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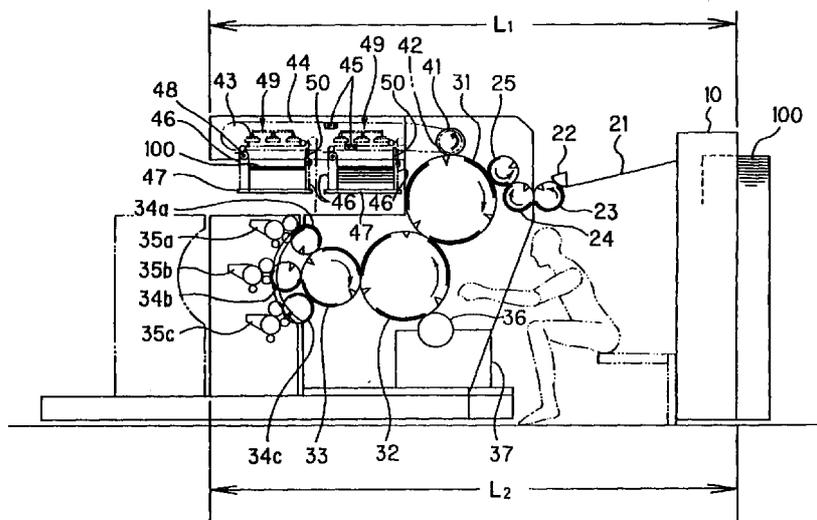
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(54) **Printing machine**

(57) A printing machine includes an impression cylinder (31) on which a sheet (100) is held; an intaglio cylinder (32) in contact with a lower portion of the impression cylinder (31) and adapted to print on the sheet (100) in cooperation with the impression cylinder (31); an ink collection cylinder (33), chablon rollers (34a to 34c), and ink supplying units (35a to 35c) provided for supplying ink to the intaglio cylinder (32); pile tables (47)

on which the printed sheets (100) are piled; and a chain (44) capable of traveling and having gripper bars 45 for transporting the sheets (100) from the impression cylinder (31) to the pile tables (47). The pile tables (47) are disposed above the ink collection cylinder (33), the chablon rollers (34a to 34c), and the ink supplying units (35a to 35c).

Fig.1



Description

[0001] The present invention relates to a printing machine, and, more particularly, to an intaglio printing machine.

[0002] FIG. 2 shows a schematic configuration of a conventional intaglio printing.

[0003] As shown in FIG. 2, a root-end portion of a sheet feeder table 121 is connected to a sheet feeder 110 for feeding a stack of sheets, which are sheet-like materials, one by one. A swing unit 122 is disposed on a projected-end portion of the sheet feeder table 121. The swing unit 122 is adapted to transfer the sheets, one at a time, to an unillustrated gripper device disposed on a transfer cylinder 123. The transfer cylinder 123 is in contact with a transfer cylinder 124 having an unillustrated gripper device. The transfer cylinder 123 is adapted to transfer the sheet held by the gripper device thereof to the gripper device of the transfer cylinder 124.

[0004] The transfer cylinder 124 is in contact with an impression cylinder 131 having an unillustrated gripper device. The transfer cylinder 124 is adapted to transfer the sheet held by the gripper device thereof to the gripper device of the impression cylinder 131. An intaglio cylinder 132 is in contact with the impression cylinder 131 while being located downstream of the transfer cylinder 124 with respect to the direction of rotation of the impression cylinder 131. Chablon rollers 134a to 134c are in contact with the intaglio cylinder 132 while being located downstream of the impression cylinder 131 with respect to the direction of rotation of the intaglio cylinder 132, and are arranged at predetermined intervals along the circumferential direction of the intaglio cylinder 132. The chablon rollers 134 are equipped with ink supplying units 135a to 135c, respectively.

[0005] A wiping roller 136 is in contact with the intaglio cylinder 132 while being located downstream of the chablon roller 134c with respect to the direction of rotation of the intaglio cylinder 132. A lower portion of the wiping roller 136 is immersed in a wiping liquid contained in a wiping tank 137.

