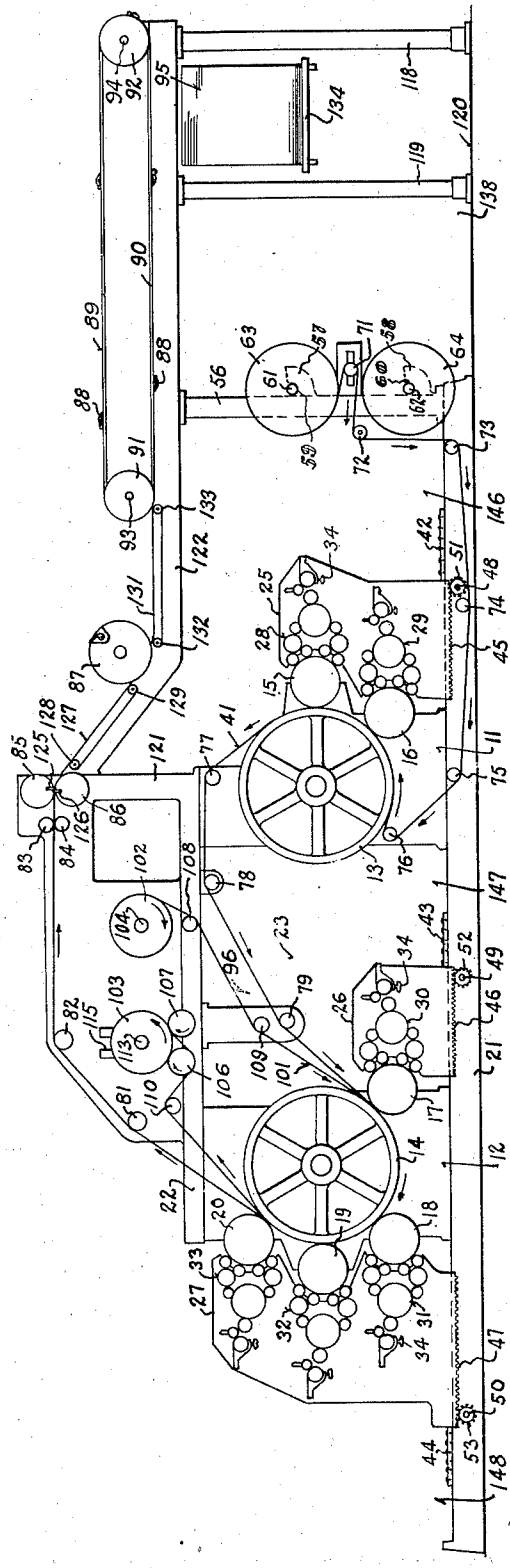
Feb. 11, 1930. L. W. CLAYBOURN ET AL 1,746,523

PRINTING MACHINERY

Filed Feb. 8, 1928 2 Sheets-Sheet 1

Fig. 1.



INVENTORS.

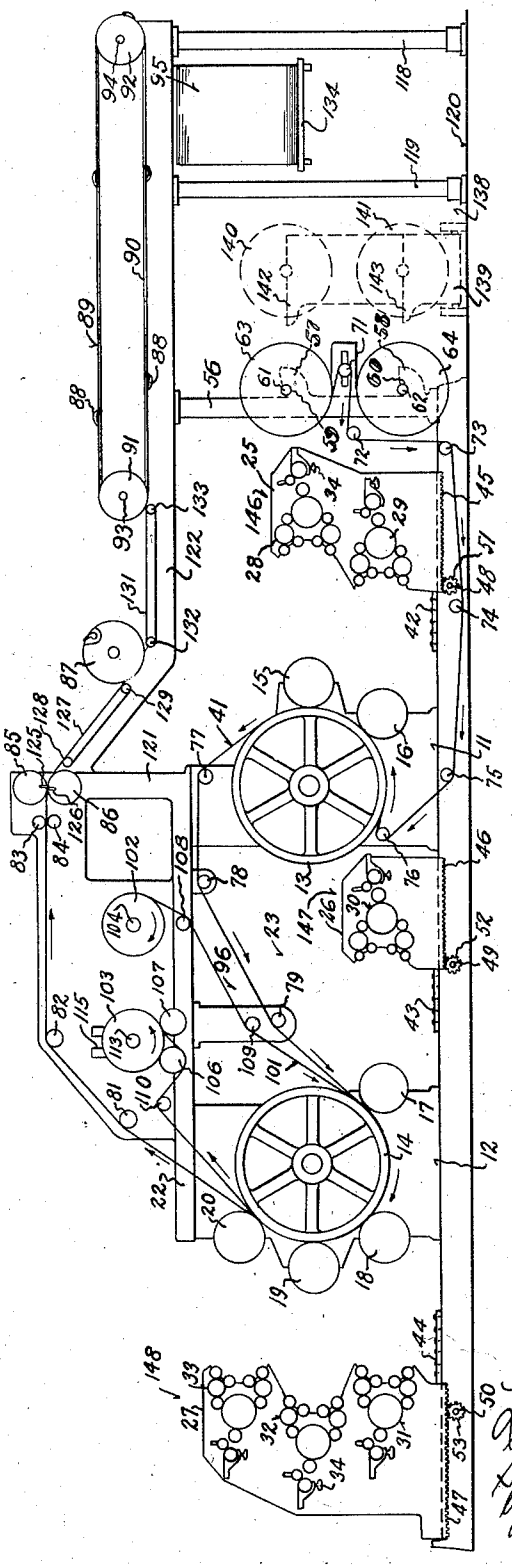
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PRINTING MACHINERY

