

Jan. 20, 1959

E. W. WORTHINGTON

2,869,460

ROTARY LETTERPRESS INK FOUNTAIN

Filed Feb. 27, 1957

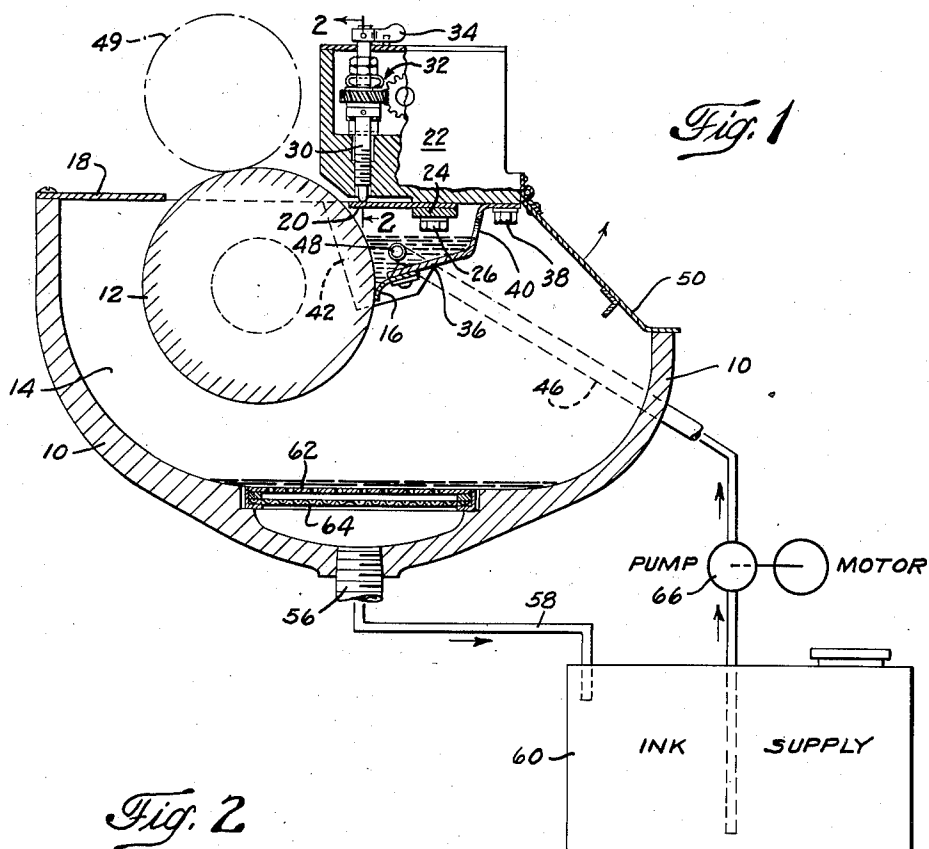
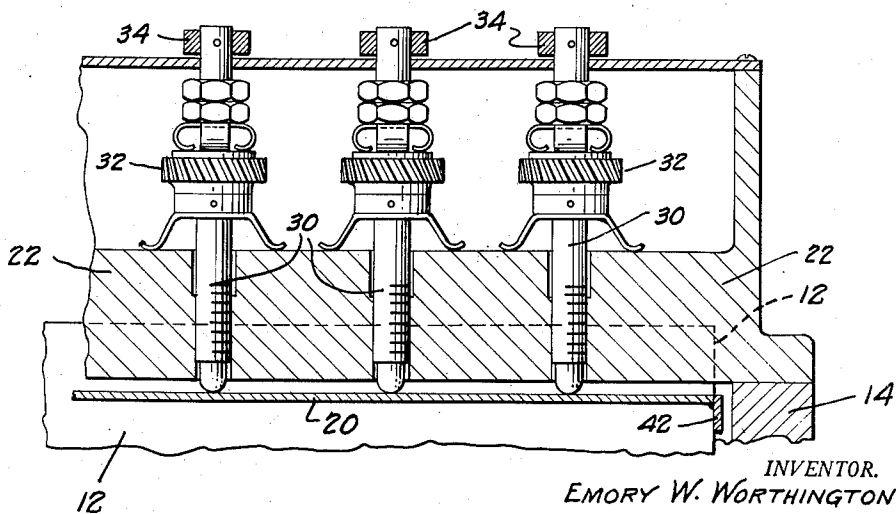


Fig. 2



INVENTOR.
EMORY W. WORTHINGTON

BY
Morgan, Finnegan, Durham & Pine
ATTORNEYS.

