Jan. 2, 1945. E. W. WORTHINGTON 2,366,375

PRINTING PRESS

Filed Jan. 14, 1944 2 Sheets-Sheet 1

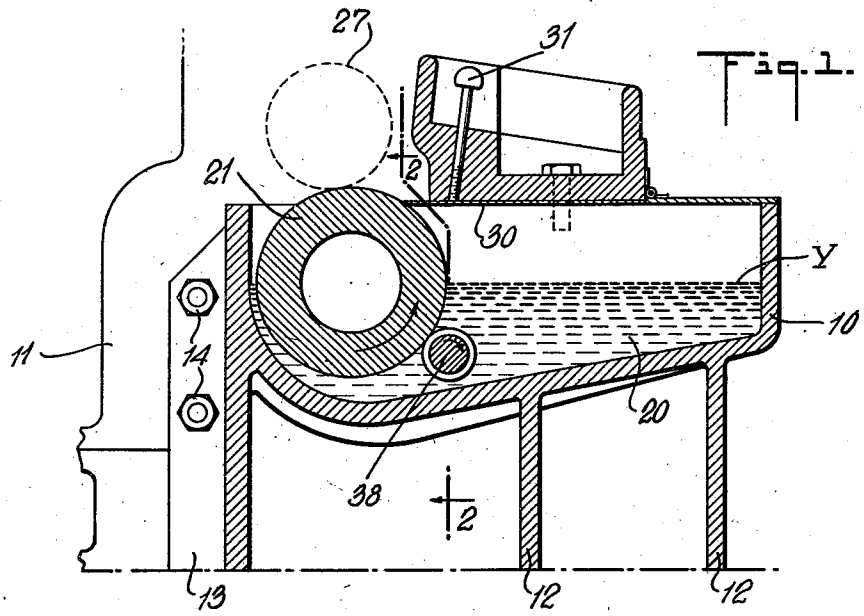



Fig. 1.

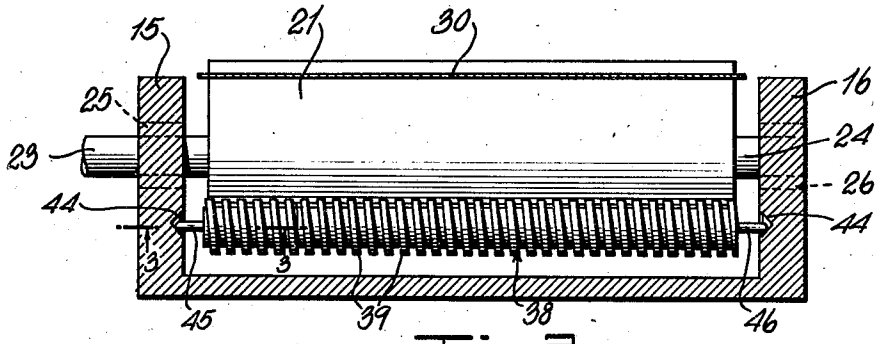



Fig. 2.

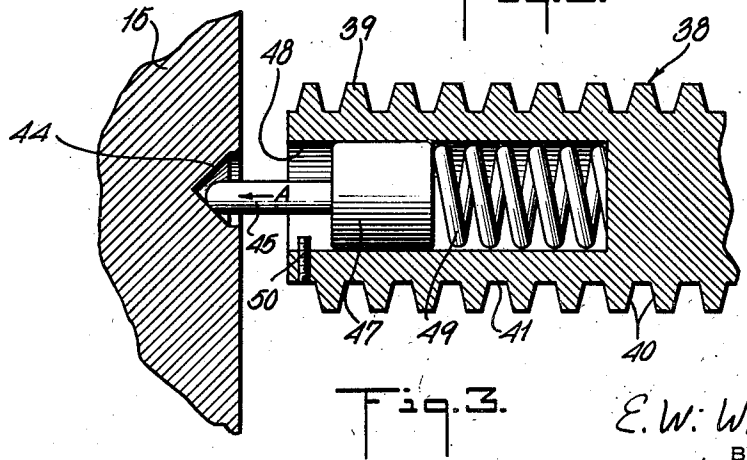



Fig. 3.