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Fig. 2.



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Patented Feb. 11, 1930. 1,746,523

UNITED STATES PATENT OFFICE

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PRINTING MACHINERY

Application filed February 8, 1928. Serial No. 252,765.

It is the object of the present invention to provide a new and improved printing press of the rotary perfecting type in which a plurality of rotary printing couples are in close association and a traveling smut-web and off-feeding and on-feeding rolls thereof are provided and located in close association with the plurality of rotary printing couples, in order that a short stretch only of the web being printed is located between the respective printing couples for printing the opposite sides of the web, and short stretches only of the smut-web are located between the off-feeding and the on-feeding rolls of the smut-web and the printing couple; further, to provide a novel arrangement of rotary impression cylinders for printing the respective sides of the web and a smut-web about one of said impression cylinders comprising off-feeding and on-feeding rolls located in vertical planes between the vertical planes occupied by said impression cylinders; further, to provide a pair of impression cylinders and plate cylinders therefor for printing the respective sides of a web, said impression cylinders located in horizontally spaced relation, an inker frame between said impression cylinders and inker frames at the distanced sides of said pair of impression cylinders, said inker frames movable toward and from said respective plate cylinders for ready accessibility to the entire surfaces of said respective impression cylinders and plate cylinders; further, to provide a novel compact arrangement for travel of the printing web about rotary impression cylinders and loopwise about smut-web rolls and the smut-web extending therefrom about one of said impression cylinders; and, further, to provide a novel association of delivery mechanism, roll support for the rolls of paper to be printed, and rotary printing couples, whereby ready delivery of web-rolls for association in the printing press are provided.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Fig. 1 is a side elevation of the improved exemplifying printing press.

Fig. 2 is a similar view, with parts in assumed positions.

11 and 12 represent printing stands in which impression cylinders 13, 14, are respectively journaled. The printing stand 11 also has plate cylinders 15, 16, journaled therein, and the printing stand 12 also has plate cylinders 17, 18, 19 and 20 journaled therein. The plate cylinders are arranged to have the printing plates secured thereto in suitable or usual manner, and the impression cylinders are arranged to have tympan sheeting received or secured thereabout in suitable manner. Suitable bearing means are provided for the impression cylinders and for the plate cylinders, adjustable and operable for on-impression and off-impression in suitable manner.

The printing stands are supported on and fixed to a base plate 21. A bridge-plate 22 is supported on and suitably secured to the printing stands and bridges the space 23 between said stands.

Inker frames 25, 26, 27, are mounted on the base and movable relatively to the impression cylinders. The inker frame 25 has sets 28, 29, of inking rollers for supplying ink to the plates on the plate cylinders 15, 16. The inker frame 26 has a set 30 of inking rollers therein, arranged to supply ink to the plates on the plate cylinder 17. The inker frame 27 has sets 31, 32, 33, of inking rollers for supplying ink to the plates on the respective plate cylinders 18, 19, 20. Each of these sets of inking rollers comprises suitable form rollers, distributing rollers and an ink fountain, the ink fountains being provided with suitable regulating means for controlling the quantity of ink supplied to the inking rollers, which regulating means are of usual construction and may include regulating screws 34, of which there are a suitable number crosswise of the machine.