2,869,460

ROTARY LETTERPRESS INK FOUNTAIN

Emory W. Worthington, Pound Ridge, N. Y.

Application February 27, 1957, Serial No. 642,904

8 Claims. (Cl. 101—366)

The present invention relates to a novel and improved rotary ink fountain especially adapted for use with high speed rotary letterpress printing presses of the type used in the printing of newspapers.

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:

Figure 1 is a cross sectional view of a typical and preferred illustrative embodiment of the present invention; and,

Figure 2 is a fragmentary longitudinal sectional view taken on the line 2—2 of Figure 1.

The present invention has for its object the provision of a novel and improved rotary letterpress ink fountain especially adapted for the supply of ink to the rotary printing member of a high speed rotary newspaper printing press. A further object is the provision of an ink fountain of the general kind referred to, which is provided with means for continuously recirculating the body of ink to and from a substantially enclosed fountain roller, for continuously supplying an excess of ink to the fountain roller, for cleaning the surface of the fountain roller at each revolution thereof, and for removing the larger particles of dirt and trash from the ink within the fountain housing while the remainder of the excess ink is returned to be recirculated in the ink system. Still another object of the invention is the provision of a novel and improved ink fountain which produces a more reliable inking system which is less likely to produce non-uniform inking as it operates over extended periods of time, than ink fountains heretofore used. A further object is the provision of an improved ink fountain which is relatively simple in its construction and is unusually reliable, precise and uniform in its operation whereby an improved quality of printing results from its use.

In accordance with the present invention, the ink fountain comprises a rotatably mounted and preferably continuously-driven fountain roller, having its major portion enclosed within a fountain housing so as to minimize the undesirable entry of dirt and trash into the fountain housing. Near the top of the horizontally extending fountain roller, and extending preferably at least from end-to-end of the roller, are blade-like members which extend inwardly towards the roller, one of these blades being free of the roller, while the other preferably also serves as the doctor knife to control the amount of ink which

is allowed to remain on the roller and thereby regulates the flow of ink from the fountain to the inking train of the printing press. Ink is transferred from the fountain roller to the printing press through a conventional inking train and is fed to the train, in the usual case, by means of a periodically oscillating doctor roll which makes periodic contact first with the fountain roller and then with a roller of the inking train, although other forms of transfer means may be employed.

Means are provided for maintaining a substantially uniform and changing mass of ink against a portion of the fountain roller surface, and these means preferably include the doctor knife and a closely spaced wiper blade positioned slightly below the doctor knife, the two being joined together and supported so as to provide a cavity closed by the surface of the fountain roller, ink being continuously fed to the cavity by a suitable recirculating pump means and overflowing from the cavity and into the lower portion of the housing in which the fountain roller is supported.

