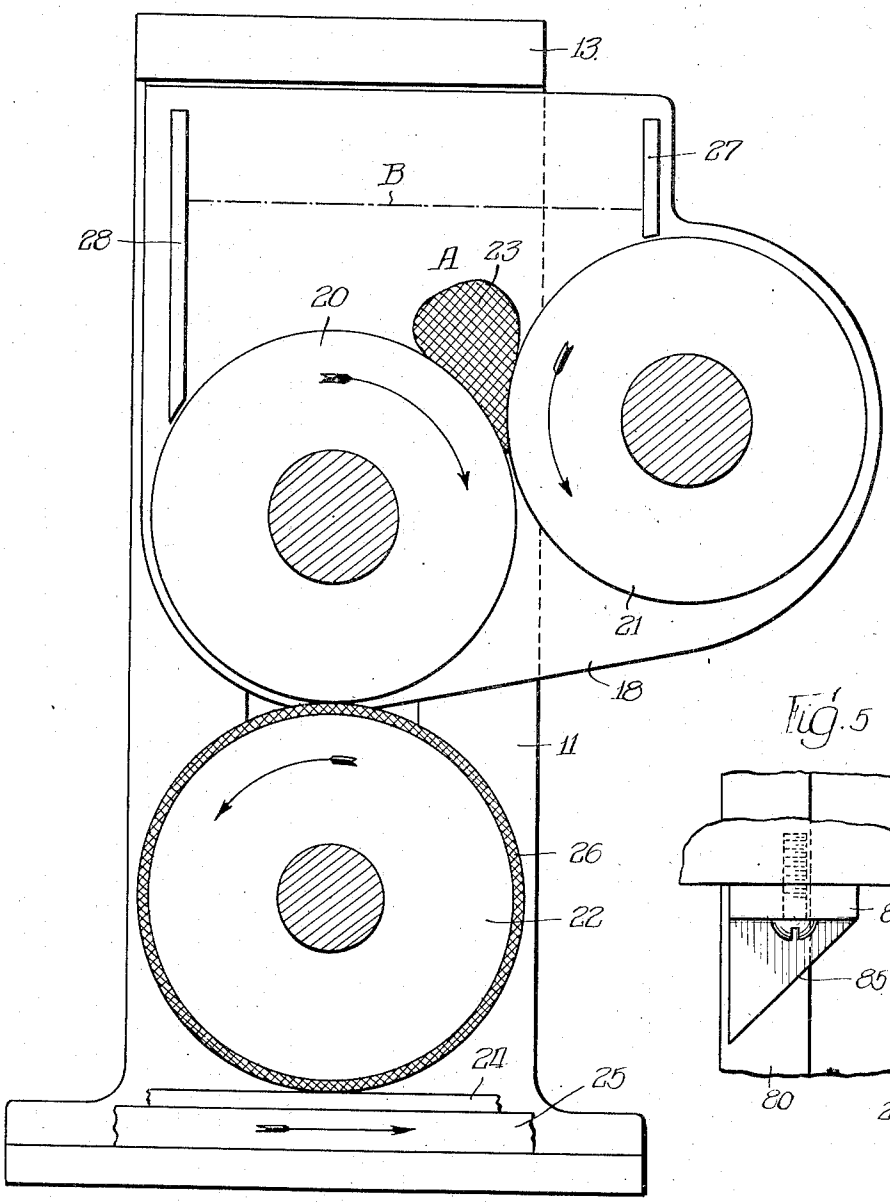


Fig. 5

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Fig. 2.

