

Nov. 11, 1941.

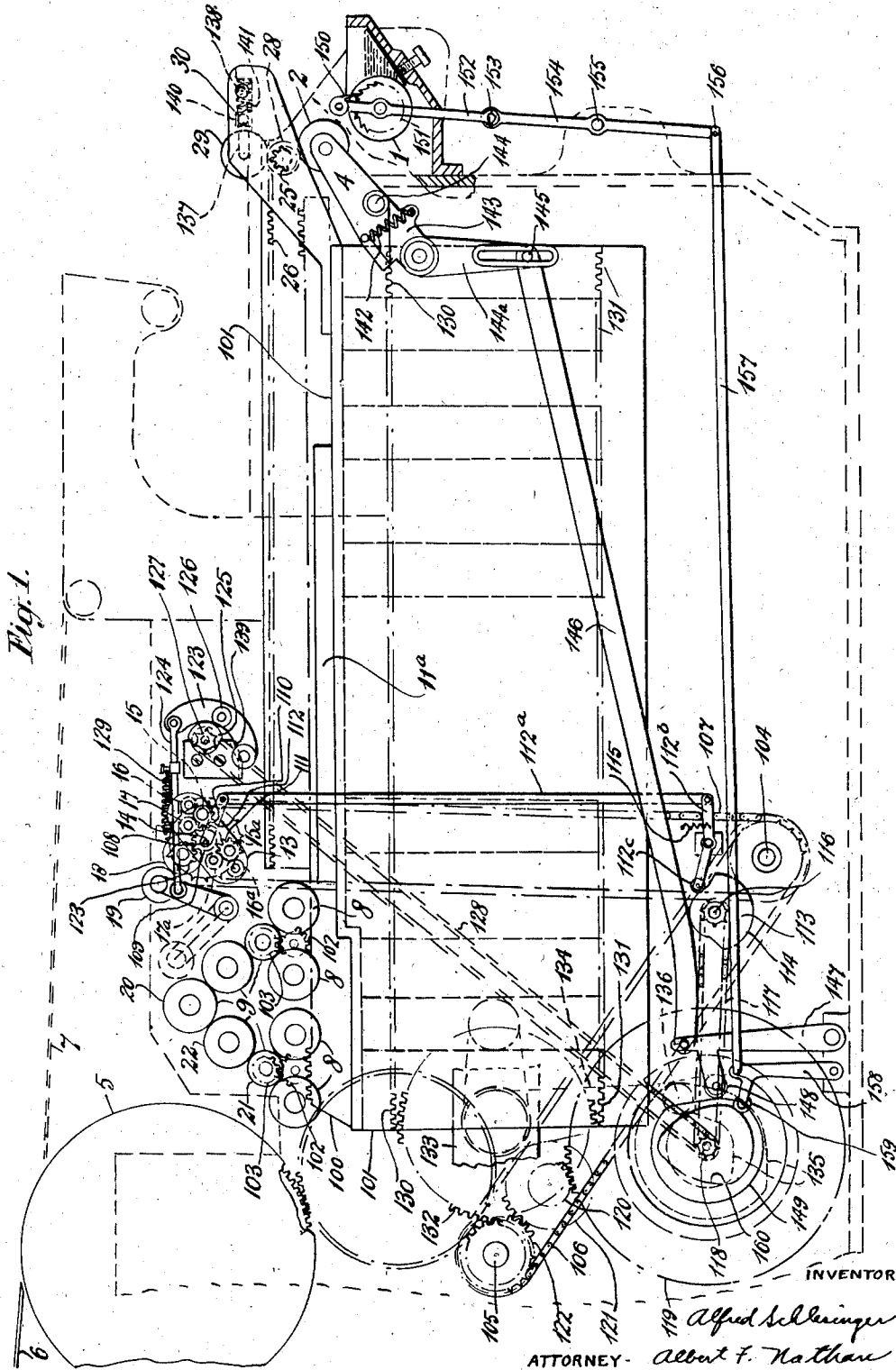
A. SCHLESINGER

2,262,470

INKING DEVICE OF FLAT BED CYLINDER PRINTING MACHINES

Filed Dec. 10, 1938

3 Sheets-Sheet 1



Nov. 11, 1941.

