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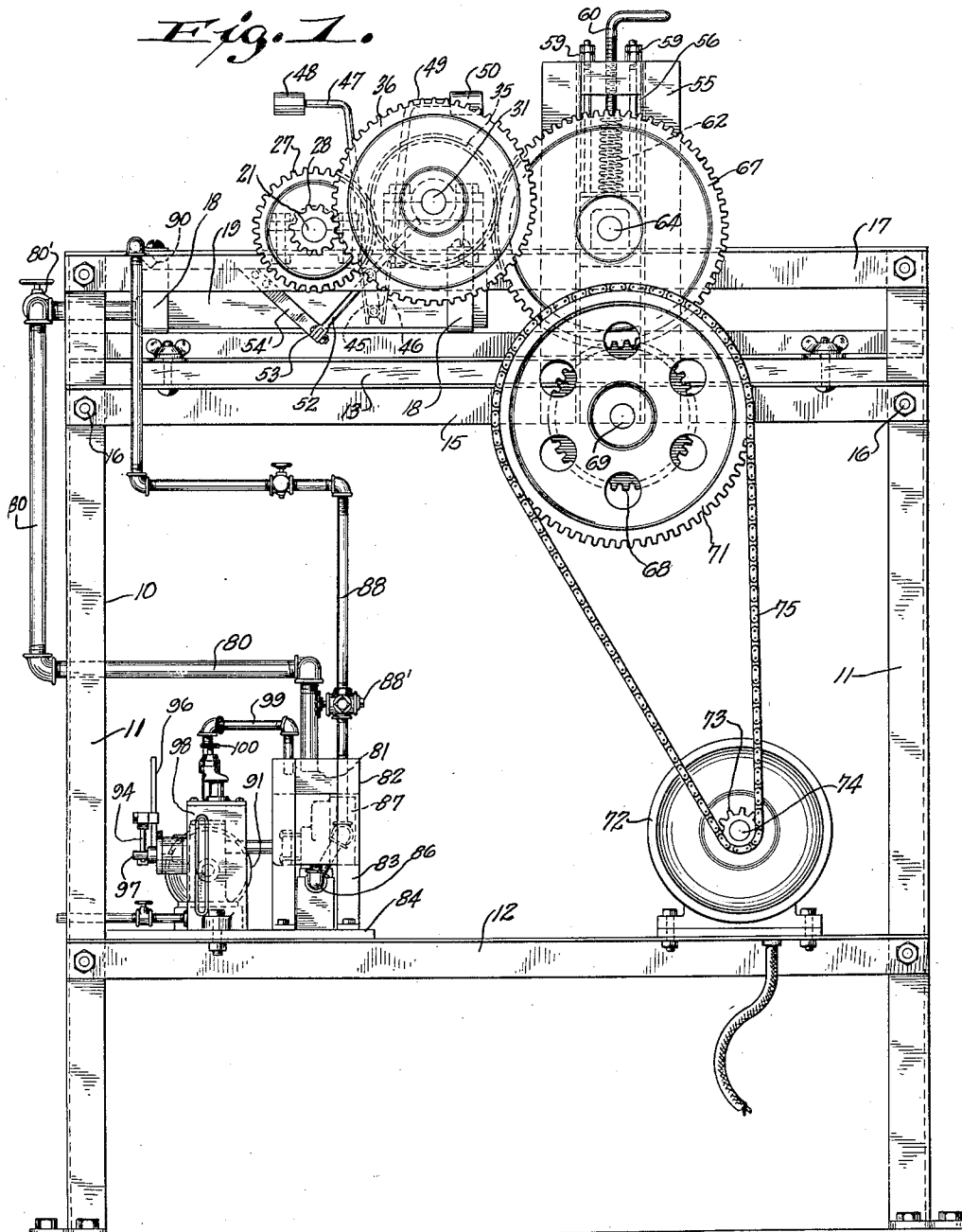
A. W. WERNER ET AL

