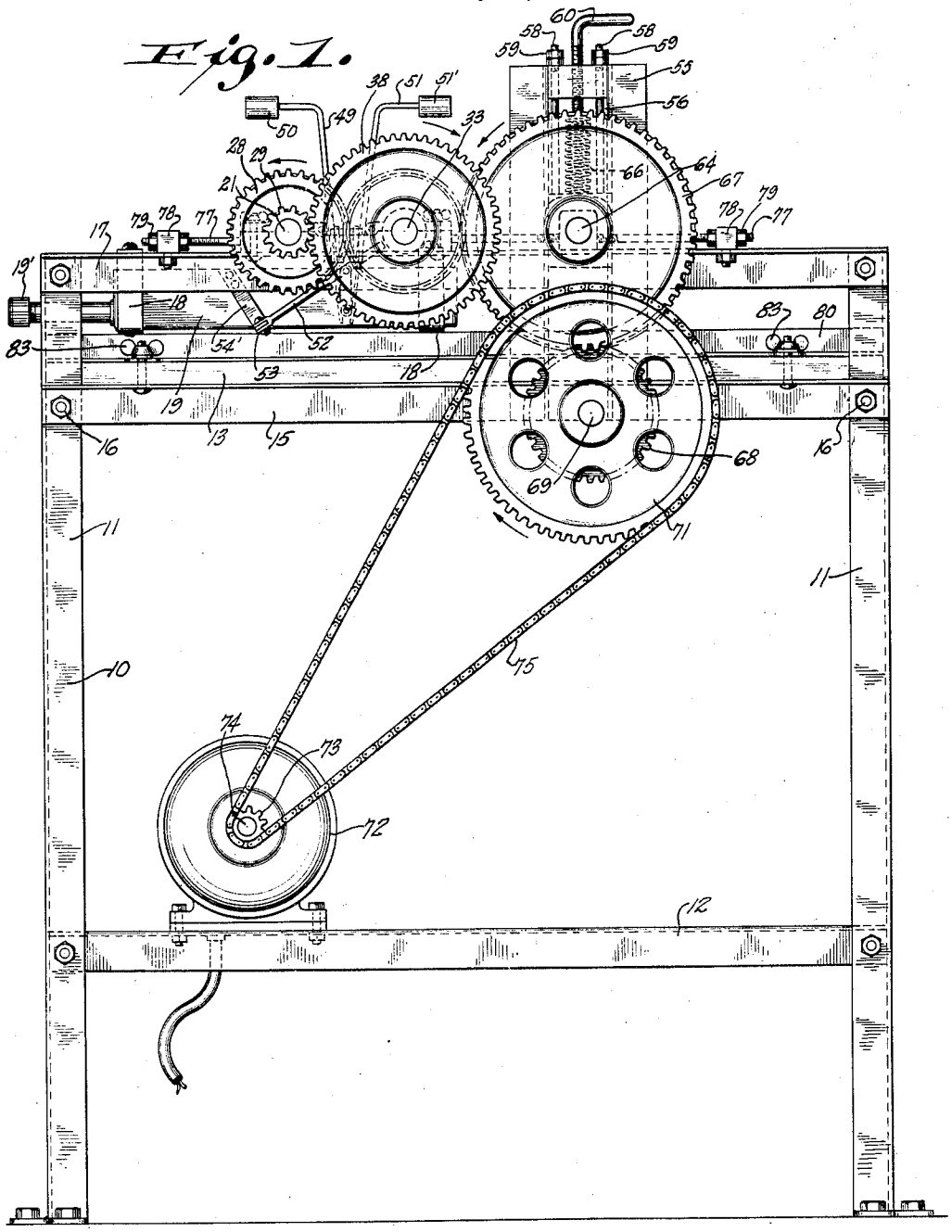
Jan. 5, 1932. E. L. WALKER 1,840,067

PRINTING MACHINE

Filed May 26, 1928 3 Sheets-Sheet 1

Fig. 1.



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PRINTING MACHINE

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Fig. 2.