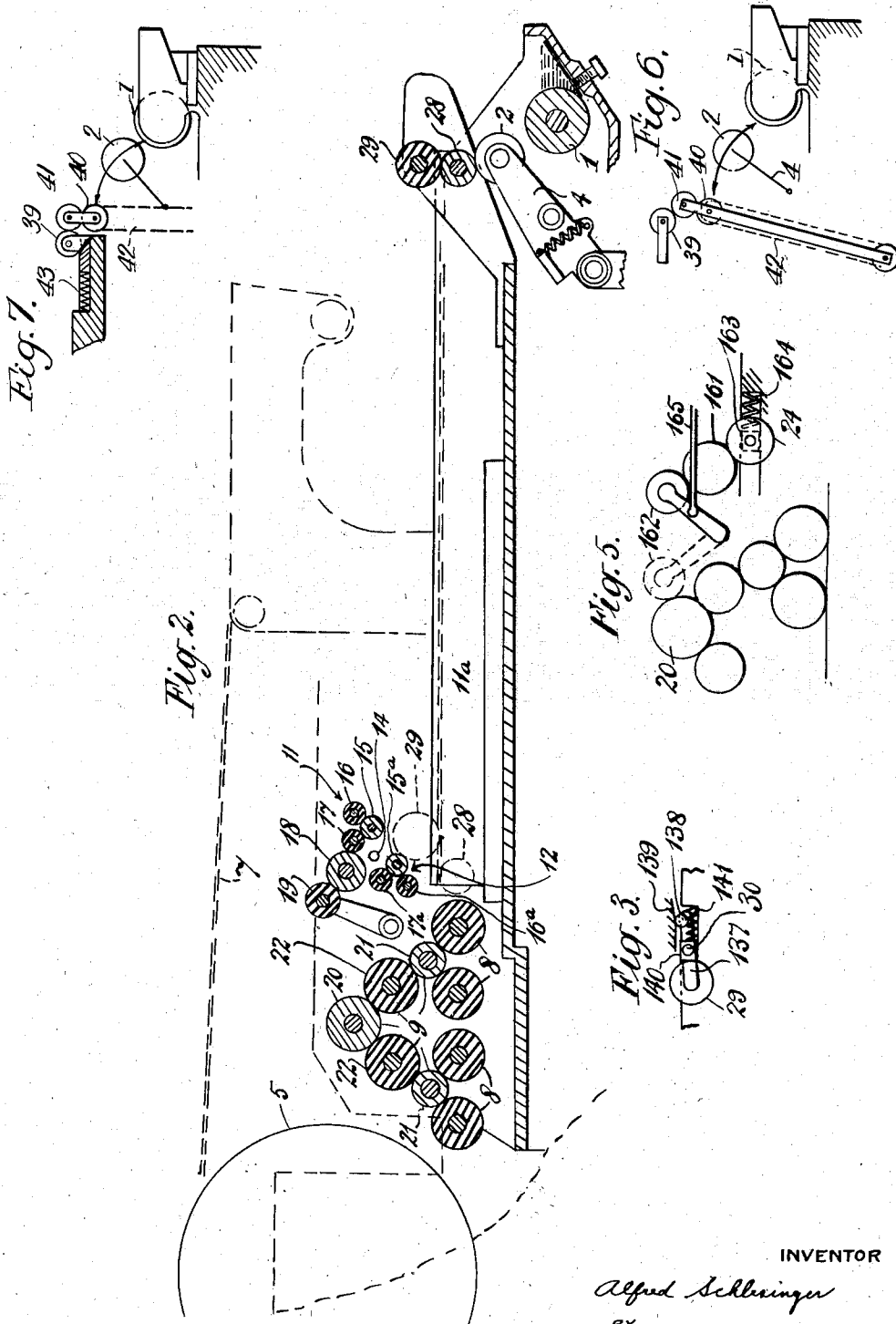
A. SCHLESINGER

2,262,470

INKING DEVICE OF FLAT BED CYLINDER PRINTING MACHINES

Filed Dec. 10, 1938

3 Sheets-Sheet 2



INVENTOR

Alfred Schlesinger

BY Albert F. Nathan  
ATTORNEY

Nov. 11, 1941.