The sets of inking rollers are arranged to supply desired colors of ink to the plates on the respective plate cylinders. The printing couple comprising the impression cylinder 13 and the plate cylinders 15, 16, is arranged to print one side of the web 41 being printed, and the printing couple comprising the im-

pression cylinder 14 and the plate cylinders 17, 18, 19, 20, are arranged to print the other side of the web, the respective sides being printed in desirable colors. In the present instance one side of the web is printed in two colors and the other side of the web is printed in four colors, although it is obvious that other color arrangements may be provided for.

The inker frames are movable toward and from the respective plate cylinders for inking the plate cylinders of said respective impression cylinders, or for placing said inker frames in distanced or retracted positions for ready attention to the inking rollers and to the respective plate cylinders, and for the ready attachment, adjustment and removal of plates. The arrangement provides for ready access to the impression cylinders, for changing the packing or tympan sheets, make-ready and other purposes.

The respective inker frames are arranged to move on roller frames 42, 43, 44, at the respective sides of the printing press, and to be guided lengthwise of the printing press. The respective ends of the inker frames at the respective sides of the press are provided with toothed racks 45, 46, 47. Shafts 48, 49, 50, for the respective inker frames are journaled in the base, pinions 51, 52, 53, being fixed to the respective shafts at each end thereof. The pinions mesh with the respective toothed racks on the inker frames. Rotation of the respective shafts causes travel of the respective inker frames toward and from their complemental plate cylinders. The shafts are suitably rotated. The shafts may be provided with squared ends for receiving crank-handles for turning the same.

A column 56 is located at each side of the inner end of the base, and has brackets 57, 58, thereon. Bearings 59, 60, are on the respective brackets for supporting shafts 61, 62, of rolls 63, 64, of web material instanced as paper to be printed. The web is represented at 41 and is arranged to be received from either roll over directing rollers 71, 72, suitably journaled on the columns 56. The directions of rotation of the respective rolls and travel of the web are indicated by arrows. The web of paper being printed proceeds in the direction of the arrows about directing rollers 73, 74, 75, journaled in the base, thence over a directing roller 76 journaled in the printing stand 11. The web proceeds about the impression cylinder 13, thence over a directing roller 77, and directing rollers 78, 79, about the impression cylinder 14, and thence about directing rollers 81, 82, and between draw-rolls 83, 84, for exerting a pull upon the web and feeding the web with the rotations of the impression cylinders and between cutting cylinders 85, 86, which cut the web into sheets, the sheets proceeding to a collecting cylinder 87, by which the sheets are collected, for example, three at a time, the collected sheets being then fed in groups of collected sheets to grippers 88 of a chain delivery 89, comprising chains 90 traveling about sprocket wheels 91, 92, fixed to shafts 93, 94, journaled in suitable bearings, the grouped sheets being delivered to a delivery sheet stacking means 95.

The web being printed is arranged loopwise about the second impression cylinder, one stretch of the loop proceeding from its first impression cylinder and the other stretch of the loop proceeding to a point above the first impression cylinder and forming a gap 96 in said loop.

A smut-web 101 is received about the second impression cylinder for preventing smutting of the side of the web printed by the first impression cylinder. The smut-web receives any offsetting due to a wet or undry condition of the printed side of the web being printed, the portion of the smut-web contacted thereby traveling beyond the second impression cylinder, so that it shall not again retransfer the offset impression received thereby to the web being printed. The smut-web is caused to travel about the second impression cylinder at the same speed at which the web being printed passes thereabout, so that there shall be no relative shifting between the webs and so that clean cut and proper impressions shall be made by coaction between the plate cylinders and the impression cylinder of the second group of printing couples. The smut-web proceeds from a roll 102 and is rolled upon a roll 103. The roll 102 is supported on a shaft 104, journaled in suitable bearings in the frame of the machine, and the roll 103 is supported on rollers 106, 107.