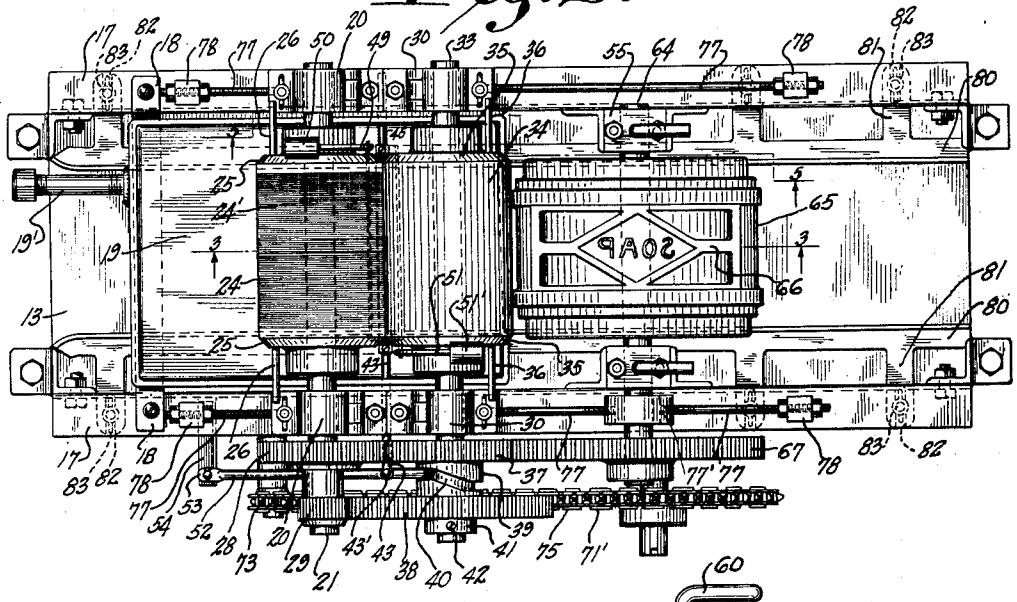
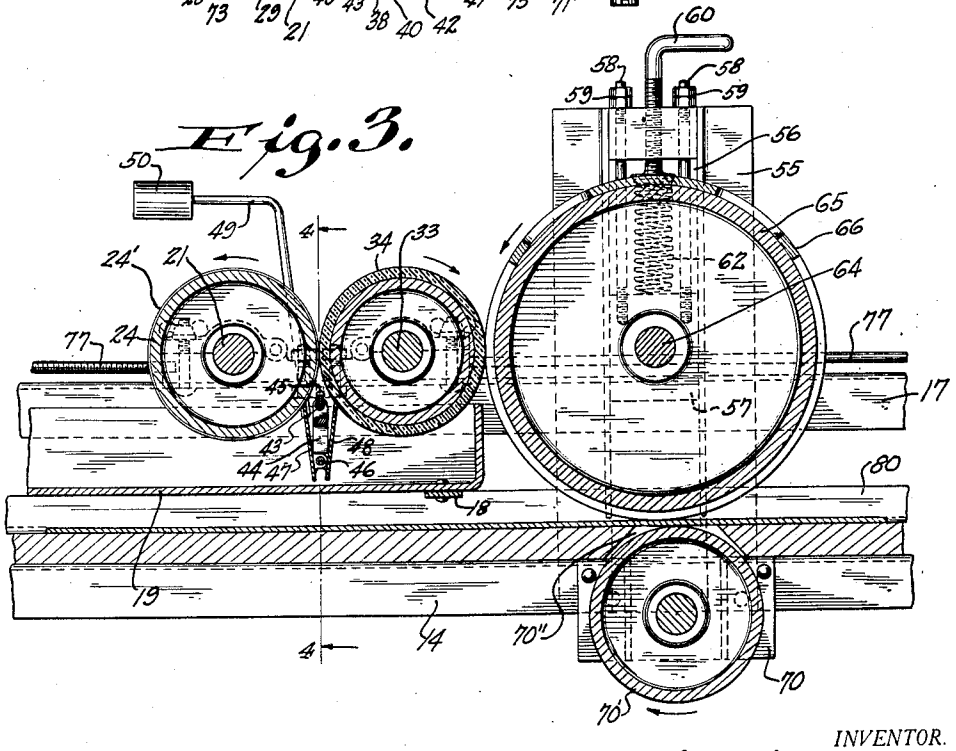


Fig. 3.



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Fig. 4.