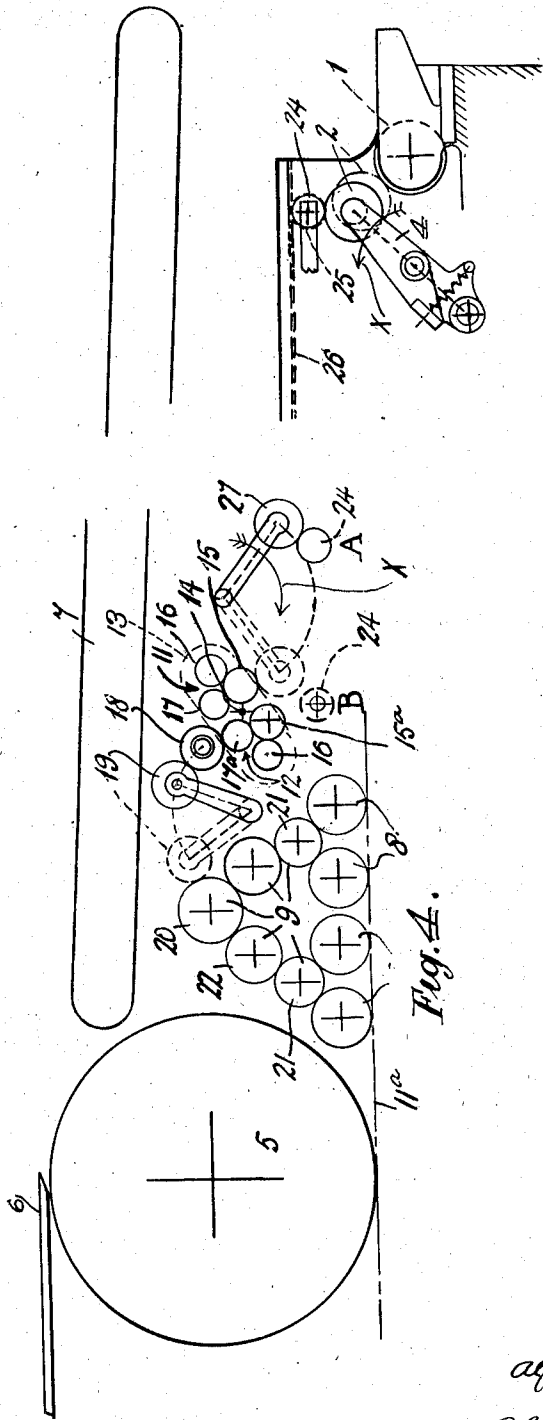
A. SCHLESINGER

2,262,470

INKING DEVICE OF FLAT BED CYLINDER PRINTING MACHINES

3 Sheets-Sheet 3

Filed Dec. 10, 1938



INVENTOR  
Alfred Schlesinger  
BY  
Albert F. Nathan  
ATTORNEY

# UNITED STATES PATENT OFFICE

2,262,470

## INKING DEVICE OF FLAT BED CYLINDER PRINTING MACHINES

Alfred Schlesinger, Hampstead, London, England

Application December 10, 1938, Serial No. 245,046

In Great Britain December 13, 1937

14 Claims. (Cl. 101—356)

The present invention relates to the inking devices of flat-bed cylinder printing machines of the two-revolution type and of the Wharfedale or stop-cylinder type in which the sheet is fed and delivered at opposite ends of the machine.