The doctor knife is minutely regulable so that the ink allowed to remain on the fountain roller may be accurately controlled in accordance with the conditions of printing, while the lower wiper blade is lightly and resiliently pressed against the lower portion of the surface of the fountain roller, the doctor knife and the wiping blade being preferably divergent and with the wiping blade being bent downwardly at its point of contact with the upwardly moving portion of the fountain roller, thereby increasing the ability of the wiping blade to remove dirt, trash and other surface accumulations from the surface of the roller just prior to the time that the roller is once more inked by contact with the clean body of fresh ink supplied to the cavity. The dirt and trash are removed from the roller surface, and drop to the bottom of the fountain housing, where a relatively large screen area is provided through which the ink can drain to a drain outlet in the bottom of the housing member to be eventually returned to the ink tank, from which it is again fed, with such fresh ink as may be required, by means of suitable pump means to supply the ink to the ink cavity. The usual streaking on the fountain roller is avoided with the inking mechanism of the present invention, even after long periods of operation as no foreign matter collects to clog the space between the fountain roller and the doctor knife, which foreign matter would normally clog one portion of the knife and wedge it away from the roller so as to flood the roller immediately adjacent the edges of the clogging matter.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to the present preferred embodiment of the invention as shown in the accompanying drawings, the ink fountain is shown in a form suitable for use with the high speed rotary printing press shown and described in United States Patent No. 2,447,872 dated August 24, 1948. The fountain housing comprises a relatively deep trough like member 10 which extends from side to side of the printing press and is preferably substantially parallel to the other rollers and cylinders of the rotary printing press. In the upper portion of the trough or housing 10 is a cylindrical fountain roller 12 which is preferably rotatably mounted in the end walls 14 of the housing and is generally driven continuously and at a relatively slow speed as the printing press operates by suitable drive means, not shown.

As the fountain roller 10 is rotated, its surface is continually cleaned by the light resilient contact of a wiping blade 16 which is positioned to one side of the roller and on its upwardly moving side. Blade 16 is preferably

3

formed of a relatively tough, somewhat flexible and resilient material, not as hard as the metal roller 12, such as a strip or narrow sheet of plastic material, nylon being preferred and generally used in a thickness of about 0.010" to 0.025", is flexed to a generally cylindrical shape and extends from end to end of the fountain roller so that accurate uniform contact is made throughout the length of the cylindrical roller, the edge of the strip 16 serving to shear off any ink, lint, paper, or other dirt which remains on the surface of roller 12, as the roller surface passes the blade 16.

Trash and dirt are substantially excluded from the interior of the fountain housing by means of a relatively flat strip of metal 18, which extends across the top of the fountain housing 10 and substantially closes the gap between the other side of the fountain roller 12 and the housing wall, but it is preferable to leave a small narrow gap between the surface of the roller 12 and the adjacent edge of the metal strip 18. The strip 18 extends from one end to the other of the housing and excludes from the ink housing most dirt and trash except for such bits of paper as may be fed onto the fountain roller 12 from the inking system.

The quantity of ink fed from the ink fountain roller 12 to the inking system of the printing press is minutely and closely regulated and controlled by means of a doctor blade 20 which extends from end to end of the fountain roller 12, and is positioned above the wiping blade 16, the knife 20 being mounted for adjustment to the surface of the roller 12 at the top of the fountain housing. Across the top of the fountain housing and extending from one end wall 14 to the other is a supporting member 22, secured to the upper part of the housing, and having a flat under surface to which the knife member 20 is secured by means of the clamping strip 24 and the cap-screws 26.

Suitable means are provided for varying the spacing of the doctor knife relative to the surface of the roller 12 to control the flow of ink to the press, and any desired form of such means may be employed, such as a plurality of adjusting screws 30 which are threaded in the supporting member and engage the upper face of the knife member 20 near its edge which contacts with the roller 12, one such screw being generally provided for each column width of the knife so that individual columnar adjustment of the flow of ink may be obtained. The adjusting screws may be individually rotated from a remote position by means of the worm gearing 32, or may be directly rotated by means of the wing 34 mounted on the upper and exposed ends of the several screws, as shown in more detail in United States Patent No. 2,467,648 of February 14, 1950.

The wiping blade is mounted on a support 36 which in turn is fastened to the under side of the supporting member 22 as by cap screws 38. The support 36 is preferably in the form of a relatively stiff sheet metal member which extends downwardly and towards the surface of the roller 12, and at its end is provided with upwardly bent sheet metal portions 42 which extend forwardly sufficiently to overlap the ends of the roller 12 and have light resilient contact with the finished end surfaces of the roller, so as to prevent excessive flow of ink at the ends of the roller 12.