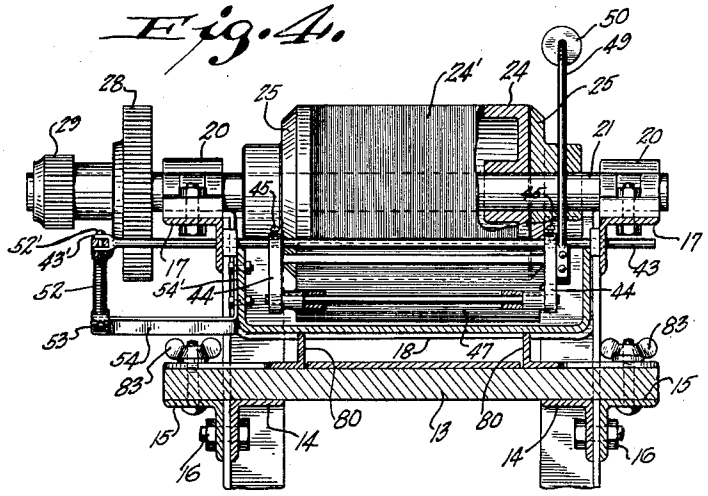
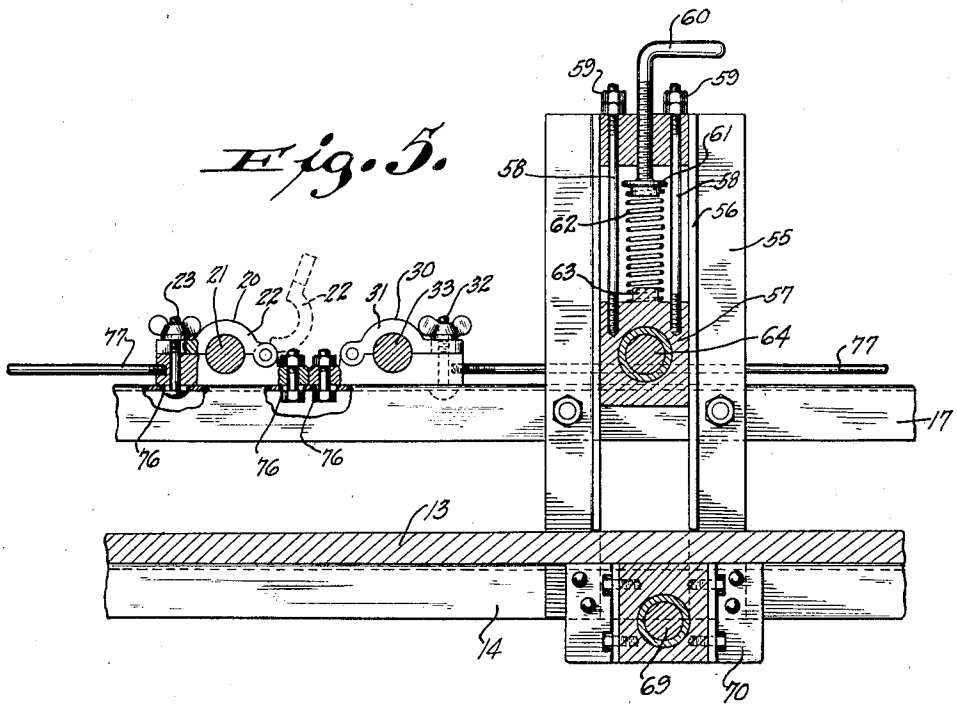


Fig. 5.



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UNITED STATES PATENT OFFICE

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PRINTING MACHINE

Application filed May 26, 1928. Serial No. 280,752.

This invention relates to improvements in printing machines.

In the paper box making industry, the printing upon the cartons or containers is performed on the flat cardboard before all the steps necessary to produce the container are completed. Heretofore, a heavy ink, very similar to paint, has been used. This ink was very slow in drying, and consequently, the remaining steps in producing the container had to be postponed for a considerable period of time to prevent smearing of the ink before it had become sufficiently dry. Various attempts were made to use a fast drying ink, but these were unsuccessful due to the fact that the ink would dry upon the rollers of the printing press and, as a result, would build up upon them. This would necessitate frequent removal and cleaning of the rollers which would interrupt the process of printing.

It is one of the objects of this invention to overcome the above-mentioned difficulties and to provide a printing machine which is designed to use a fast drying ink, and which is so constructed as to prevent the ink from drying and building up on the rollers.

It is a further object of this invention to provide a printing machine in which a novel means is employed for measuring the exact quantity of ink necessary for each application.