1,840,071

PRINTING MACHINE

Filed Feb. 1, 1929

3 Sheets-Sheet 1



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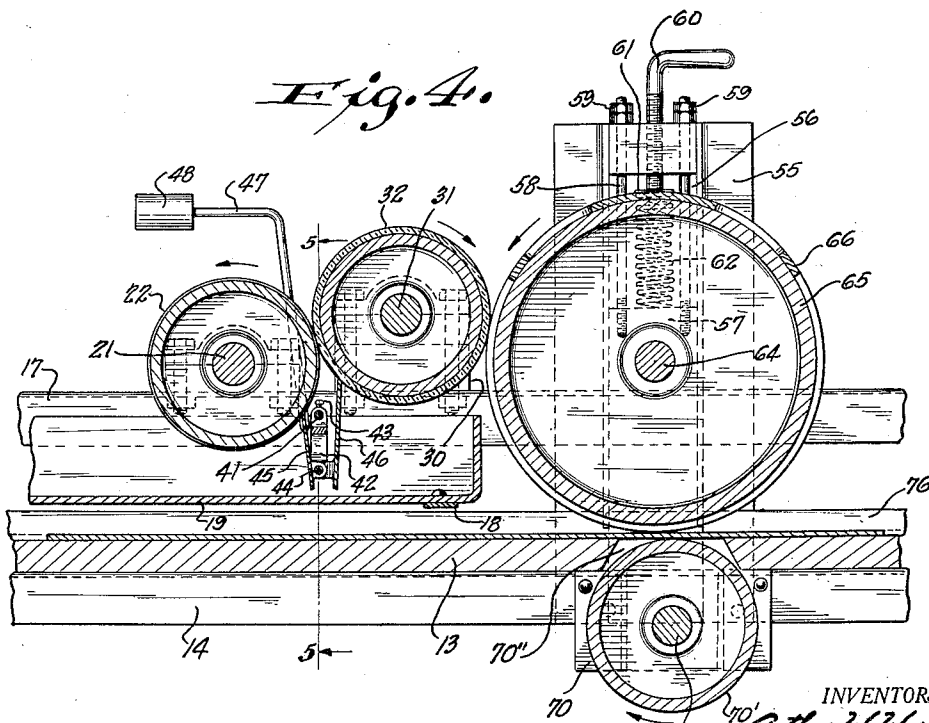
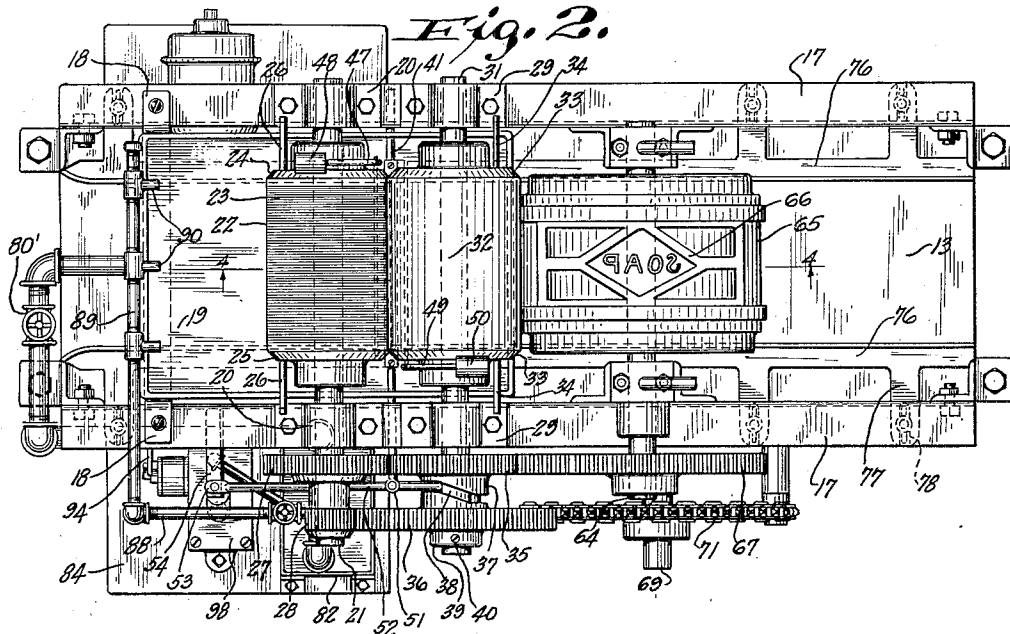
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1,840,071