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PRINTING PRESS

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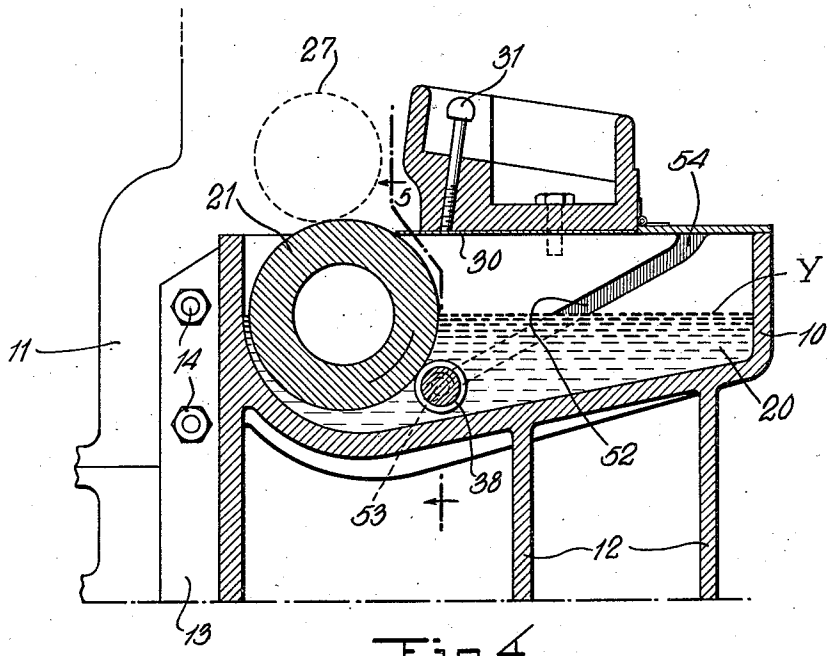



Fig. 4.

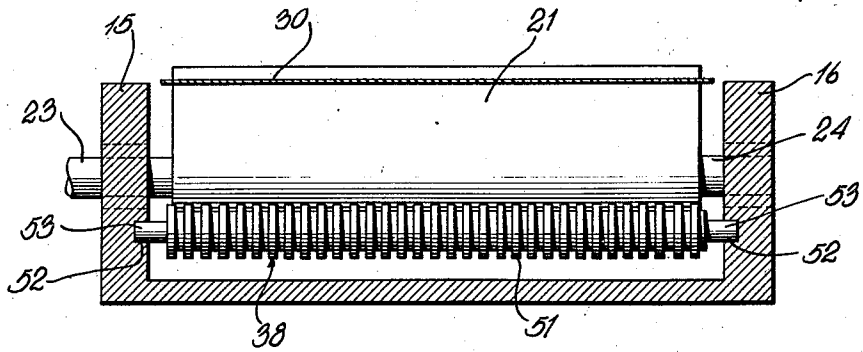



Fig. 5.

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# UNITED STATES PATENT OFFICE

2,366,375

## PRINTING PRESS

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Application January 14, 1944, Serial No. 518,218

12 Claims. (Cl. 101—364)

This invention relates to printing presses and is more particularly concerned with new and improved inking mechanisms therefor.

In the modern technique of printing, the inks which are being utilized are heat setting inks which are of thick consistency, and in some instances comprise pasty, viscous concentrates with little of the property known as liquid, so that, in use, they tend to be difficult to apply to the fountain rollers and to the pickup and ductor rollers of the inking system. Furthermore, color changes of subsequent printing impressions tend to be apparent when using these viscous inks.