[0006] A delivery cylinder 141 constituted by a rotatably disposed sprocket is in contact with the impression cylinder 131 while being located downstream of the intaglio cylinder 132 with respect to the direction of rotation of the impression cylinder 131. An endless chain 144 is looped around the sprocket of the delivery cylinder 141 while being guided by an unillustrated chain guide and looped around an unillustrated sprocket. A plurality of unillustrated gripper bars for receiving the sheets from the gripper device of the impression cylinder 131 are mounted on the chain 144 at predetermined intervals along the direction of travel of the chain 144. A plurality of delivery units 150 serving as stacker means are disposed under the chain 144.

[0007] In the above-described intaglio printing machine, when a sheet is fed onto the sheet feeder

table 121 from the sheet feeder 110, the sheet is transferred to the transfer cylinder 123 by the swing unit 122 and is then transferred to the impression cylinder 131 from the transfer cylinder 123 via the transfer cylinder 124. Meanwhile, when ink is supplied from the ink supplying units 135a to 135c to the intaglio cylinder 132 via the chablon rollers 134a to 134c, respectively, excess ink is removed by the wiping roller 136. The thus-supplied ink is transferred onto the sheet held on the impression cylinder 131. The thus-printed sheet is transferred to the delivery cylinder 141 from the impression cylinder 131. Subsequently, the printed sheet is gripped by one of the gripper bars of the chain 144. The thus-gripped sheet is transferred to a position located above the delivery unit 150 as the chain 144 travels as a result of rotation of the sprockets.

[0008] In the above-described conventional intaglio printing machine, in order to facilitate maintenance and inspection of the chablon rollers 134a to 134c and the ink supplying units 135a to 135c, the ink supplying units 135a to 135c can be moved in a reciprocating manner so as to be moved away from the chablon rollers 134a to 134c, to thereby form a work space between the chablon rollers 134a to 134c and the ink supplying units 135a to 135c. Accordingly, a retreat space for accommodating the retreated ink supplying units 135a to 135c must be established between the printing section and the delivery section. As a result, the distance between the printing section and the delivery section becomes very long; i.e., the overall size of the printing machine becomes very big.

[0009] In view of the foregoing, an object of the present invention is to provide a printing machine capable of assuming a compact overall size.

[0010] To achieve the above object, the present invention provides a printing machine comprising a first cylinder for holding a sheet-like material; a second cylinder in contact with a lower portion of the first cylinder and adapted to print on the sheet-like material in cooperation with the first cylinder; ink supplying means for supplying ink to the second cylinder; stacker means for stacking the printed sheet-like materials; and transport means for transporting the sheet-like material from the first cylinder to the stacker means. The printing machine is characterized in that the stacker means is disposed above the ink supplying means.

FIG. 1 is a schematic structural view of an intaglio printing machine according to an embodiment of the present invention; and

FIG. 2 is a schematic structural view of a conventional intaglio printing machine.

[0011] An intaglio printing machine according to an embodiment of the present invention will next be described with reference to FIG. 1.

[0012] As shown in FIG. 1, a root-end portion of a sheet feeder table 21 is connected to a sheet feeder 10

for feeding a stack of sheets 100, which are sheet-like materials, one by one. A swing unit 22 is disposed on a projected-end portion of the sheet feeder table 21. The swing unit 22 is adapted to transfer the sheets 100, one at a time, to an unillustrated gripper device disposed on a transfer cylinder 23. The transfer cylinder 23 is in contact with a transfer cylinder 24 having an unillustrated gripper device. The transfer cylinder 23 is adapted to transfer the sheet 100 held by the gripper device thereof to the gripper device of the transfer cylinder 24. The transfer cylinder 24 is in contact with a transfer cylinder 25 having an unillustrated gripper device. The transfer cylinder 24 is adapted to transfer the sheet 100 held by the gripper device thereof to the gripper device of the transfer cylinder 25.