The rollers 106, 107, are rotated in similar directions for rotating the smut-web roll 103 for feeding the smut-web away from the impression cylinder, the smut-web roll 102 being rotated, as by pull upon the web, for feeding the smut-web toward the impression cylinder. The directions of rotation and feeding are indicated by the arrows. The infeeding stretch of the smut-web toward the impression cylinder is guided by direction rollers 108, 109, and the outfeeding stretch of the smut-web away from the impression cylinder is guided by a direction roller 110 and by being received about the supporting and drive roller 106. Uniform speed of travel is imparted to the smut-web regardless of the diameters of the smut-web rolls. The smut-web rolls are received about the shafts 104, 113. The ends of the shaft 113 are mounted in suitable bearings slidable up and down in guideways 115, on the bridge-plate 22.

The bights of the loops of the smut-web and of the web being printed are presented toward one end of the printing press, while

the open ends of said loops are presented toward the other end of the printing press, at which other end the roll for the web to be printed and the delivery means for the printed sheets are also located.

Columns 118, 119, are located on the floor 120 at each side of the printing machine, preferably in line with the columns 56 and with column 121 at the respective sides of the bridge-plate 22. The columns 121 may be extended as side-plates above the bridge-plate. Suitable bracing means connect opposite columns. A girder 122 connects the columns at each side of the printing machine, the girders extending lengthwise of the printing machine.

The cutting cylinders are provided with suitable coacting cutter-blades 125, 126, of suitable construction and arrangement for cutting the printed web into sheets of the desired lengths. Feeding tapes 127 are received about pulleys 128, 129. The feeding tapes are arranged to feed the severed sheets to the collecting cylinder 87, which may be of suitable or usual construction and is arranged to collect the severed sheets into groups, for instance of three sheets each. Upon arrangement of these three sheets into the group, the feeding of the group of sheets continues on feeding tapes 131 in a desired manner. The feeding tapes 131 are shown received about pulleys 132, 133.

The advancing edges of said groups of sheets are gripped by one of a series of sets of grippers 88 of a chain delivery 89, the respective groups being carried to a point above a delivery platform 134, whereupon the grippers are tripped in suitable manner for releasing the group of sheets, the group of sheets then descending toward the platform and being jogged by suitable jogger mechanism for even delivery of succeeding groups on the platform. Suitable means are provided for lowering of the platform as the sheets are received on the stack, the top of the stack remaining adjacent to the chain delivery.

A passageway 138 is provided between the delivery sheet stacking means 95 and the roll supporting columns 56, being located between the columns 119 and 56, this passageway extending downwardly to the floor line 120, so that a truck exemplified at 139 may be wheeled or pushed into said passageway. This truck is a roll-truck, and is arranged to support fresh rolls 140, 141, of paper to be supplied to the roll stand, the fresh rolls being supported on brackets 142, 143, of said roll-truck, the ends of the brackets 142, 143, being in association with the ends of the brackets 57, 58, of the roll-stand for ready transference of the fresh rolls into the printing press.

Suitable gearing is provided for rotating the respective impression cylinders and plate cylinders forming the respective printing couples at proper circumferential speeds for proper printing, and for rotating the rollers 106, 107, at corresponding speeds for proper feeding of the smut-web with the printing web, and for properly rotating the cutting cylinders and the collecting cylinder, and for proper travel of the delivery tapes and chains, and for proper operation of the grippers, of the jogging mechanism, and of the platform, such means not being more particularly shown or described as the same will be apparent to anyone skilled in the art.

A passageway 146 for the operator is provided cross-wise of the machine between the roll-stand and the inker frame 25 for proper adjustment of any part in the width of the inker frame and for observation of the web printed by the first printing couple.

A passageway 147 for the operator is provided between the impression cylinder 13 and the inker frame 26 for proper attention to any part of the impression cylinder 13 across its width and for proper adjustment to any part of the inker frame 26, across its width, as well as for observation of the printing done by the first printing couple throughout its width.

The inker frame 27 is also freely accessible across its width, and the web printed by the second printing couple is also observable throughout its width. A passageway 148 across the end of the machine is provided for the purpose.

The inker frames 25, 26, 27, are also movable away from their respective printing couples, for instance, into the passageways 146, 147, 148, as shown in Fig. 2, and to greater or less extents into said passageways, for ready access to the plate cylinders and to the impression cylinders throughout their respective widths. All portions of the printing machine are by the arrangement of the printing couples and of the inker frames, and by the movements of the latter, readily accessible throughout their entire widths. The inker frames are readily movable.