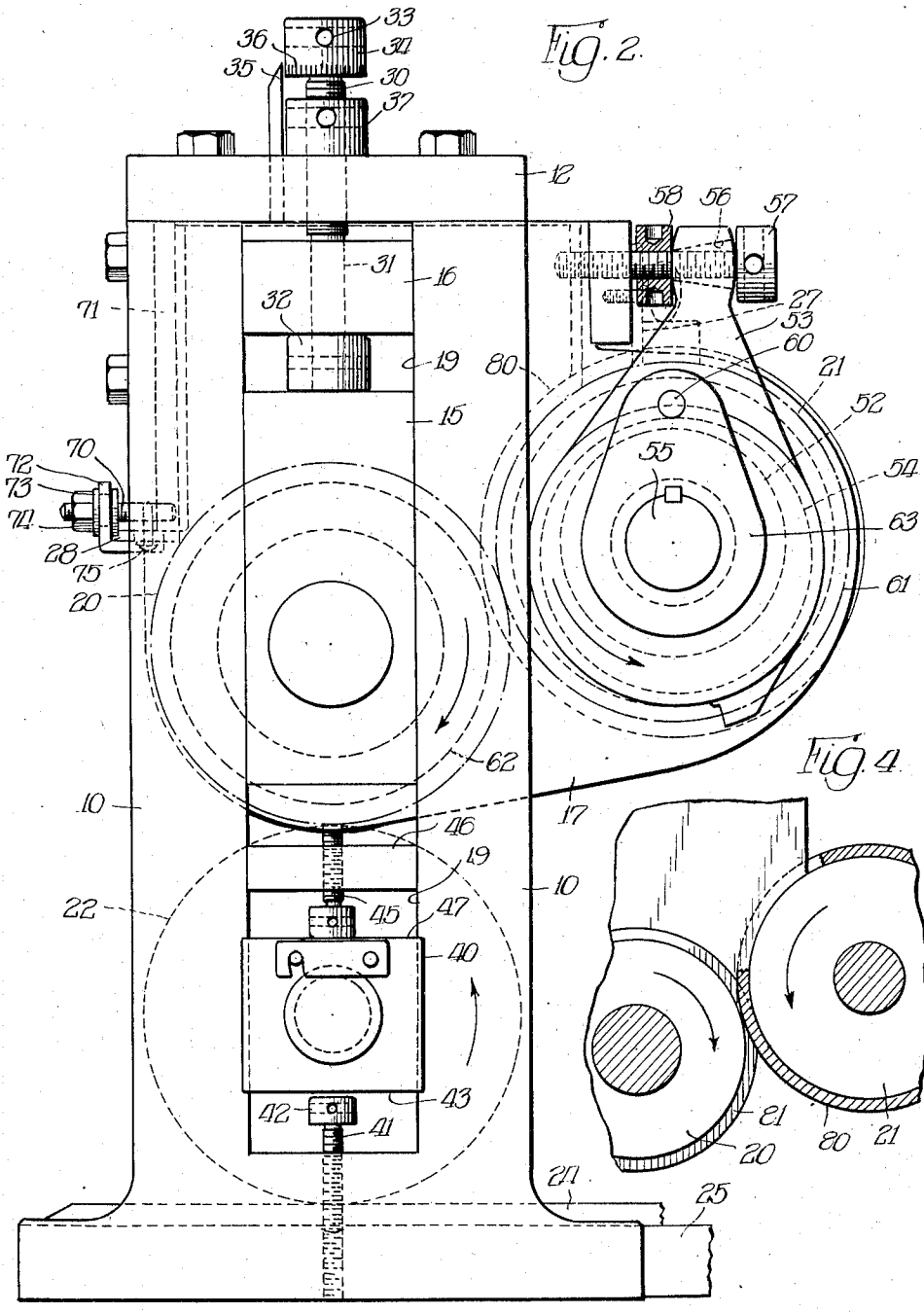


Fig. 4.