[0013] The transfer cylinder 25 is in contact with an upper portion of a triple-size impression cylinder 31 having an unillustrated gripper device and serving as a first cylinder. The diameter of the triple-size impression cylinder 31 is three times that of chablon rollers 34a to 34c. The transfer cylinder 25 is adapted to transfer a sheet held by the gripper device thereof to the unillustrated gripper device of the impression cylinder 31. A triple-size intaglio cylinder 32 serving as a second cylinder is in contact with a substantially lower portion of the impression cylinder 31 which is located downstream of the transfer cylinder 25 with respect to the direction of rotation of the impression cylinder 31. The diameter of the triple-size intaglio cylinder 32 is three times that of the chablon rollers 34a to 34c. An ink collection cylinder 33 is in contact with a side portion of the intaglio cylinder 32 which is located downstream of the impression cylinder 31 with respect to the direction of rotation of the intaglio cylinder 32. The chablon cylinders 34a to 34c are in contact with the corresponding side portions of the ink collection cylinder 33 which are located downstream of the intaglio cylinder 32 with respect to the direction of rotation of the ink collection cylinder 33, and are arranged at predetermined intervals along the circumferential direction of the ink collection cylinder 33. Ink supplying units 35a to 35c are located at the respective positions corresponding to the respective side portions of the chablon rollers 33a to 34c which are located downstream of the ink collection cylinder 33 with respect to the direction of rotation of the chablon rollers 33a to 34c.

[0014] In the present embodiment, the ink collection cylinder 33, the chablon rollers 34a to 34c, and the ink supplying units 35a to 35c constitute ink supplying means.

[0015] A wiping roller 36 is in contact with the intaglio cylinder 32 while being located downstream of the ink collection cylinder 33 with respect to the direction of rotation of the intaglio cylinder 32. A lower portion of the wiping roller 36 is immersed in a wiping liquid contained in a wiping tank 37.

[0016] A delivery cylinder 41 is in contact with an upper portion of the impression cylinder 31 while being

located downstream of the intaglio cylinder 32 with respect to the direction of rotation of the impression cylinder 31. The delivery cylinder 41 includes a sprocket 42 such that the delivery cylinder 41 and the sprocket 42 are coaxial and can rotate as a single unit. A sprocket 43 is disposed above the ink supplying unit 35a. An endless chain 44 is looped around and extend between the sprockets 42 and 43. A plurality of gripper bars 45 for receiving the sheets 100 from the gripper device of the impression cylinder 31 are mounted on the chain 44 at predetermined intervals along the direction of travel of the chain 44.

[0017] In the present embodiment, the delivery cylinder 41, the sprockets 42 and 43, the chain 44, and the gripper bars 45 constitute transport means.

[0018] A plurality of pile tables 47 are disposed above the ink supplying means, such as the ink collection cylinder 33, the chablon rollers 34a to 34c, and the ink supplying units 35a to 35c, and between and below the sprockets 42 and 43. The pile tables 47 are supported in a vertically movable manner by means of chains 46. In FIG. 1, reference numeral 48 denotes a suction wheel for decelerating the speed of sheets 100 in the process of transport; reference numeral 49 denotes a fan; and reference numeral 50 denotes a guide plate capable of standing up and falling down. In the present embodiment, the chains 46, the pile tables 47, the suction wheels 48, the fans 49, and the guide plates 50 constitute stacker means.

[0019] In the above-described intaglio printing machine, when the sheet 100 is fed onto the sheet feeder table 21 from the sheet feeder 10, the sheet 100 is transferred to the transfer cylinder 23 by the swing unit 22 and is then transferred to the impression cylinder 31 from the transfer cylinder 23 via the transfer cylinders 24 and 25. Meanwhile, when ink is supplied from the ink supplying units 35a to 35c to the intaglio cylinder 32 via the chablon rollers 34a to 34c and the ink collection cylinder 33, excess ink is removed by the wiping roller 36. The thus-supplied ink is transferred onto the sheet 100 held on the impression cylinder 31. The thus-printed sheet 100 is transferred to the delivery cylinder 41 from the impression cylinder 31. Subsequently, the sheet 100 is gripped by one of the gripper bars 45. The thus-gripped sheet 100 is transferred to a position located above the ink feeding section as the chain 44 travels as a result of rotation of the sprockets 42 and 43.