In general in these machines the ink is taken from a duct roller or cylinder onto a slab which moves with the reciprocating bed first under distributing rollers which spread the ink over the whole or a large surface of the slab and then under rollers which take off the ink directly from the slab and deliver it to the printing forme.

The main object of the present invention is to achieve the effective distribution of the ink without spreading a large quantity of ink over a reciprocating slab, because the weight of the slab necessarily lowers the speed of the machine and because the ink whilst in a static condition on the slab is given undue exposure to the atmosphere and dust and dirt is unduly liable to settle thereon.

According to the present invention the machine comprises one or more ink-receiving rollers arranged to travel with the bed and to carry the ink delivered from the duct roller along the machine without distributing the ink over a slab and to deliver it directly, or through intermediate means, to rollers which supply the forme-engaging rollers and which distribute the ink before it is supplied to such forme-engaging rollers. The ink may be delivered to the travelling roller from the duct roller by a swinging roller. The distributor rollers preferably form with the forme-engaging rollers a pyramidal series, and by means of this invention the stripe can be transferred to the uppermost roller of the series so that the ink cannot reach the forme until it has been well distributed through the series of rollers.

The travelling ink-roller may be brought at the appropriate time into contact with the distributors, e. g., by swinging up to the distributor rollers, or one or more separate transfer rollers may be interposed between the roller carried by the bed and the distributor rollers and be movable at the appropriate time in order to effect the transfer.

Preferably I replace the slab by two or more rollers which move with the bed and I arrange for ink to be delivered to one or more of them from the duct roller, these travelling rollers acting on the ink and distributing the ink over their surfaces whilst the bed is making the advance stroke during which printing takes place. The ink is transferred from such rollers to the distributor rollers, e. g., by one or more of the rollers moving with the bed coming into contact with the distributor rollers, e. g., by swinging up to one of such latter rollers.

Distribution of the ink will generally be effected by a series of rollers which, with the co-oper-

ating forme-engaging rollers they supply, are driven in such a manner that their circumferential surfaces run in unison with the type bed, but in addition, rollers may be provided, preferably in different sets or pairs, which serve to carry round between them an isolated supply of ink with the aim not only of effecting or assisting distribution but also of frictionally heating and working the ink and reducing its fluidity prior to being transferred from such rollers to the inking rollers or to the distributors which rotate in co-ordination with the forme-engaging rollers and type bed. Where the ink is so treated, a more viscous ink than usual may be employed. These ink-working rollers may be run at comparatively high speed in relation to the speed of the ordinary distributor rollers.

Suitable ink-working devices which will serve well are described in my earlier Patents Nos. Re. 20,458 and 2,123,476.

Provision may be made for effecting a preliminary distribution or working up of the ink on co-operating rollers at the duct end of the machine, and such means may be used for distributing the ink over the surface of the travelling roller.

The roller or rollers carried by the bed may be arranged at or near the rear edge of the forme-carrying part of the bed.

In order that the invention may be the more readily understood, reference is made to constructional forms thereof illustrated by way of example in the accompanying drawings, in which—

Fig. 1 is a general side view of part of a two revolution press showing a form of inking mechanism according to the invention in full lines and the general framework of the machine in dotted outlines and Fig. 2 is a longitudinal section through the upper part of Fig. 1 showing various parts omitted in order to illustrate clearly the arrangement of the rollers according to the invention. In this form of the apparatus two travelling rollers are provided. Fig. 3 is a detail view of the mounting of the upper travelling rollers. Fig. 4 shows diagrammatically an alternative form of the invention in which the ink is carried along the machine on a single roller. Fig. 5 is a detail view of a further modification. Fig. 6 is a detail view of a modified device for supplying a travelling roller and Fig. 7 shows another means of supplying ink to the travelling roller.