While the present invention is not to be construed or limited to the solving of this problem, it does provide means whereby such inks used in modern technique can be fed to the inking system without such disadvantages as color changes and difficult feeding.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Fig. 1 is a vertical cross-section through a standard form of overshot ink fountain for a printing press incorporating one embodied form of this invention;

Fig. 2 is a section on lines 2—2 of Fig. 1 showing in detail the construction of one form of mixing roller according to this invention;

Fig. 3 is a section on the lines 3—3 of Fig. 2, showing a detail of the mixing roller of Fig. 2;

Fig. 4 is a view, in cross-section, similar to Fig. 1 but showing a modified form of the present invention; and

Fig. 5 is a section on the lines 5—5 of Fig. 4, showing in detail, the construction of the modified form of mixing roller according to Fig. 4.

It is the general object of the present invention to provide means to adequately mix and apply printing ink to a fountain roller in an ink fountain of a printing press.

More specifically, it is the object of the invention to provide an improved and novel ink fountain for a printing press which is adapted to feed ink, and particularly modern concentrated viscous inks, smoothly and satisfactorily and without color changes or like disadvantages.

A further object of the invention is to provide a mixing system of either an overshot or undershot ink fountain for a printing press, to overcome specific disadvantages of lack of physical and color homogeneity.

According to this invention, as generally embodied, there is provided in a conventional ink fountain, whether of the overshot or undershot type, a mixing roller adapted to be frictionally rotated in the ink within the ink trough by contact with the fountain roller and having grooves on its periphery, adapted to apply ink to the fountain roller and correctly spread the ink thereon.

Specifically, with a fountain of the conventional type having the fountain roller rotating within the ink in the trough, there is journalled within the trough a circumferentially grooved roller; the lands or teeth thus formed being in actual frictional contact with the periphery of the fountain roller and thus being rotated thereby. The teeth may be either helically formed or parallel and the spaces or hollows formed within each pair of teeth receive ink and pass same to the periphery of the fountain roller, acting to spread this thereon and smoothen out any ink picked up by the fountain roller itself. The teeth may be suitably shaped so as to give a wedge action toward the fountain roller, and either a single or double helical formation may be used to assist in passing the ink across the periphery of the fountain roller.

The mixing roller rotating in the body of the ink, and preferably completely submerged therein, acts also to agitate the body of ink in the trough and thus accomplishes a dual result of both physical and color homogenizing.

Means are provided to urge the mixing roller into good frictional contact with the fountain roller, and either spring means or gravitational pull may be utilized for this.

When using a divided or sectional fountain, as is conventional, each division may have its individual mixing roller according to the invention, and where it is desired, the use thereof can be discontinued by removal of the mixing roller from contact with the fountain roller, as by taking the mixing roller completely out of the fountain, means being provided to permit this, either for

such silencing or for cleaning, replacement or repairs.

Referring now specifically to the accompanying drawings there is shown an ink fountain comprising a relatively long narrow ink trough 10 which extends across the press and is supported by the frame members 11 thereof, the weight of the trough being suitably supported as by narrow vertical webs 12. This trough may be conventionally sub-divided into a plurality of units. An angle bracket 13 is attached by bolts 14 to a frame member 11 and the trough 10 has side plates 15 and 16 attached thereto or integral therewith, if desired. A body of ink 20 is contained within the enclosed trough to a level such that a fountain roller 21 mounted to rotate within the trough will always have part of its periphery submerged in the body of ink 20. The level of ink is shown at Y in Fig. 1 and this level is generally maintained.

Fountain roller 21 has shaft extensions 23 and 24 which are journalled in side walls 15 and 16 preferably with anti-friction bearings 25 and 26. Suitable means to drive the fountain roller 21 will be provided, as by gearing associated with shaft 23 and a press driven shaft (not shown).

A ductor roll or similar ink pick-up roll 27 contacts the surface of fountain roller 21 in the usual manner, for transferring the ink from fountain roller 21 to the printing couple.