It is a further object of this invention to provide a printing machine in which the measuring and transfer rollers rotate in a liquid bath, preferably of the ink which is being used, to re-dissolve any ink which may have dried upon the rollers.

It is a further object of this invention to provide a printing machine which is not only adapted for use in printing upon cardboard which is to be made up into containers, but which may be used for any desired type of printing.

It is a further object of this invention to provide a printing machine which is simple in construction, efficient in operation, and well adapted for the purpose described.

With the above and other objects in view, the invention consists of the improved printing machine and all its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings, in which the same reference characters designate the same parts in all of the views:

Fig. 1 is a side elevation of the improved machine;

Fig. 2 is a plan view thereof;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3; and

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2.

Referring to the drawings, the figure 10 designates a suitable frame or support, comprising supporting legs 11, an intermediate brace 12, and a supporting top 13. The supporting top rests upon a pair of inner angle members 14 and a pair of outer angle members 15 which are secured to the supporting legs by nuts and bolts 16. The supporting legs extend above the supporting top and angle members 17 connect the upper ends of two legs on each side.

A pair of U-shaped metal bands 18, extending between the angle bars 17, support an ink pan 19, the pan being held a short distance above the supporting top 13. A plug 19′ in the outer end of the fan permits draining of the ink when necessary.

Bearings 20, secured to opposite angle members, have a shaft 21 journaled therein. The bearings have hinged upper sections 22 (see Fig. 5) which are normally held in closed position by nuts and bolts 23. An ink measuring roller 24 is mounted rigidly on the shaft 21 and the outer surface of the roller is formed with a plurality of grooves 24′. Loosely surrounding the shaft 21 at each end of the roller are collars 25. The collars are held against rotation with the roller by projecting pins 26 which contact with the frame. One end of the shaft 21 extends outwardly from its bearing, and carries a rigidly mounted gear 28 and a smaller gear 29.

A second pair of bearings 30 mounted adjacent the bearings 20 and having hinged up-

per sections 31 (see Fig. 5), normally held in operative position by nuts and bolts 32, have a shaft 33 journaled therein. A transfer roller 34, having its outer surface preferably constructed of rubber, is mounted rigidly on the shaft 33. The latter roller engages the ink measuring roller 24. Collars 35, similar to the collars 25, are loosely mounted on the shaft 33 at each end of the roller. Pins 36 projecting from the collars contact with the frame to hold the collars against rotation with the roller. The shaft 33 extends outwardly through one of the bearings and carries a rigidly mounted gear 37 which meshes with the gear 28 on the shaft 21. A gear 38 is loosely mounted on the shaft 33, and has an integral hub portion 39 with a cam groove 40 extending around its outer periphery (see Fig. 2). A collar 41 with a set screw 42 maintains the loosely mounted gear 38 in position on the shaft.

Between the two rollers 24 and 34, and positioned below their point of contact, is a rod 43 which is journaled in the frame. The rod extends through perforations in the upper end of a pair of spaced apart plates 44 (see Fig. 4). Set screws 45 hold the plates rigidly to the rod. A second rod 46 extends through perforations in the lower ends of the plates. A scraping or "doctoring" strip 47 for the roller 24 is pivoted on the rod 46, and a similar strip 48 for the roller 34 is pivoted on the same rod. An L-shaped arm 49 extends upwardly from the strip 47 and carries a weight 50 which tends to keep the strip in contact with the roller 24. A similar arm 51 carrying a weight 51′ is connected to the strip 48 to maintain the latter strip in contact with its roller 34.

The outer end of the rod 43 is bifurcated as at 43′ and is connected to an arm 52 by a pin 52′. The arm 52 has one end extending within the cam groove 40 in the hub 39 of the gear 38. The other end of the arm 52 is bifurcated as at 53 and is connected to the end of an arm 54 which is part of a bracket 54′ secured to the frame. When the rollers are in motion the arm 52 is moved back and forth laterally by reason of its engagement with the cam groove 40. This in turn imparts a reciprocal motion to the rod 43 which moves the strips 47 and 48 back and forth laterally as they engage their respective rollers.

At each side of the frame are upright members 55 each having a slotted inner portion 56 (see Fig. 5). Within the slot of each member 55 is a bearing block 57. Bolts 58 have their lower ends threaded in the bearing block, and their upper ends extending through perforations in the upper end of the member 55. The upper ends of the bolts are threaded to receive nuts 59. A bolt 60 is threaded in the upper end of the member 55 between the bolts 58. The lower end of the bolt 60 is formed with a head 61 to receive the upper end of a spring 62. The lower end of the spring engages a knob 63 on the upper end of the bearing block.