The knife 20, the wiping blade 16, and their supporting members together with the enclosed surface of the roller 12 form a cavity which may be supplied with ink, and the ink therein is maintained at a constant level by the continuous flow of ink thereto through a supply pipe 46 which is attached to a suitable aperture in the end wall 42 of the support member, the discharge opening 48 being below the normal level of the ink in the cavity. Excess ink supplied to the cavity, and beyond that fed to the press while the press is in operation, spills from the cavity by means of the outlet holes 40 formed in the supporting sheet 36, one or more such outlets, all prefer-

4

ably at the same level, being provided so that a constant level of ink is maintained in the cavity. This contributes greatly to uniform inking as there is a constant area of the surface of the fountain roller 12 which is immersed in the body of the ink. There is also a constant distance between the top of the ink body and the doctor knife 20, so that for any given speed of rotation of the fountain roller 12, the fountain roller surface is wet with ink for a constant time and another constant time is allowed for ink to drain downwardly on the upwardly moving surface of the roller prior to the inked surface being engaged with the knife 20, after which the ink film is fed to the printing member by the doctor roll 49.

On the fountain side where the supporting member 22 is located, a hinged cover 50 is preferably provided which can be raised to allow access to the interior of the fountain housing, for repairs or for cleaning the interior of the fountain. As shown a sheet metal member 50 is hingedly mounted on the outer edge of the supporting member and extends downwardly to a point where it contacts with the upper wall of the housing 10.

Means are provided for returning the surplus ink from the ink cavity to the main ink supply after the once-used ink has been passed through a screen to remove any large particles of dirt or bits of paper which might tend to clog the piping. At the bottom of the fountain housing is one or more drain outlets 56 which are connected to suitable piping 58 which conducts the accumulated ink by gravity to the ink supply tank 60. Above the drain outlets 56, but also near the bottom of the housing 10 is mounted a horizontal screen, preferably formed as a pair of spaced screen members 62 and 64, the upper screen member 62 being somewhat coarser than the lower. These screen members preferably extend throughout at least most of the length of the fountain housing to provide a relatively large area, thereby avoiding the possibility that the screen would become clogged with paper, dirt or other trash in normal service. The excess ink which flows from the ink cavity, either at the ends of the roller 12 or from the outlet holes 40, together with any trash or dirt which is removed from the surface of the fountain roller by the blade 16, or which accidentally enters the fountain housing through the gap between the plate 18 and the roller surface, accumulates at the bottom of the fountain housing, the ink drains through the screens 62 and 64 and is returned to the ink tank 60 without being contaminated with large pieces of paper or dirt. If desired, other filter mechanism may be provided between the line 58 and the tank 60.

Ink is supplied to the ink cavity through pipe 46 by means of the motor driven pump 66 from the tank 60, and thus is continuously recirculated during the operation of the ink fountain and printing press while only a single ink fountain is shown, ink may be supplied from tank 60 by pump 66 to all of the ink fountains of a multi-unit printing press such as is commonly used for newspaper printing. This results in a great simplification of the conventional construction which requires a float valve for each fountain.

In the use of the ink fountain of the present invention, there is an almost complete absence of irregularity in the ink fed to the printing cylinder, due to the constant level of the ink against the fountain roller, the small and constant distance between the top level of the ink in the cavity and the doctor blade 20, and also due to the substantially complete elimination of the possibility that particles of dirt, bits of paper or accumulations of lint and other trash can build up at the point of contact of the knife 20 with the roller 12 so as to gradually force the knife edge away from the roller, thereby starving the roller of ink at the point of the accumulation and flooding the roller surface with ink on both sides of the accumulated wedge of dirt or trash.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but depart-

tures 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 is claimed is:

1. A rotary letterpress ink fountain including in combination, a fountain roller rotatably mounted and driven within a housing to feed ink to a rotary printing member, a pair of spaced blades cooperating with the surface of the fountain roller and resiliently pressed towards it, the blade last cooperating with the surface of the rotating ink roller being positioned above the other blade, means for closing the space between the two blades to form, with the surface of the roller, an ink-retaining cavity, an overflow outlet from the cavity above the level of the engagement of the lower blade with the roller surface, means for supplying ink to the cavity in excess of the amount of ink transferred from the ink roller to the rotary printing member so that there is a continuous overflow through the outlet, a screened drain in the housing near its bottom and pump means for circulating ink from the screened drain to the ink-supply means for the cavity.