Means are provided for removing surplus ink from the fountain roller 21 and for regulating the quantity of ink to be fed therefrom to the printing couple, and for this purpose a scraper blade 30, of conventional construction, is mounted above the fountain roller and is variably pressed against the surface thereof by means of the usual columnar adjusting means 31. Thus, the illustrated fountain is of the conventional overshot type.

In accordance with the present invention, means are provided for mixing the ink 20 within the trough 10, and to cause the ink to be in relatively homogeneous condition as it passes from the fountain roller 21 to the roll 27.

To this end, immersed in the body of ink 20, there is provided a mixing roller 38 having a surface adapted to mix the body ink 20 and to apply mixed ink to the fountain roller 21, the mixing roller 38 riding against the periphery of fountain roller 21 and being frictionally driven thereby in the opposite direction thereto.

In the illustrated form of Figs. 1, 2 and 3, mixing roller 38 has a plurality of teeth 39 thereon, these being formed in a helical path around the periphery of mixing roller 38. The side faces of each tooth 39 are preferably inclined as at 40 (Fig. 3) and thus present a somewhat V shaped space 41 between each pair of teeth in which ink will be carried. This shaping of the spaces 41 will result in a wedge action of the ink therein against the surface of the fountain roller 21 to cause even dispersion thereover.

The mixing roller 38 is journalled in any desired manner in the fountain trough 10 and in Fig. 3 there is a detailed view of one form of mounting where the mixing roller 38 is actually spring pressed into contact with the fountain roller 21. As shown, in each of the side plates 15 and 16 a countersunk hole 44 is formed into which spindles 45 and 46 forming bearing mountings for mixing roller 38 are adapted to ride. Spindle 45 is attached to a plunger 47 mounted in a bore 48 in the end of mixing roller 38, a spring 49 serving to force plunger 48 outwardly. A stop to prevent accidental removal of plunger 48 is formed by a set screw 50 threaded through the body of mixing roller 38 and projecting into bore 48.

The spring created pressure on pin 45 in the direction of the arrow A will cause a force to be exerted of the mixing roller 38 against fountain roller 21 by virtue of the incline faces of the countersunk hole 44 and the pin 45 pressing thereagainst. Preferably, the end of pins 45 and 46 will be rounded and smoothed off to allow a minimum of friction in their bearing holes 44 under spring pressure of spring 49.

Obviously, mixing roller 38 can be readily removed from the fountain side plates for cleaning or the like by depression of the plunger 48 against the spring 49.

In the modification shown in Figs. 4 and 5 the mixing roller 38 is of similar construction except that the teeth 51 are of square contour and are all parallel. This form of grooved roller is again mounted within the side plates 15 and 16 of the ink fountain 10 and gravitational load is allowed to form the means of obtaining good contact between the mixing roller 38 and fountain roller 21.

To this end, a long shaped groove or track 52 is provided in each side plate 15 and 16, into which groove the bearing support pins 53 of the mixing roller 38 are adapted to slide.

Thus, in Fig. 4 one groove 52 is shown as a long angular guide extending below the lowermost position the mixing roller 38 could occupy with fountain roller 21 in position and the width of the groove 52 is there shown as sufficient to adequately guide and rotatably support the mixing roller by means of pins 53.

Roller 38 is placed in the topmost part of the grooves 52, which may be conveniently shaped as by a vertical portion to permit ready insertion as shown at 54, and thereafter the mixing roller 38 is permitted to slide down the trackway formed by the grooves into good frictional contact with the fountain roller 21, the weight of the mixing roller 38 causing this contact by means of the inclined plane action of grooves 52 and bearing pins 53.

When using a divided fountain in a printing press, each division may be provided with its mixing roller 38, which roller can be silenced, if desired, by removal from its division.

The rotation of the mixing roller 38 within the body of ink will have two functions. The first is the actual mixing of the ink by the agitating action of teeth 39 or 51 caused by grooving the mixing roller, as described. The second is the actual application of ink to the possibly already inked parts of the periphery of the fountain roller 21 and the spreading, milling and homogenising of the ink over these inked parts by the action of the teeth and hollows on the mixing roller caused by the stated grooving.