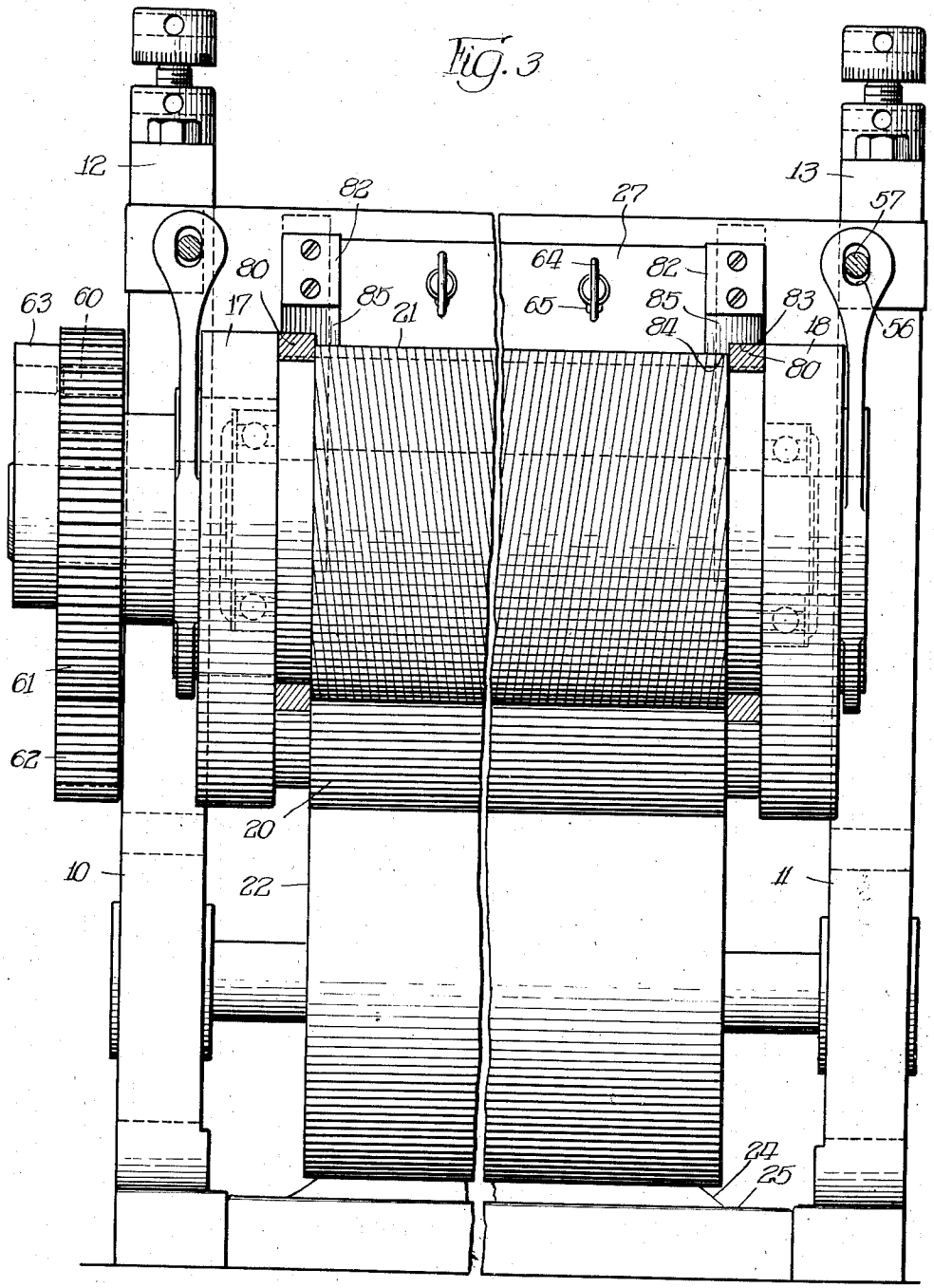
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Fig. 3



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Patented Mar. 10, 1942

2,275,514

UNITED STATES PATENT OFFICE

2,275,514

INK FOUNTAIN STRUCTURE

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Application May 8, 1939, Serial No. 272,325

7 Claims. (Cl. 101—364)

This invention relates to improvements in inking mechanism for printing presses, and while its principle may be applied in connection with numerous types of printing machinery, the invention is particularly well adapted for use in ink fountain units such as are often provided on power plate presses where printing is done from flat, engraved plates.