Referring to Fig. 1, a stripe or band of ink is delivered from the ink duct roller 1 by means of the vibrator roll 2 on to the roller 2B. The duct roller may be driven intermittently and the extent of rotation may be varied by well-known means to regulate the width of the stripe or band which is received by the vibrator roller 2. The vibrator is freely rotatable upon the arms or

levers 4 so that it may be driven by the duct roller whilst the stripe or band of ink is being transferred thereto and is frictionally driven by contact with the roller 28 of a pair of rollers 28, 29 in order that the ink may be transferred to the roller 28. The printing cylinder 5 is arranged medially of the machine as is usual in two-revolution machines and in that class of stop-cylinder machine in which the feed is at one end of the machine and delivery at the other. The drawings illustrate diagrammatically the feed table 6 and the delivery device 7. The latter may take the form of endless tapes. The feeding and delivering means may be of the usual forms to be found in machines of the kind just referred to, and as these means form no part of the present invention, they will not be described in detail herein. The arrangement of the delivery device ordinarily makes it impracticable or inconvenient to arrange a system of distributors in close vicinity to the cylinder and with a duct adjacent to the upper distributor, but in accordance with this invention the ink delivered on to the roller 28 from the duct, which may be kept at one end of the machine as shown, is carried along towards the cylinder upon the roller, but the roller, instead of delivering the ink on to the rollers 8 which engage the forme 11a is arranged to stop short of the said rollers at the position indicated in dotted lines in the drawings. Upon the forme-engaging rollers 8 I mount a series of distributor rollers 9 forming with the rollers 8 a pyramidal system.

In the form shown the ink is not delivered directly on to the uppermost roller of the pyramidal series, but a system of rollers is introduced between the travelling rollers and the uppermost roller 20 of the pyramid which have the effect of working-up the ink and frictionally heating it prior to its being transferred to the pyramid. These rollers include two sets 11, 12 of rollers, each set in the form illustrated consisting of three rollers and they are mounted on a carrier 13 which rocks about the axis 14. Each set of three may comprise a steel roller 15, 15a and two hard rubber rollers 16, 16a, 17, 17a and the sets are arranged alternately to contact with a positively driven steel roller 18. The rollers may be of smaller diameter than the distributors to facilitate the repeated passage of the ink between the co-operating rollers.

The drawings show the roller 15a in contact with the roller 29 and following the next or after two or more printing operations the system of rollers 15 to 17a rocks so that the steel roller 15 will be brought into contact with the travelling roller 29 at the appropriate time and simultaneously the rubber roller 17 of the set which has been in running contact with the fixed geared roller 18 is drawn away from such roller whilst the rubber roller 17a of the other set is brought into contact therewith. A vibrator 19 rocks between the geared roller 18 and the uppermost roller 20 of the pyramidal series of distributors, running in contact first with the roller 18 and then with the roller 20. This arrangement permits of the ink being well worked up and frictionally heated to assist in bringing it to good printing consistency, the provision of two sets of ink-working rollers being advantageous as an isolated quantity of ink can be kept on one set for a longer period of time than if a single set were employed. The provision of these ink-working rollers enables the machine more readily to deal with the highly viscous inks.

The pyramidal series of rollers may include, in addition to the upper steel roller 20, positively driven steel rollers 21 and two intermediate composition rollers 22, the lower steel rollers supplying the forme engaging rollers 8. More distributing rollers could be included where space permits or other arrangements of the distributing rollers could be employed. The distributing rollers 20 to 22 will be run in unison with the forme-engaging rollers 8 at the speed of the type bed.

The ink is thereafter carried through the distributors 20 to 22 to the rollers 8.

The roller 28 of the pair which travel with the bed is geared by a pinion 25 to a fixed rack 26 on the machine frame. A strip or band of ink is delivered to the lower roller 28 from the duct roller 1 by means of vibrator 2. The travelling roller 28 is positively driven from the rack 26, this roller being conveniently a steel roller and frictionally driving the roller 29 which is preferably of composition. These two rollers act on the ink whilst the bed is travelling and distribute the ink over their surfaces. The composition roller in this way receives a distributed charge of ink and the roller is itself rocked at the appropriate time during the travel of the bed about its pivot 30 for transferring the ink thereon to the rollers 15, 15a.