Journaled in the bores of the bearing blocks 57 is a shaft 64 which carries a rigidly mounted printing roller 65 carrying the type or plate 66. The outer end of the shaft 64 carries a rigidly mounted gear 67 which meshes with the gear 37 on the shaft 33 and with a gear 68 on a shaft 69, the latter shaft being journaled in bearings 70 and carrying a supporting roller 70′, the upper portion of which is received by an opening 70″ in the supporting top 13. The shaft 69 carries a rigidly mounted sprocket wheel 71 on its outer end.

An electric motor 72 is mounted on the brace member 12 and carries a small sprocket wheel 73 on the end of its drive shaft 74. The sprocket wheel 73 is connected with the sprocket 71 by an endless chain 75.

The bolts securing the bearings 20 and 30 to the angle members 17 extend through slots 76 (see Fig. 5) in the angle members. This permits adjustment of the bearings to move the rollers toward or away from one another according to the contact desired between them. This adjustment is accomplished by means of adjustment rods 77 which have ends threaded in the bearings and which extend from perforated lugs 78. Nuts 79 threaded on the adjustment rods adjacent the lugs may be turned to accomplish the desired adjustment in order to avoid interference of the rod 77 on one side of the device with the shaft 64, a portion of said rod is formed in two sections with the adjacent ends of the sections threaded into a U-shaped member 77′ loosely surrounding the shaft 64.

A pair of guide members 80 positioned on opposite sides of the supporting top are formed with extensions 81 having slotted end portions 82. Bolts and winged nuts 83 secure the guide members in place. By loosening the nuts, the guide members may be moved closer together or farther apart according to the width of the material upon which the printing is to be done.

The operation of the device is as follows. When the motor 72 is set in operation, through the endless chain 75 motion is imparted to the sprocket wheel 71 and shaft 69. From this shaft the motion is transmitted to the shaft 64 by means of the gears 68 and 67 thereby rotating the printing roller 65. The gear 67 engaging the gear 37 rotates the shaft 33 and transfer roller 34. The gear 37 in turn engages the gear 28 to turn the shaft 21 and the ink measuring roller 24.

The small gear 29 on the shaft 21, engaging the loosely mounted gear 38, causes the gear 38 to revolve and also its hub portion 39 with the cam groove 40. This imparts reciprocal motion to the scraping strips 47 and 48 through the action of the rods 52 and 43.

The pan 19 is filled with a suitable ink, and,

as before pointed out, the machine is designed particularly to permit the use of a fast drying ink. The guiding members 80 are next adjusted according to the width of the material to be printed upon. The material is then fed in at the left hand end of the machine (referring to Figs. 1 and 2), and it passes beneath the ink pan and between the printing roll and the supporting roll, being discharged at the right hand end of the machine.

The ink measuring roller 24 revolves in the ink bath and the ink adheres to its surface. The scraping strip 47 removes all of the ink picked up by the roller with the exception of that within the grooves 24'. Thus by the time the roller engages the transfer roller 34, the amount of ink received by the latter roller will be exactly the amount contained by the grooves 24'. If more or less ink is necessary for certain types of printing, a measuring roller with grooves of greater or less depth may be used.

The ink received by the rubber transfer roller is transferred to the plate 66 on the printing roller. The portion of the transfer roller which has given up its ink then goes through the ink bath, and any ink which may be left upon it is re-dissolved by the ink in the bath. The strip 48 then removes all of the ink picked up from the bath, leaving the transfer roller perfectly clean to receive a new supply of ink from the measuring roller 23.

One of the most important features of the machine lies in having the ink measuring roller and the transfer roller revolve in the ink bath. It is this feature which permits the use of a fast drying ink, for if any of the ink on either of the rollers should dry, it will be immediately dissolved by going through the fresh ink in the bath. If this feature were not present, the ink would dry upon the rollers and would "build up" upon them, thereby hindering the process of printing.

Practically all of the ink which is transferred to the printing roller is removed by contact with the paper or cardboard upon which the printing is being done. Should any remain upon the printing plate, it will be redissolved by reason of its contact with the rubber transfer roller carrying a fresh supply of ink.