In printing presses of that class, the most generally used inking mechanisms are of the ink mill type, that is to say, the metal rollers by means of which the ink is transferred from the fountain to the printing plate, are of large diameter with correspondingly large bearing journals, making frequent "washing up" of the inking mechanism necessary because of the ink seeping between the ends of the rollers and the end walls of the fountain and eventually reaching the journal bearings.

The rollers in such inking mechanisms are driven mostly at a constant speed, some of them preferably at different rates of speeds and frequently in opposite directions. The peripheries of those rollers, which control the amount of ink to be applied to the printing plate, are slightly spaced from each other, and the gap between adjacent rollers may be varied in order to determine the thickness of the film of ink that is to be fed to the inking-in roller or rollers.

The ink used for printing from engraved plates is of a comparatively heavy consistency and therefore when it is forced through the gap of adjacent rollers, particularly so when the two rollers are rotated at different surface speeds, some of the ink is forced laterally, i e. towards the ends of said rollers and eventually will reach between the end walls of the rollers and the fountain walls, as stated above.

In the operation of printing presses of this class is occurs also that some of the ink that is spread laterally, gathers, i. e. builds up outside of the fountain frame in the form of ridges. When this ink becomes dry, it frequently happens that particles thereof break off and become lodged between the printing plate and the web whereby the plate is wiped, resulting in tearing of the web material.

Because of the fact that during the running of the press, the length of the metal rollers increases slightly, due to the heat generated by the friction of the ink being forced through the gap of adjacent rollers, it is essential to provide some clearance between the ends of the rollers and their bearing walls, thus permitting some of the ink to reach the roller bearings.

Many attempts have been made to seal the end bearing surfaces of the rollers against such seepage of ink. For instance, sealing blocks, made of wood or other comparatively soft material, were arranged at the ends of the rollers so as to closely fit their peripheries and the end plates of the fountain.

In other instances, resiliently mounted bearing plates were interposed between the end surfaces of the rollers and said end plates. It has been found, however, that not any of these previous attempts proved effective and consequently the nuisance of frequent washing up of the fountain unit was not avoided.

Therefore, one of the primary objects of my invention resides in the provision of means whereby the accumulation of printing ink at the ends of the inking rollers and consequent seepage of it to the journal bearings, shall be eliminated.

Another object is to provide means which shall assure a tight fit at the point of contact at the ends of the two adjacent rollers, and to maintain such fit irrespective of expansion or contraction of said rollers.

A further object resides in means whereby any gathering of ink outside of the fountain frame and the consequent breaking loose of particles thereof shall be avoided.

Still further objects and novel features of the invention will become apparent from the following description and appended claims.

One practical and preferred embodiment of the invention is illustrated by way of example in the accompanying drawings of which:

Figure 1 represents a diagrammatic view of the roller arrangement;

Figure 2 is a side elevation of the fountain unit, showing the general construction of the unit with the inking rollers and associated adjusting means therefor;

Figure 3 is a front elevation of the unit;

Figure 4 is a detail fractional section of two cooperative rollers showing the cooperative relation of the sealing means applied to two adjacent rollers; and

Figure 5 shows a plan view of the scraper described herein.

The ink fountain unit structure, as illustrated diagrammatically in Figure 1 of the drawings, has upright frame members **10**, **11** and includes three rollers **20**, **21** and **22**, the former two of which rollers are positioned so as to constitute an ink fountain by providing an ink retaining space A for a supply of ink **23**.

Preferably, the fountain rollers **20** and **21** are

mounted for relative adjustment in order to vary the gap between them which controls the amount of ink that is to be supplied to the printing plate 24 on the plank 25. These rollers which may be journaled in end plates, one of which is denoted by 18 in Figure 1, may be adjusted also vertically as a unit with relation to the inking-in roller 22 for the purpose of changing the contact pressure that is required between the roller 22 and the plate 24 as well as between the composition surface 26 of said latter roller and the roller 20, for inking-in the plate 24.