PRINTING MACHINE

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3 Sheets-Sheet 2



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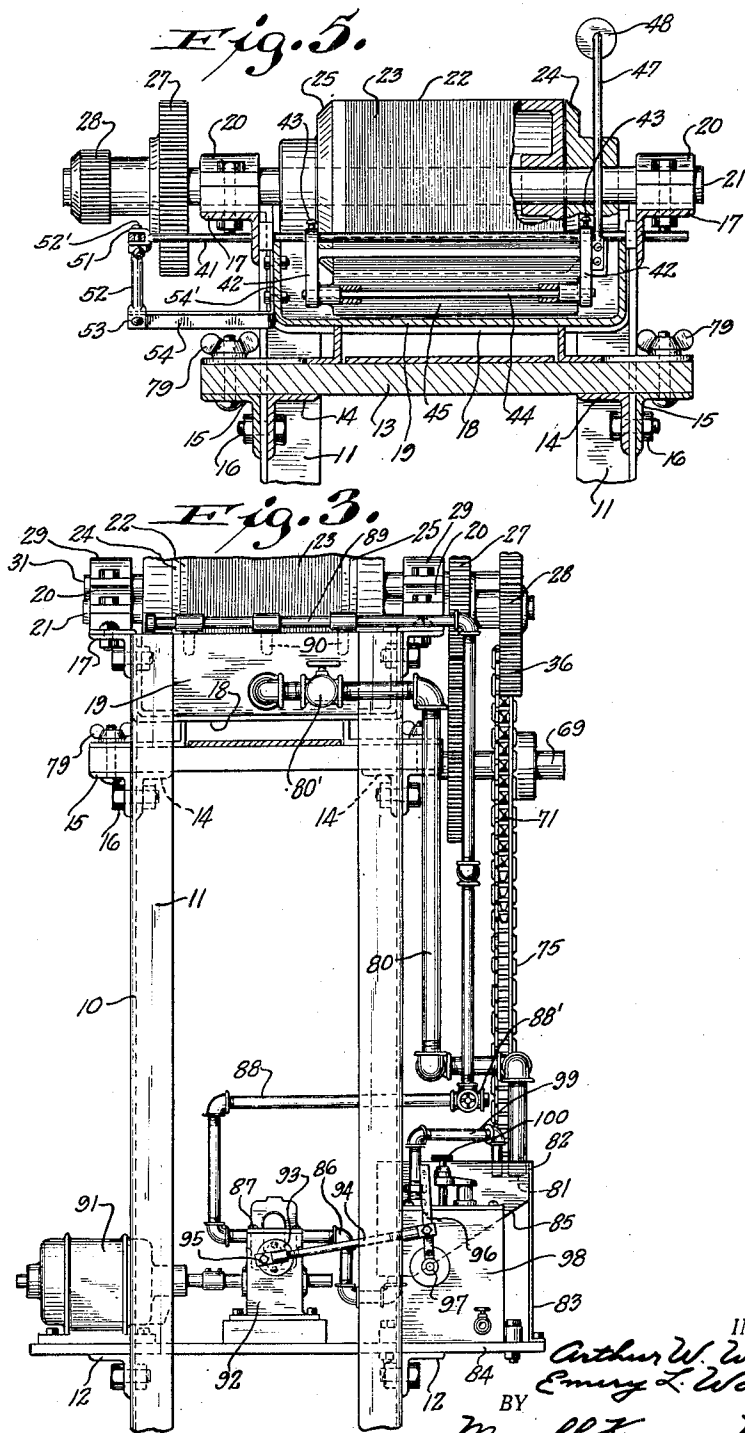
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PRINTING MACHINE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

ARTHUR W. WERNER, OF MILWAUKEE, AND EMERY L. WALKER, OF WAUWATOSA, WISCONSIN, ASSIGNORS TO KIECKHEFER CONTAINER COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF MAINE

PRINTING MACHINE

Application filed February 1, 1929. Serial No. 336,759.

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. In the application of Emery L. Walker, Serial No. 280,752, a printing machine, designed to use a fast drying ink is described. The present invention was designed as an improvement upon the device described in the former application, and it has been found that it will operate with greater efficiency.