2. An ink fountain as claimed in claim 1 in which the lower blade converges towards the roller and comprises a bent strip of tough, flexible, resilient plastic material, lightly engaging with the surface of the roller, and the upper blade comprises an overshoot blade provided with means for regulating the space between it and the surface of the cylinder.

3. A rotary letterpress ink fountain including in combination, a fountain roller rotatably mounted and driven within a housing substantially enclosing the major portion of the roller surface, the roller at one side of the housing being substantially closed by means of a fountain blade extending longitudinally of the roller surface and adjustable relative to the roller to control the thickness of the film of ink on the surface of the roller to be transferred to a rotary printing member, a second blade positioned below the fountain blade and provided with means to form a small cavity extending the length of the fountain roller between the two blades, overflow means from the cavity below the upper blade, and means for supplying ink to the cavity in excess of the amount of ink delivered by the fountain roller to the rotary printing member whereby a substantial overflow is provided, means for straining the overflow ink and means for recirculating the overflow ink as part of the ink supplied to the cavity.

4. A rotary letterpress ink fountain as claimed in claim 3 in which the upper blade is a metal blade and is selectively regulable along its length, while the lower blade is a longitudinally extending flexible strip lightly bearing against the surface of the roller and extending downwardly thereof.

5. A rotary letterpress ink fountain as claimed in claim 3 in which the lower portion of the fountain is provided with a drainage outlet connected to the recirculating means for the ink and a relatively large screen prevents refuse from entering the drain.

6. A rotary letterpress ink fountain including in combination a fountain roller to feed ink to a rotary printing member, a fountain housing within which a roller is mounted and driven, a pair of members pressed towards the surface of the roller and extending longitudinally thereof, the lower member first engaging the surface of the roller comprising a flexible member resiliently pressed against the roller to remove material from the surface of the rotating roller, the second member later cooperating with the surface of the roller and variably positionable relative to the roller to control the film of ink remaining on the roller surface, said members forming an ink-retaining cavity between them and the roller, means for continuously supplying an excess of ink to the cavity, an overflow outlet for the cavity, a screened drain near the lower portion of the housing through which excess ink drains to a reservoir and means for returning ink to the continuous supply means,

7. A rotary letterpress ink fountain including in combination, a fountain roller driven and rotatably mounted within a housing which substantially encloses the major portion of the roller surface, means for maintaining a longitudinally extending body of ink against the surface of the roller comprising an ink holding means having a lower wiping blade and an upper blade, both cooperating with the surface of the roller, the lower blade removing dirt from the surface of the roller and the upper blade controlling the amount of ink fed from the surface of the roller to a rotary printing member, outlet means for the ink holding means, ink supply means for supplying ink to the holding means in excess of the ink fed by the roller and the ink overflowing through the outlet, a drain at the bottom of the housing, screen means extending longitudinally of the housing to remove trash from the overflowing ink as it passes to the drain, and pump means for recirculating the ink from the drain to the ink holding means through said ink supply means.

8. A rotary letterpress ink fountain according to claim 7 in which the roller engaging blades diverge with the lower wiping blade bearing lightly against the surface of the roller, and comprising a longitudinally extending resilient strip of tough, flexible plastic material.

References Cited in the file of this patent

UNITED STATES PATENTS

1,338,044	Smith	Apr. 27, 1920
2,018,193	Smith	Oct. 22, 1935
2,177,656	Kaddeland	Oct. 31, 1939