The collars 25 and 35 adjacent the ends of the ink measuring roller and the transfer roller are provided to prevent ink from being picked up by the ends of the rollers. By having the stationary collars, any surplus ink will run down the beveled edges of the collars and return to the ink pan. If no collars were provided, ink picked up by the edges and ends of the rollers might work onto the main portions of the rollers and cause a thicker coating of ink at each end which would materially affect the quality of the printing.

The hinged tops 22 and 31 of the bearings 20 and 30 are provided to permit removal of the rollers when desired.

The coil spring 62 engaging the bearing block 57 allows the printing roller to give upwardly against the tension of the spring when a thick piece of cardboard is being used in the machine. By manipulating the nuts 59 and the bolt 60, the roller may be adjusted toward or away from the supporting roll.

From the foregoing description, it may be seen that the improved printing machine is very efficient in operation and well adapted for the purpose described.

What I claim is:

1. A printing machine comprising a frame, a liquid receptacle mounted on said frame, a printing member carried by said frame, an ink supplying member, a transfer roller journaled on the frame for transferring ink from the ink supplying member to the printing member, said transfer roller extending into the liquid receptacle, the liquid therein acting to dissolve the hardened unused ink upon said transfer roller, and scraper means engaging said transfer roller to remove all ink therefrom before it receives a new charge from the ink supplying member.

2. A printing machine comprising a frame, an ink receptacle mounted on said frame, a printing member carried by said frame, an ink supplying roller journaled on the frame and extending into the ink receptacle, a transfer roller journaled on the frame and extending into the ink receptacle for transferring ink from the ink supplying roller to the printing member, the ink in the ink receptacle acting to dissolve hardened unused ink upon the ink supplying roller and the transfer roller, and scraper means engaging said transfer roller for removing all ink therefrom before it receives a new charge from the ink supplying member.

3. A printing machine comprising a frame, an ink receptacle mounted on said frame, a printing member carried by said frame, a grooved ink measuring and supplying roller journaled in the frame and extending into the ink receptacle, and a transfer roller journaled in the frame and extending into the ink receptacle for transferring ink from the ink measuring and supplying roller to the printing member, the ink in the ink receptacle acting to dissolve hardened unused ink upon the ink supplying roller and the transfer roller.

4. A printing machine comprising a frame, a liquid receptacle mounted on said frame, a printing member carried by said frame, an ink supplying member, a transfer roller journaled on the frame for transferring ink from the ink supplying member to the printing member, said transfer roller extending into

the liquid receptacle, the liquid therein acting to dissolve the hardened unused ink upon said transfer roller, and a reciprocating scraper adjacent the liquid receptacle engaging said transfer roller for removing liquid which has adhered thereto.

5. A printing machine comprising a frame, an ink receptacle mounted on said frame, a printing member carried by said frame, a grooved ink measuring and supplying roller journaled in the frame and extending into the ink receptacle, a transfer roller journaled in the frame and extending into the ink receptacle for transferring ink from the ink measuring and supplying roller to the printing member, the ink in the ink receptacle acting to dissolve hardened unused ink upon the ink measuring and supplying roller and the transfer roller, means adjacent the ink receptacle engaging the ink measuring and supplying roller for removing ink in excess of the amount contained by the grooves of said roller, and means adjacent the ink receptacle engaging the transfer roller for removing all ink which has adhered thereto.

6. A printing machine comprising a frame, an ink receptacle mounted on said frame, a printing member carried by said frame, a grooved ink measuring and supplying roller journaled in the frame and extending into the ink receptacle, a transfer roller journaled in the frame and extending into the ink receptacle for transferring ink from the ink measuring and supplying roller to the printing member, the ink in the ink receptacle acting to dissolve hardened unused ink upon the ink measuring and supplying roller and the transfer roller, a reciprocating scraper adjacent the ink receptacle engaging the ink measuring and supplying roller for removing ink in excess of the amount contained by the grooves of said roller, and a reciprocating scraper adjacent the ink receptacle engaging the transfer roller for removing all ink which has adhered thereto.

7. A printing machine comprising a frame, an ink receptacle mounted in said frame, a printing member carried by the frame, an ink supplying roller journaled in the frame and extending into the ink receptacle, and a fixed collar adjacent an end of said roller.