[0020] While the sheet 100 is sucked at its tail side by the suction wheel 48 associated with the selected pile table 47 to thereby be decelerated, and its front side released from a gripper of the gripper bar 45 is positioned by means of the guide plate 50, a descending air flow from the fan 49 causes the sheet 100 to drop, thereby piling the sheets 100 on the selected pile table 47.

[0021] That is, the pile tables 47 are disposed above the ink supplying means to thereby pile the sheets 100 above the ink supplying means.

[0022] Thus, the overall length L_1 between the feeder section (sheet feeder 10) and the delivery section including the stacker means (46, 47, 48, 49, and 50) can be substantially equal to the total length L_2 of the feeder section and the printing section including the ink supplying means (33, 34a to 34c, and 35a to 35c).

[0023] Accordingly, even in the case where, in order to maintain and inspect the chablon rollers 34a to 34c and the ink supplying units 35a to 35c, the ink supplying units 35a to 35c are moved away from the chablon rollers 34a to 34c so as to establish a work space between the chablon rollers 34a to 34c and the ink supplying units 35a to 35c, the overall size of the printing machine can be rendered compact. Further, since the above-described length L_1 is equal to the above-described length L_2 , an operator can easily remove printing paper and perform various operations, monitors, etc., for the printing machine during printing operation.

[0024] Since the transfer cylinder 25 is in contact with an upper portion of the impression cylinder 31, a peripheral space around the intaglio cylinder 32 and the wiping roller 36 can be expanded, thereby improving workability relative to maintenance and inspection of the intaglio cylinder 32 and the wiping roller 36.

[0025] A line connecting the center of the transfer cylinder 25 in contact with the impression cylinder 31 and the center of the impression cylinder 31 and a line connecting the center of the delivery cylinder 41 and the center of the impression cylinder 31 form an angle less than 180° . As a result, when the impression cylinder 31 is to be disengaged (released) from the plate cylinder 32 for restoration due to occurrence of, for example, a printing defect, the transfer cylinder 25 prevents the disengagement of the impression cylinder 31. Therefore, it is preferred to employ a structure such that disengagement of the transfer cylinder 25 is effected in a manner linked to disengagement of the impression cylinder 31 (for this mechanism, refer to, for example, Japanese Patent No. 2591668).

[0026] The present embodiment is described while mentioning supply of ink from the ink supplying units 35a to 35c to the intaglio cylinder 32 via the chablon rollers 34a to 34c and the ink collection cylinder 33. However, the ink collection cylinder 33 may be eliminated for supply of ink from the ink supplying units 35a to 35c to the intaglio cylinder 32 via the chablon rollers 34a to 34c.

[0027] The present embodiment is described while mentioning the plurality of pile tables 47. However, a single pile table may be employed according to the number of sheets 100 to be printed.

[0028] The present embodiment is described while mentioning an intaglio printing machine. However, the present invention may be embodied in various printer forms; for example, letterpresses, offset printing presses, and perfectors.

[0029] According to a printing machine of the present invention, since pile tables are disposed above

ink supplying means, the overall size of the printing machine can be made compact. Further, since the overall length L_1 between the feeder section and the delivery section can be substantially equal to the total length L_2 of the feeder section and the printing section, various operations and monitors can be performed easily.