Fig. 1 shows the details of construction and operation of the machine. The drive for the distributors 9 is derived from a rack 100 travelling with the bed 101 and forme 11a, the two steel rollers 21 being positively driven by pinion wheels 102, 103 from the rack so that all the rollers 9 run at the surface speed of the bed. The rollers 15 to 17a however which rotate at a considerably higher surface speed are driven from the high speed shaft 104, itself driven from the shaft 105 of the machine through a chain 106. The drive from the shaft 104 is through chain 107 to the fixed shaft 108 carrying a spur wheel 109 which is engaged by spur wheels 110, 111 on the steel rollers 15, 15a. The rocking carrier 13 is attached to a link 112 connected through rod 112a to a lever 112b which has a roller 112c engaged by a cam 113 having a high portion 114 which turns the carrier against the force of spring 115 in order to bring the rollers 15a, 16a, 17a into engagement with the fixed roller 18. The cam shaft 116 is driven by chain drive 117 from shaft 118 which is driven through gearing 119, 120, 121, 122 from the main shaft 105.

The fixed roller 18 carries a pinion 123 which gears with pinion 109. Ink is supplied from the fixed roller 18 to the upper distributor roller 20 by a vibrator roller 19 the arm carrying which is connected to a lever 123 by a link 124, this lever carrying a roller 126 tracking a cam 127 by which the lever 123 is periodically rocked to rock the vibrator 19. The shaft 127 of the cam 125 is driven by chain drive 128 from shaft 118. The link 124 is returned by spring 129.

The means for reciprocating the bed 101 carrying the forme may be as is usually employed in the class of machines above referred to. For example, a common method of reciprocating the bed in a two-revolution press of commercial form comprises a pair of racks 130, 131 carried by the bed and engaged in turn by a spur wheel 132, the spur wheel shifting at the end of each stroke in order to be disengaged from one rack and engaged with the other. In the form shown the continuously rotating spur wheel 132 is mounted in a frame 133 which has a small vertical movement which allows the wheel to engage alternate-

ly with the top and bottom rack, the frame carrying a depending arm 134 at the end of which is a roller 136 which works in a cam 135 mounted on the shaft 118.

The roller 29 (see Figs. 1 and 3) is carried by a lever 137 the rear of which is provided with a roller 138 which engages a fixed cam 139 so as to rock the roller 29 into engagement with roller 15 or 15a and the bearing 140 for the axle 30 of the lever may be yieldingly held by a spring 141 in a recess in the bed so as to allow the bed to continue its movement while the roller 29 dwells in inking contact with the roller 15 or 15a.

The arm 4 is yieldingly connected through spring 142 to the lever 143 so that when engaged by the travelling roller 28 the arm 4 rocks about its pivotal connection 144 to the lever 143 against the force of the spring 142 so that the vibrator roller dwells in contact with the travelling roller for a sufficient length of time. The means for rocking the arm 4 and the means for periodically turning the ductor roller 1 may be of any usual well-known type found in commercial two-revolution or stop cylinder machines. For example, the arm 143 carries the arm 144a which is slotted adjustably to receive the pin 145 of a long link 146 connected to a lever 147 carrying a roller 148 which is tracked by a cam 149 mounted on the shaft 118. The pawl 150 which operates the ratchet 151 of the duct roller is carried by a lever 152 pivoted at 153 to a two arm lever 154 pivoted at 155 to the frame and pivoted at 156 to a long link 157 whose other end is pivoted to a lever 158 carrying a roller 159 which tracks the cam 160 mounted on the cam shaft 118.