8. A printing machine comprising a frame, an ink receptacle mounted in said frame, a printing member carried by the frame, an ink supplying roller journaled in the frame and extending into the ink receptacle, and a fixed collar adjacent an end of said roller, said collar being of substantially the same diameter as the roller and having a beveled edge.

9. A printing machine comprising a frame, an ink receptacle mounted on said frame, a printing roller rotatably mounted on said frame, a transfer roller journaled on said frame and engaging said printing roller, a grooved ink measuring roller journaled on said frame and engaging said transfer roller, said ink measuring and transfer rollers extending into the ink receptacle, the ink therein acting to dissolve hardened unused ink on said rollers and to supply new ink to the ink measuring roller, a reciprocating scraper adjacent the ink receptacle and engaging the ink measuring roller for removing ink in excess of the amount contained by the grooves of said roller, a reciprocating scraper adjacent the ink receptacle and engaging the transfer roller for removing all of the ink adhering thereto, and means for rotating said rollers.

10. A printing machine comprising a frame, a liquid receptacle mounted on said frame, a printing member carried by said frame, an ink supplying member, a transfer roller journaled on the frame for transferring ink from the ink supplying member to the printing member, said transfer roller extending into the liquid receptacle, the liquid therein acting to dissolve the hardened unused ink upon said transfer roller, and a scraper adjacent the liquid receptacle engaging said transfer roller for removing liquid which has adhered thereto.

11. A printing machine comprising a frame, an ink receptacle mounted on said frame, a printing member carried by said frame, a grooved ink measuring and supplying roller journaled in the frame and extending into the ink receptacle, a transfer roller journaled in the frame for transferring ink from the ink measuring and supplying roller to the printing member, the ink in the ink receptacle acting to dissolve hardened unused ink upon the ink measuring and supplying roller, means adjacent the ink receptacle engaging the ink measuring and supplying roller for removing ink in excess of the amount contained by the grooves of said roller, and means adjacent the ink receptacle engaging the transfer roller for removing all ink which has adhered thereto.

12. A printing machine comprising a frame, a printing member carried by said frame, an ink supplying member, a transfer roller journaled on the frame for transferring ink from the ink supplying member to the printing member, means for maintaining a substantial body of ink in direct contact with said transfer roller to redissolve hardened unused ink thereon, and scraper means engaging said transfer roller to remove all ink therefrom before it receives a new charge from the ink supplying member.

13. A printing machine comprising a frame, a printing member carried by said frame, an ink supplying member, a transfer roller journaled on the frame for transferring ink from the ink supplying member to the printing member, means for maintaining a substantial body of ink in direct contact

with said ink supplying member to supply ink thereto and to redissolve hardened unused ink thereon, means for keeping a substantial body of ink in direct contact with said transfer roller to redissolve hardened unused ink thereon, and scraper means engaging said transfer roller to remove all ink therefrom before it receives a new charge from the ink supplying member.

14. A printing machine for use with a rapidly drying ink comprising a frame, an ink receptacle mounted on said frame a printing member carried by said frame, an ink measuring and supplying roller having depressions therein journaled in the frame and extending into the ink receptacle, a single transfer roller journaled in the frame for transferring ink from the ink measuring and supplying roller to the printing member, the ink in the ink receptacle acting to dissolve hardened unused ink upon the ink measuring and supplying roller, means adjacent the ink receptacle engaging the ink measuring and supplying roller for removing ink in excess of the amount contained by the depressions of said roller, and means adjacent the ink receptacle engaging the transfer roller for removing all ink which has adhered thereto, said single transfer roller delivering a measured supply of ink to the printing member in a condition for immediate transfer to a sheet of material to be printed upon.

15. A printing machine for use with a rapidly drying ink comprising a frame, a printing member carried by said frame, an ink measuring and supplying roller journaled in the frame and having depressions in its outer surface, means for maintaining a substantial body of ink in fluid form in constant contact with a portion of said ink measuring and supplying roller to supply ink thereto and to redissolve hardened unused ink which has accumulated thereon, a single transfer roller journaled in the frame for transferring ink from the ink measuring and supplying roller directly to the printing member, and scraper means engaging the ink measuring and supplying roller for removing ink in excess of the amount contained by the depressions therein so that only a measured supply is delivered to the transfer roller, said single transfer roller delivering said measured supply of ink to the printing member in a condition for immediate transfer to a sheet of material to be printed upon.

In testimony whereof, I affix my signature.

EMERY L. WALKER.