The means whereby these adjustments may be readily accomplished will be described later.

While in this instance the surfaces of the rollers 20 and 21 at the ink supplying point travel in the same direction, the surface speeds of said rollers are different. The roller 20 preferably rotates at press speed but the roller 21 travels considerably slower. The difference in the surface speeds of the two coacting rollers creates an "ink-mill" effect, in other words, the ink is prerubbed before it is transferred to the inking-in roller 22.

When the printing operation is stopped, while ink still remains in the space A, then the rollers 20 and 21 are brought together so as to have metal to metal contact, thereby preventing leakage of ink from the fountain along the surface of the rollers. If the ink which remains in the fountain when the press is idle, extends approximately up to the level indicated at B, then the fountain may be further sealed against leakage, preferably by means of sealing plates 27 and 28 which are mounted for adjustment as will be hereinafter described.

As shown in Figures 2 and 3, the frame of the inking mechanism includes a pair of uprights 10, 11 of substantially U shape, with their upper ends connected by means of tie bars 12 and 13 respectively. Lugs 15 and 16 are provided on each one of the fountain end plates 17 and 18 and they slidably fit within the recess 19 of said uprights, see Figure 2.

For the purpose of simplicity I shall proceed to describe merely that side of the fountain such as is viewed in Figure 2, the arrangement at the other side, namely, that to the right as viewed in Figure 3, being identical.

The manner of mounting the several rollers of the fountain unit is best illustrated in Figure 2. The rollers 20 and 21 are journaled in the end plate 17 and are so arranged that they will constitute the actual ink fountain by providing an ink retaining space A between them as already indicated.

For the purpose of adjusting the end plate 17 and therewith the fountain roller 20 and rider roller 21, in a vertical direction with relation to the inking-in roller 22, an adjusting screw 30 is threaded into the tie bar 12 and projects downwardly and through a bore 31 provided in the lug 16. To the free end of said screw is keyed a collar 32 which snugly fits into the gap between the lugs 16 and 15. It will be seen therefore, that by turning the screw 30 by means of inserting a pin wrench into the holes 33 in the screw head 34, the end plate 17 can be adjusted vertically, the lugs 15 and 16 sliding within the slot 19 provided by the uprights 10.

By means of an indicator 35 and the scale 36 on the screw head 34, the degree of adjustment can be readily determined.

A lock nut 37 is provided on the screw 30 and bearing against the top face of the tie bar 12, so that the end plate 17 and therewith the rollers 20 and 21 can be securely locked in their adjusted position.

The inking-in roller 22, which is journaled in the bearing 40 arranged to slide within the slot 19, may be adjusted vertically and independently of any of the other rollers. This is accomplished by means of a set screw 41 which is threaded into the base of the upright frame 10, and the head 42 of which bears against the lower face 43 of the journal bearing 40. The screw 41 is so set that when the roller 22 rolls over the printing form, there is a slight clearance between the face of the screw head 42 and the face 43. Thereby the desired rolling contact between the roller 22 and the plate 24 will be assured while the plate is being inked in.

The extent of upward movement of the roller 22 is limited by means of a set screw 45 threaded into the plate 46 and the face of the head of which screw bears against the upper face 47 of the journal bearing 40.

The relative adjustment of the fountain roller 20 and the rider roller 21 for varying the width of the gap between them is preferably accomplished by means of the following mechanism.

As indicated above, the parts viewed in Figure 2 are duplicated at the opposite end of the fountain unit, therefore I need describe the arrangement and operation of the adjusting means as applied to one side of the press only.

The journal bearing 52 which carries the roller 21, is mounted within an eccentric lever 53 formed with a bearing member 54, the center of which is eccentric to that of the roller journal 55 and its bearing 52. The arm of said lever extends upwardly and is provided with a bore 56 which embraces the threaded portion of an adjusting screw 57. The latter is preferably threaded into the frame of the fountain unit and a lock-nut 58 is provided on said screw in order to secure the lever 53 in the desired position. If for instance the gap between the rollers 20 and 21 is to be increased then the lock-nut 58 is unloosed and the adjusting screw 57 released the desired amount, whereupon the lock-nut is again tightened against the lever 53. To decrease the gap, this operation is reversed as will be readily apparent.