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 having an ink measuring roller which rotates in a bath of fast drying ink, and having an ink transfer roller which is supported outside of said ink bath, said transfer roller being engaged by means for efficiently removing all ink therefrom before it receives a new supply from the measuring roller.

A further and important object of this invention resides in the provision of means for adding new vehicle to the ink in the ink pan at the same rate as the original vehicle evaporates, to maintain the ink in the pan of a constant consistency.

It is a further object of the invention to

provide means for keeping the ink in the pan in circulation.

A further object of this invention is to provide a printing machine which is comparatively 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 an end view, parts being broken away;

Fig. 4 is an enlarged sectional view taken on line 4—4 of Fig. 2, parts being broken away; and

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4.

Referring to the drawings, the numeral 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.

Bearings 20, secured to opposite angle members, have a shaft 21 journaled therein. An ink measuring roller 22 is mounted rigidly on the shaft 21 and the outer surface of the roller is formed with a plurality of grooves 23. Loosely surrounding the shaft 21 at each end of the roller are collars 24 and 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 27 and a smaller gear 28.

A second pair of bearings 29 mounted adjacent the bearings 20 on blocks 30, which raise said bearings considerably above the bearings 20, have a shaft 31 journaled therein. A transfer roller 32, having its outer surface preferably constructed of rubber, is mounted rigidly on the shaft 31. The latter roller engages the ink measuring roller 22, but does not extend into the ink pan 19. Collars 33, similar to the collars 25, are loosely mounted on the shaft 31 at each end of the roller. Pins 34 projecting from the collars contact with the frame to hold the collars against rotation with the roller. The shaft 31 extends outwardly through one of the bearings and carries a rigidly mounted gear 35 which meshes with the gear 27 on the shaft 21. A gear 36 is loosely mounted on the shaft 31, and has an integral hub portion 37 with a cam groove 38 extending around its outer periphery (see Fig. 2). A collar 39 with a set screw 40 maintains the loosely mounted gear 36 in position on the shaft.

Between the two rollers 22 and 32, and positioned below their point of contact, is a rod 41 which is journaled in the frame. The rod extends through perforations in the upper end of a pair of spaced apart arms 42 (see Fig. 5). Set screws 43 hold the arms rigidly to the rod. A second rod 44 extends through perforations in the lower ends of the arms. A scraping or "doctoring" strip 45 for the roller 22 is pivoted on the rod 44, and a similar strip 46 for the roller 32 is pivoted on the same rod. An L-shaped arm 47 extends upwardly from the strip 45 and carries a weight 48 which tends to keep the strip in contact with the roller 22. A similar arm 49 carrying a weight 50 is connected to the strip 46 to maintain the latter strip in contact with its roller 32.

The outer end of the rod 41 is bifurcated as at 51 and is connected to an arm 52 by a pin 52'. The arm 52 has one end extending within the cam groove 38 in the hub 37 of the gear 36. 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 38. This in turn imparts a reciprocal motion to the rod 41 which moves the strips 45 and 46 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. 4). 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 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 35 on the shaft 31 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.

A pair of guide members 76 positioned on opposite sides of the supporting top are formed with extensions 77 having slotted end portions 78. Bolts and winged nuts 79 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.

Extending from an opening in the end of the ink pan 19 is a pipe line 80 controlled by a valve 80', the lower end of the pipe line being open as at 81 to discharge into a tank 82. The tank is supported by legs 83 which extend upwardly from a shelf 84 mounted on the frame portions 12. The tank has an inclined bottom portion 85, from an opening in which pipes 86 extend. The latter communicate with a pump 87. Extending upwardly from the pump are pipes 88 which terminate in a horizontally disposed portion 89 having a plurality of nozzles 90 extending therefrom and arranged to discharge into the ink pan. The flow of ink through the pipes 88 is controlled by a valve 88'.