Claims

1. A printing machine comprising a first cylinder (31) for holding a sheet-like material (100); a second cylinder (32) in contact with a lower portion of said first cylinder and adapted to print on said sheet-like material in cooperation with said first cylinder; ink supplying means (33, 34a to 34c, 35a to 35c) for supplying ink to said second cylinder; stacker means (46, 47, 48, 49, 50) for stacking said printed sheet-like materials; and transport means (41, 42, 43, 44, 45) for transporting said sheet-like material from said first cylinder to said stacker means, characterized in that said stacker means is disposed above said ink supplying means.
2. A printing machine as described in claim 1, characterized in that a plurality of said stacker means (46, 47, 48, 49, 50) are disposed along the direction of transport of said sheet-like material.
3. A printing machine as described in claim 1, characterized in that said first cylinder is an impression cylinder (31); said second cylinder is an intaglio cylinder (32); and ink is supplied from a plurality ink supplying units (35a to 35c) to a plate surface of said intaglio cylinder (32) via a plurality of chablon rollers (34a to 34c).
4. A printing machine as described in claim 3, characterized in that said impression cylinder (31) and said intaglio cylinder (32) each have a diameter three times that of said chablon rollers (34a to 34c).
5. A printing machine as described in claim 3, characterized in that said ink supplying units (35a to 35c) can move toward and away from said chablon rollers (34a to 34c).
6. A printing machine as described in claim 1, characterized in that the overall length (L_1) between a feeder section for supplying said sheet-like material (100) and a delivery section including said stacker means (46, 47, 48, 49, and 50) is substantially equal to the total length (L_2) of said feeder section and a printing section including said ink supplying means (33, 34a to 34c, and 35a to 35c).