Thus, in using thick inks the agitation and application to the fountain roller will result in great advantages both with respect to a homogeneous physical condition of the ink and with respect to color, while, with thinner inks, where these problems of physical condition and color changes are not so prominent, better mixing and spreading of the ink on the fountain roller will be obtained.

The helical formation of the teeth 39 of Figs. 1, 2 and 3 has the advantage over the straight teeth 51 of Figs. 4 and 5 that a lateral component of force will be applied to the ink as the mixing roller 38 rotates causing additional agi-

tation or mixing, and obviously the actual contour of the helix and pitch thereof can be chosen to give a desired mixing action to suit the requirements of a specific form of ink.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. In an inking mechanism for a printing press the combination of an ink fountain, a fountain roller journalled to rotate partially immersed in a body of ink, and a grooved mixing roller frictionally driven by said fountain roller to rotate within said body of ink.

2. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller partially immersed in said ink, and a mixing roller in peripheral contact with said fountain roller mounted to rotate within said ink by said contact, said mixing roller being grooved on its periphery.

3. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller rotating in contact with said ink, and a grooved mixing roller fully immersed in said ink, having the teeth formed by the grooving thereof in frictional contact with the periphery of said fountain roller and rotated thereby.

4. In an inking mechanism for a printing press, the combination of an ink fountain, a fountain roller journalled to rotate partially immersed in a body of ink, and a helically grooved mixing roller frictionally driven by said fountain roller to rotate within said body of ink.

5. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller partially immersed in said ink, and a mixing roller in peripheral contact with said fountain roller mounted to rotate within said ink by said contact, said mixing roller being helically grooved on its periphery.

6. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller rotating in contact with said ink, and a helically grooved mixing roller fully immersed in said ink, having the teeth formed by the grooving thereof in frictional contact with the periphery of said fountain roller and rotated thereby.

7. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller rotating in contact with said ink, and a grooved mixing roller fully immersed in said ink, having the teeth formed by the grooving thereof in frictional contact with the periphery of said fountain roller and rotated thereby, said mixing roller being spring urged toward said fountain roller.

8. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller partially immersed in said ink, and a mixing roller in peripheral contact with said fountain roller mounted to rotate within said ink by said contact, said mixing roller being grooved on its periphery and being positively urged toward said fountain roller to positively establish and maintain said driving peripheral contact.

9. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller rotating in contact with said ink, and a circumferentially grooved mixing roller fully immersed in said ink, having the teeth formed by the grooving thereof in frictional contact with the periphery of said fountain roller and rotated thereby.

10. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller partially immersed in said ink, and a mixing roller in peripheral contact with said fountain roller mounted to rotate within said ink by said contact, said mixing roller being grooved on its periphery and being positively urged toward said fountain roller to positively establish and maintain said driving peripheral contact, by trackways arranged within said fountain permitting the weight of said mixing roller to bear fully against a contact portion of the periphery of said fountain roller.

11. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller partially immersed in said ink, and a mixing roller in peripheral contact with said fountain roller mounted to rotate within said ink by said contact, said mixing roller being grooved on its periphery and being positively urged toward said fountain roller to positively establish and maintain said driving peripheral contact, by a spring pressed plunger seated within a bore in said mixing roller and adapted to press against an inclined face within said fountain to spring urge said mixing roller relative to said fountain roller.

12. In an inking mechanism for a printing press, the combination of a fountain containing a body of ink, a fountain roller rotating in contact with said ink, and a grooved mixing roller fully immersed in said ink, having the teeth formed by the grooving thereof in frictional contact with the periphery of said fountain roller and rotated thereby, said grooving being shaped to cause a wedge action to be exerted on the ink within said grooves and against said fountain roller.

EMORY W. WORTHINGTON.