The pump 87 is driven by a motor 91, which has a drive shaft extending into a gear reducing box 92, the latter being in connection with the pump. A wheel 93 extends rotatably from the gear reducing box, and to said wheel one end of a small piston 94 is connected by an eccentrically positioned pin 95. The other end of the piston is pivoted to an arm 96, the latter having its lower end rigidly secured to a shaft 97 and being arranged to reciprocate the latter upon movement of the piston. The shaft 97 extends into an ordinary drip "lubricator" 98 to operate a pump therewithin. Instead of having lubricant within the drip "lubricator", vehicle for the

ink is used. This vehicle is forced out through the pipe 99, and is discharged drop by drop into the tank 82 to replace the vehicle in the ink which has been lost by evaporation. The flow from the pipe 99 is controlled by a valve member 100, and by turning the latter the vehicle may be made to drip either slowly or rapidly into the tank 82. The valve 100 should be so adjusted that new vehicle is supplied at the same rate as the original vehicle is lost by evaporation.

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 35 rotates the shaft 31 and transfer roller 32. The gear 35 in turn engages the gear 27 to turn the shaft 21 and the ink measuring roller 22.

The small gear 28 on the shaft 21, engaging the loosely mounted gear 36, causes the gear 36 to revolve and also its hub portion 37 with the cam groove 38. This imparts reciprocal motion to the scraping strips 45 and 46 through the action of the rods 52 and 41.

The pan 19 and circulating system are 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 76 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 22 revolves in the ink bath and the ink adheres to its surface. The scraping strip 45 removes all of the ink picked up by the roller with the exception of that within the grooves 23. Thus by the time the roller engages the transfer roller 32, the amount of ink received by the latter roller will be exactly the amount contained by the grooves 23. 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 passes the strip 46 which removes all remaining ink, leaving the transfer roller perfectly clean to receive a new supply of ink from the measuring roller 23. As the strip 46 removes ink from the transfer roller there will be an accumulation of ink between said strip and the roller which will act to re-dissolve any ink which has hardened upon the roller. The transfer roller is supported above the ink

pan instead of in it, because if it revolved in the ink it would pick up more ink than could be efficiently removed by the strip 46.

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 re-dissolved by reason of its contact with the rubber transfer roller carrying a fresh supply of ink.

The collars 24 and 25 and 33 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.

It has been found that when a fast drying ink, such as is used in the present machine, is permitted to stand in the ink pan that a large percentage of the vehicle of the ink is lost by evaporation. The result of this is that the ink becomes thick and builds up upon the rollers. Therefore, in order to make the present machine practical, it was necessary to provide the before described circulating system and means for replacing the lost vehicle. With the use of this system, the ink from the pan is discharged constantly into the pipe line 80 and into the tank 82. While in the tank, the ink receives a fresh supply of vehicle from the pipe 99, and it then passes from the tank into the pipes 86 and is forced by the pump 87 back into the ink pan 19 by way of the pipe line 88. Thus the ink is kept in constant circulation, and the desired consistency is maintained by the addition of new vehicle.

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 we claim is:

1. A printing machine for use with rapidly drying ink 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 single transfer roller journaled in the frame and positioned out of the ink receptacle for transferring ink from the ink measuring and supplying roller directly to the printing member in an accurately measured amount and in a condition ready for immediate transfer to a sheet of material to be printed upon, and means engaging said transfer roller for removing the unused ink

therefrom before said roller receives a new supply from the ink supplying roller.

2. A printing machine for use with rapidly drying ink 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 single transfer roller journaled in the frame and positioned outside of the ink receptacle for transferring ink from the ink measuring and supplying roller directly 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, said single transfer roller delivering to the printing member an accurately measured amount of ink in a condition ready for immediate transfer to a sheet of material to be printed upon.

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, a transfer roller journaled in the frame and positioned outside of 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, 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.

4. A printing machine for use with rapidly drying ink 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 single transfer roller journaled in the frame and positioned outside of the ink receptacle for transferring ink from the ink measuring and supplying roller directly to the printing member, the ink in the ink receptacle acting to dissolve hardened unused ink upon the ink measuring and supplying roller, and 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, said single transfer roller delivering

to the printing member an accurately measured amount of ink in a condition ready for immediate transfer to a sheet of material to be printed upon.

5. A printing machine for use with 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 and unused ink which has accumulated thereon, a single transfer roller journaled in the frame and out of contact with said body of ink 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 to the printing member an accurately measured amount of ink in a condition ready for immediate transfer to a sheet of material to be printed upon.

In testimony whereof, we affix our signatures.

ARTHUR W. WERNER.
EMERY L. WALKER.

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