In the variant form shown in Fig. 3 a single roller 24 is carried by the bed in lieu of a plurality of rollers as in the first form described and a composition vibrator 27 is provided which is brought into contact with the roller 24 during the travel of the latter and is frictionally driven in contact therewith for a sufficient time to take off the necessary quantity of ink. In this form as in the first form described the ink need not be delivered directly by the vibrator 27 to the uppermost roller of the pyramidal series but a system of rollers 11, 12 may be introduced for working up the ink. The transfer roller 27 is arranged to be moved at the appropriate time into contact with roller 24, e. g., at the position A while the roller 24 is travelling and leaving roller 24 before the latter reaches position B.

The ink need not be passed through intermediate ink working rollers prior to passing to the distributors. It can be transferred from the roller 24 to the first distributor roller 20 in various ways. A form which avoids the use of long arms for carrying the vibrator roller is shown in Fig. 5 in which there is provided an intermediate geared roller 161 which receives ink from the roller 24, a vibrator roller 162 taking the ink from the geared roller to the distributor 20. The roller 24 is in a bearing 163 which is slidable in a recess in the forme bed against the pressure of a spring 164. The vibrator 151 is actuated by a link 165 similarly to the vibrator 19 (Fig. 1).

One or more of the rollers which travel with the bed may be freely rotatable at least when they are at the duct end of their travel and arranged to be driven when the bed is at or near the end of its movement in the direction of the ink duct. This is preferably effected by interposing (see Figs. 6 and 7,) rollers 40, 41 which transmit frictional drive to the bed roller 39 and

which are driven, e. g. from a suitable chain drive 42. These rollers (hereinafter termed the driven rollers) may be rotated continuously or rotated only when the bed roller or rollers are approaching them and whilst contact between the driven rollers and the bed rollers is required. One positively driven roller 40 can as shown drive the other or others by friction.

The driven rollers may be arranged to move e. g., to rock and maintain contact with the bed rollers for a sufficient length of time whilst the bed is travelling (see Fig. 6). Alternatively the bed roller could be under the control of a spring 43 so as to keep them in contact with stationary driven rollers for the necessary time (see Fig. 7).

By driving the bed roller in the way above described the ink is well distributed over the surface of the roller in spite of the fact that the bed roller need not rotate during the travel of the bed.

Cam means for operating the vibrator rollers are not illustrated as such means are well known in the art, as also are the means for reciprocating and guiding the bed.

I claim:

1. Inking apparatus for a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as the bed travels, distributing rollers arranged in ink-supplying relation to said forme-engaging rollers, means for carrying ink from said duct to said distributing rollers, said means including at least one roller carried by said bed and travelling therewith between said duct and said distributing rollers.

2. Inking apparatus for a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme while the bed travels, distributing rollers arranged in ink-supplying relation to said forme-engaging rollers, means for carrying ink from said duct to said distributing rollers, said means including a plurality of rollers carried by said bed, means for rotating said travelling rollers in cooperation whilst they are travelling with the bed in order to distribute the ink over their surfaces.

3. Inking apparatus of a flat bed printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, a series of rollers, said series including forme-engaging rollers arranged to make inking contact with said forme as the bed travels, said series of rollers including rollers adapted frictionally to work ink before its transfer to said forme-engaging rollers, means for effecting such transfer, at least one roller carried by said bed and travelling therewith, means for operatively relating a said travelling roller in ink-transferring relation to said ink-working rollers during a predetermined part of the travel of said bed and means for maintaining at least some of said ink working rollers temporarily out of inking engagement with said forme-engaging rollers during a period of working up of the ink.

4. Inking apparatus of a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as it reciprocates, and ink distributing rollers rotatable continuously in inking relation with said forme-

engaging rollers, a plurality of sets of preliminary distributing rollers, means for conveying ink from said duct to said latter rollers, said means including at least one roller mounted to reciprocate with said bed, said sets of preliminary distributing rollers being operative in turn temporarily to isolate from said first distributing rollers and frictionally to work a charge of ink received from said travelling roller and then to supply said first distributing rollers with previously isolated and worked ink.