Preferably, to avert damage to any of the rollers in the event that during the running of the press, a metal article or any other hard object accidently falls into the ink-well, I provide means which shall automatically disconnect at least one of the inking rollers from its drive as soon as such article or object becomes wedged between two adjacent rollers.

This I propose to accomplish by providing a shear pin 60, which is driven into a bore drilled into the gear 61, whereby motion is transmitted from the gear 62 to the roller 21. To the end of the journal 55 a shear arm 63 is keyed, which arm has a bore into which the shear pin 60 extends. The gear 61 is mounted to rotate freely on said journal. In this manner, instead of the roller 21 being driven direct by the gear 61, it is driven through the intermediary of the shear arm 63 and the shear pin 60. Therefore, should any article become wedged betwen the rollers 20 and 21, the stress set up thereby wil cause the pin 60 to shear and consequently the gear 61 may rotate freely on the journal 55 and the roller 21 will remain stationary, thereby preventing any serious damage to the rollers.

The means whereby the plate 27 may be ad-

justed towards and away from the rollers 21 and 20 respectively, can be of any suitable kind and may include thumb screws 64 threaded into the fountain frame and passing through slots 65 in said plates, located at readily accessible points, permitting of quick manipulation of said screws.

A somewhat more positive arrangement is desirable for moving the plate 28. According to the means shown in Figure 2, I provide a series of screws 70 which are tightly threaded into the back plate 71. The latter is secured to one or more brackets 72, preferably by riveting. The upwardly extending portion of each bracket 72 is recessed and embraces a groove provided in the annular base 73 of an adjusting nut 74 which is threaded onto the screw 70. The screws 75 pass through guide slots formed in spaced relation in the plate 28 and are threaded into the end plate of the fountain, thereby permitting adjustment of the plate and holding it in position. By turning the nut 74 either to the left or to the right, the plate 28 will be moved either away from or toward the roller 20.

The preferred means whereby ink is prevented from spreading to the ends of the roller 21 includes an ink obstructing member, such as a ring 80, arranged at each end of the roller 21, see Figures 3 and 4. In the roller 20 a recess 81 is provided into which said ring extends to thereby seal the ends of said rollers against leakage of ink at the point where the rollers meet. While this function of the ring is important, the main purpose of it is to obstruct the lateral spreading of ink adjacent the ends of the roller 21 and to avoid any accumulation of ink so spread by carrying it around to a point where it shall be removed and directed back into the ink-well. The close fit between the ring 80 and the recess 81 will of course be maintained irrespective of expansion or contraction of the rollers due to changes in temperature.

It will be understood that during the rotation of the roller 21 in the direction indicated by the arrow in Figure 4, some of the ink that is being forced through the gap between the two rollers 20 and 21 will be compelled to spread laterally against the inner side face of the ring 80 and eventually will reach the periphery of the ring. The ink so accumulated would, during the continued operation of the press, flow beyond the ends of the roller and then find its way between the end faces of the roller and the end plates of the fountain, and into the bearings of the roller, and furthermore some of the ink would gather at the end plates 17 and 18, dry up, and particles thereof would break off and fall onto plate 24 as it passes beneath, resulting in tearing the wiper web. In order to prevent this, I propose to provide scraper members 82, preferably made of metal, such as brass. These members are mounted in close proximity to the plate 27 and are formed with bearing faces 83, 84 which closely fit over the periphery and side face of the ring 80 as well as over the end of the roller periphery, as clearly shown in Figure 3. The face 85 of the scraper, see Figure 5, is slanted inwardly so that ink scraped off the ring 80 will be directed inwardly and beneath the plate 27, back into the ink-well. In this manner any spreading and gathering of the ink, and seepage of it into the bearings of the roller 21 is effectively overcome.