Fig.1

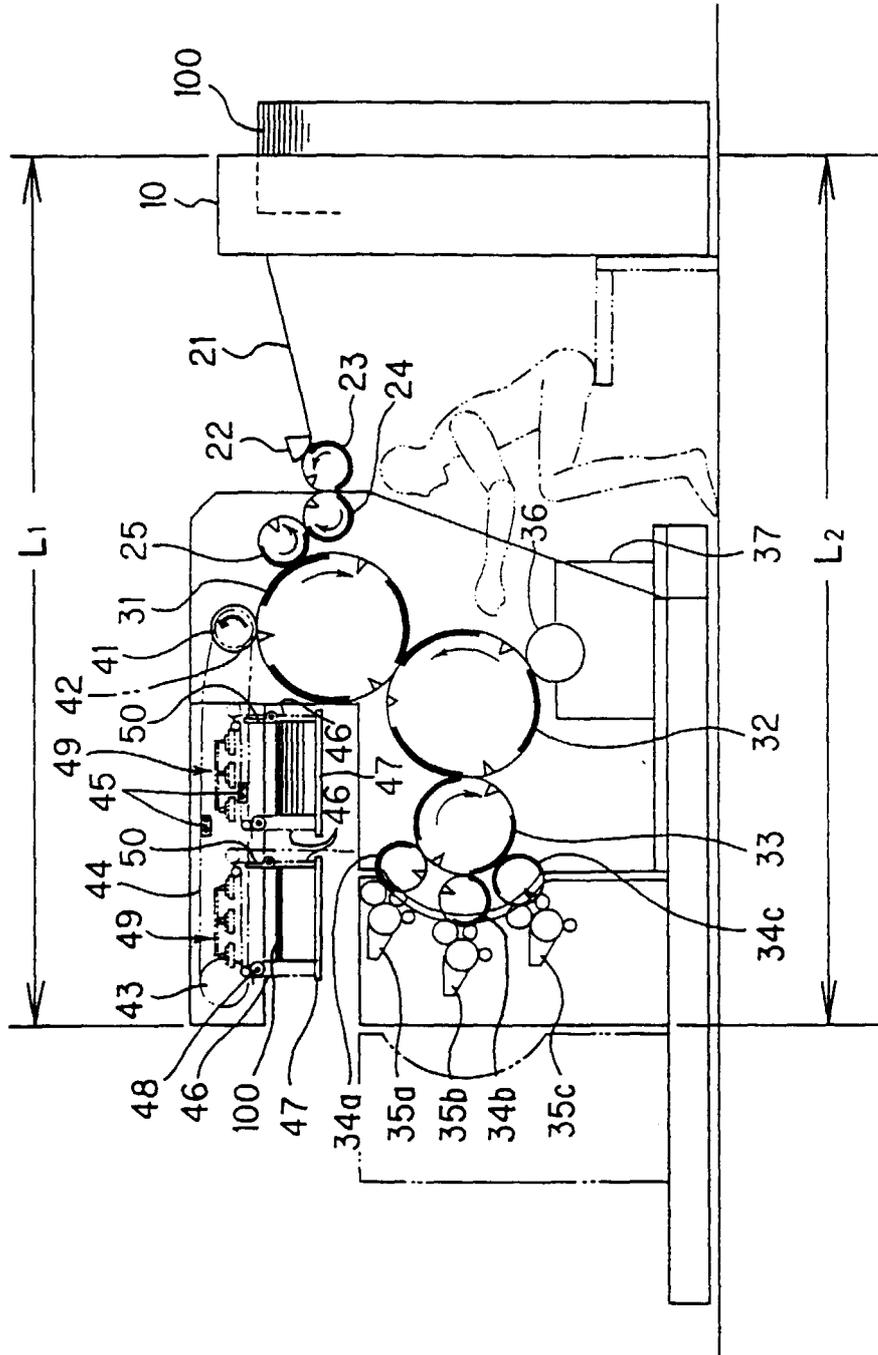
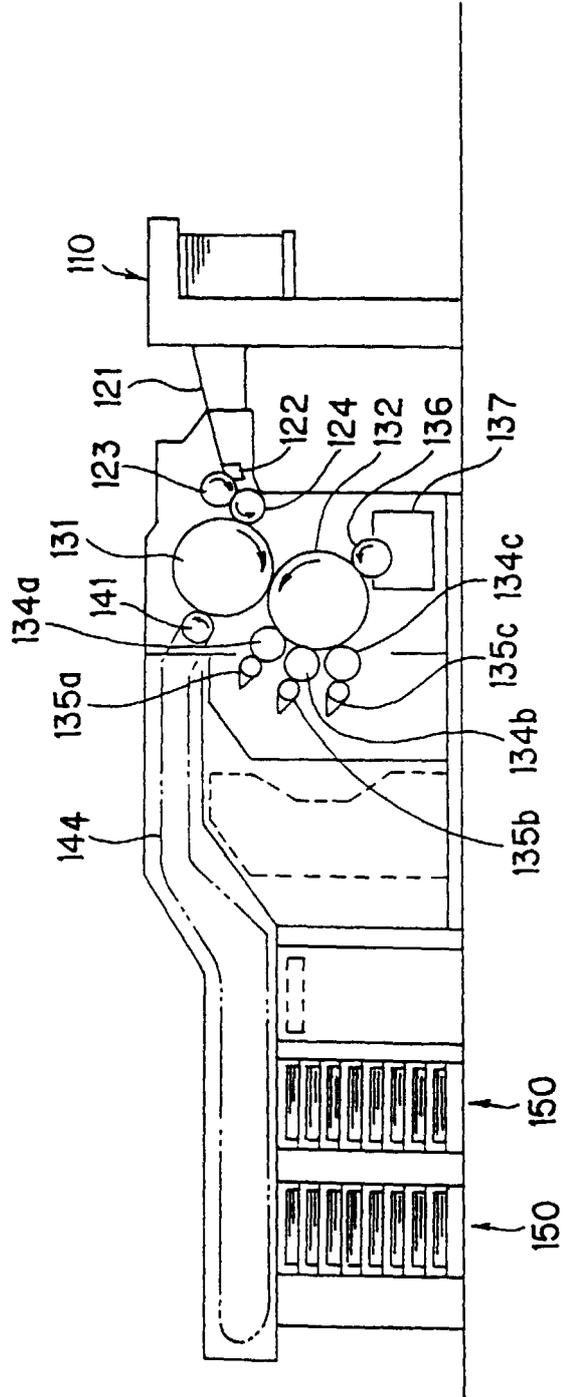


Fig.2

Related Art





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 12 0258

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CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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