5. Inking apparatus for a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as it travels, distributing rollers arranged in ink-supplying relation to said forme-engaging rollers, means for carrying ink from said duct to said distributing rollers, said means including a plurality of rollers carried by said bed and travelling therewith, means for rotating said travelling rollers in co-operation while they move with the bed and means for separating said rollers and bringing at least one of said rollers into ink-transferring engagement with said distributing rollers during a predetermined part of the travel of said bed.

6. Inking apparatus for a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as it travels, distributing rollers arranged in continuous ink-supplying engagement with said forme-engaging rollers, and forming therewith a pyramidal series, means for carrying ink from said duct to the uppermost roller of said distributing rollers, said means including at least one roller carried by said bed.

7. Inking apparatus for a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as it travels, distributing rollers arranged in ink-supplying relation to said forme-engaging rollers, means for carrying ink from said duct to said distributing rollers, said means including a plurality of rollers carried by said bed, means for positively driving at least one of said latter rollers whilst it is travelling and at least one other of said rollers being mounted so as to be frictionally driven by said positively driven roller and means for separating said travelling rollers and bringing said frictionally driven roller into inking contact with said distributing rollers during a predetermined part of the travel of the bed.

8. Inking apparatus for a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as it travels, distributing rollers arranged in ink-supplying relation to said forme-engaging rollers, means for carrying ink from said duct to said distributing rollers, said means including a plurality of rollers carried by said bed, a pinion attached to one of said rollers, a fixed rack, said pinion being arranged to gear with said rack as the bed travels thereby to rotate said roller, at least one other travelling roller being in frictional driving relation to said positively driven roller and serving as an ink-transfer roller.

9. An inking apparatus as in claim 1, comprising a ductor roller, means for rocking said roller between said duct and a said travelling roller, means resiliently mounting said ductor roller so that it yields to the pressure of the travelling roller and maintains contact therewith during a predetermined part of the travel of the bed.

10. Inking apparatus according to claim 1, comprising means resiliently mounting a said travelling roller for a limited relative movement with respect to the bed, said travelling roller being arranged to contact said distributor rollers during a part of the travel of the bed during which said relative movement occurs to provide a prolonged dwell between said travelling roller and said distributors whilst the bed is still travelling.

11. Inking apparatus of a cylinder printing machine according to claim 2, comprising a roller for charging with fresh ink at least one of said travelling rollers and another roller for taking off ink from at least one of said travelling rollers, means for maintaining said charging roller and its co-operating travelling roller in contact during a part of the travel of the latter to enable it to take up a sufficiency of ink and means to maintain said take-off roller and its co-operating travelling roller in contact during a part of the travel of the co-operating travelling roller to enable said take-off roller to receive a sufficiency of ink.

12. Inking apparatus of a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as it reciprocates and ink distributing rollers rotatable continuously in inking relation with said forme-engaging rollers, means for rotating said forme and distributing rollers, a plurality of sets of preliminary distributing and ink-working rollers interposed between said first distributing rollers and said duct, means for rotating said preliminary distributing rollers at a considerably greater peripheral speed than that of said first distributing rollers, means for conveying ink from said duct to said preliminary distributing rollers, said means including at least one roller mounted to reciprocate with said bed, said sets of preliminary distributing rollers being operative in turn temporarily to isolate from said first distributing rollers and frictionally to work a charge of ink received from said travelling roller and then to supply said first distributing rollers with previously isolated and worked ink.

13. Inking apparatus for a flat bed cylinder printing machine comprising a reciprocating bed, a printing forme carried thereby, an ink duct, forme-engaging rollers arranged to make inking contact with said forme as it travels, distributing rollers arranged in ink-supplying relation to said forme-engaging rollers, means for carrying ink from said duct to said distributing rollers, said means including at least one roller carried by said bed, a roller movable between said travelling roller and the duct, means for driving said movable roller and means mounting said travelling roller so that it is frictionally driven by said movable roller when the bed is travelling nearest to the duct.

14. A printing machine according to claim 13, comprising two or more rollers between the duct and the travelling roller which effect a preliminary distribution of the ink.

ALFRED SCHLESINGER.