In order to minimize the tendency of ink spreading laterally of the rollers, I have found that preferably the surface of the rollers should be ground in opposite directions, i. e. beginning at the ends and proceeding toward the middle of their surface or vice-versa. This I have indicated by faint lines on the roller 21 as viewed in Figure 3.

Furthermore, depending on the consistency of the ink to be used, it is of advantage to give to the surface of one or more of the ink distributing rollers a grained finish rather than a high polish. This can be accomplished preferably by etching or by any other suitable method, and need not be described in detail.

It is evident of course, that without departing from the basic principle of my invention, many variations could be made from the arrangement illustrated and described herein, therefore, I intend to cover any such modifications that will come within the meaning of the appended claims.

I claim:

1. An ink fountain unit, having in combination a train of inking rollers, an inkwell, annular members provided at the ends of at least one of said rollers for obstructing the spreading of ink beyond the ends of the roller or rollers, and means for removing ink accumulated on said members and direct it back into said inkwell.

2. An ink fountain unit, having in combination a train of inking rollers, at least two of which are arranged to form an inkwell, annular elements provided adjacent the ends and extending above the surface of one of said latter rollers, complementary grooves in the periphery of an adjacent roller and into which grooves said annular elements extend, and scrapers bearing against said elements and the surface of said latter rollers to remove accumulated ink from said elements and direct it away from said ends and back into said inkwell.

3. An ink fountain unit, having in combination a train of inking rollers, at least two of which are arranged to form an inkwell, means for adjusting all of said rollers relative to each other, means for preventing leakage of ink from said well, said latter means including an annular recess in one roller, an annular element on the adjacent roller, said element extending into said recess, and a member bearing against said element and the end surface of said latter roller to remove ink from said element and end surface and direct it back into said inkwell.

4. An ink fountain unit, having in combination a train of inking rollers, at least two of which have different peripheral speeds and are arranged to form an inkwell, means for adjusting all of said rollers relative to each other, means for preventing leakage of ink from said well, said latter means including an annular recess in one roller, an annular element on the adjacent roller, said element extending into said recess, and a member bearing against said element and the end surface of said latter roller to remove ink from said element and end surface and direct it back into said inkwell.

5. In an ink fountain structure for printing presses, of the class comprising end walls and a train of inking rollers mounted for rotation between said walls so that at least two of said rollers together with said walls form an ink retaining well, the provision of ink obstructing means coaxial with and extending around the ends of at least one of said rollers for the purpose of hindering the spreading of ink beyond said ends, and scraper means engaging said first mentioned means and the periphery adjacent the

ends of the associated roller for removing ink therefrom and directing it back into the ink well.

6. In an ink fountain structure for printing presses, of the class comprising end walls and a train of inking rollers mounted for rotation between said walls so that at least two of said rollers together with said walls form an ink retaining well, the provision of ink obstructing means arranged at each end of one of said rollers, complementary means provided at each end of an adjacent roller and cooperating with said obstructing means to establish a seal against leakage of ink, scraper means engaging said obstructing means and the periphery of said first mentioned roller at its ends, said scraper means acting to remove ink from said latter means and from said ends and direct it back into the ink well, and means for rendering ineffective the driving means for said rollers in the event that a foreign body accidentally becomes wedged between said rollers.

7. In an ink fountain structure for printing presses, of the class including, end walls and a train of inking rollers mounted for rotation between said walls so that at least two of said rollers together with said walls form an ink retaining well, means provided adjacent the ends of at least one of said rollers for obstructing the spreading of ink beyond the ends of such roller or rollers, and means for removing ink from said first means and directing it back into the ink well, the novel feature of providing the surface of at least one of said rollers with faint lines preferably produced by grinding, which lines extend in opposite directions from the ends of the rollers toward the middle and around the periphery of the roller, for the purpose of minimizing the tendency of ink spreading laterally of the rollers.

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