New rolls of webs to be printed are readily placed in the machine, and the arrangement of the printing couples and of the smut-webs and their rolls are compact and closely associated in such relation that the loop portions of the webs are comparatively short and the printing of the respective sides of webs accomplished in close association so as to insure registry between the printings of the respective sides of the web, and clear, clean and accurate printings on both sides of the web.

Both of the impression cylinders are also readily accessible throughout their widths for ready attention to and changing of packing and sheets thereon, for the purpose of make-ready, and for other attention. The distance of web travel between the printing

couples, and between the printing couples and the severing mechanism, as well as the distance of travel of the smut-web, are comparatively short, for insuring printing registry, complemental travel of the webs about the second impression cylinder, and cutting registry for cutting the printed web into sheets, and such association and relation of the parts further permits ready observation of the operation of the printing couples and ready adjustment of the inking mechanism during the printing.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is:

1. In a multi-color web perfecting printing press, the combination of a pair of rotary impression cylinders located side by side and having a slight space between them, distanced plate cylinders at the distanced sides of said impression cylinders, an intermediate plate cylinder in said space between said impression cylinders, said plate cylinders complemental to said respective impression cylinders, distanced inker frames at the distanced sides of said distanced plate cylinders complemental to said distanced plate cylinders, an intermediate inker frame in said space complemental to said intermediate plate cylinder, means for moving said intermediate inker frame in said space toward and from the adjacent sides of said impression cylinders, and means for moving said pair of distanced inker frames toward and from the distanced sides of said distanced plate cylinders.

2. In a multi-color web perfecting printing press, the combination of a pair of rotary impression cylinders located side by side and having a slight space between them, distanced plate cylinders at the distanced sides of said impression cylinders, an intermediate plate cylinder in said space between said impression cylinders, said plate cylinders complemental to said respective impression cylinders, distanced inker frames at the distanced sides of said distanced plate cylinders, an intermediate inker frame in said space, means for moving said last-named inker frame in said space toward and from the adjacent sides of said pair of impression cylinders, means for moving said pair of distanced inker frames toward and from the distanced sides of said distanced plate cylinders, web drawing means above one of said impression cylinders, means guiding the web being printed about the other of said impression cylinders between said one of said impression cylinders and said web drawing means, smut-web rolls, means for guiding the smut-web loopwise about said other of said impression cylinders, and means for supporting said smut-web rolls and guiding said smut-web within said loop of said web being printed.

3. In a multi-color web perfecting printing press, the combination of a pair of rotary impression cylinders, distanced plate cylinders at the distanced sides of said impression cylinders, an intermediate plate cylinder between said impression cylinders, a roll support for the printing web at one side of said pair of rotary impression cylinders, distanced inker frames at the distanced sides of said distanced plate cylinders, an intermediate inker frame between said impression cylinders, a passageway between said last-named inker frame and one of said impression cylinders, a passageway between one of said distanced inker frames and said roll support, a passageway at the distanced side of the other of said distanced inker frames, and means for moving said respective inker frames into said respective passageways for providing passageways between said respective inker frames and their complemental plate cylinders.

4. In a multi-color web perfecting printing press, the combination of a pair of rotary impression cylinders, distanced plate cylinders at the distanced sides of said impression cylinders, an intermediate plate cylinder between said impression cylinders, a roll support for the printing web at one side of said pair of rotary impression cylinders, distanced inker frames at the distanced sides of said distanced plate cylinders, an intermediate inker frame between said impression cylinders, a passageway between said last-named inker frame and one of said impression cylinders, a passageway between one of said distanced inker frames and said roll support, a passageway at the distanced side of the other of said distanced inker frames, means for moving said respective inker frames into said respective passageways for providing passageways between said respective inker frames and their complemental plate cylinders, means for guiding the web being printed from said roll support, underneath said one of said distanced inker frames, about one of said impression cylinders, loopwise about the other of said impression cylinders and above said one of said impression cylinders, smut-web rolls, and a smut-web extending loopwise therefrom about said other of said impression cylinders, said smut-web rolls and said smut-web located wholly within said loop of said web being printed.

5. In a multi-color web perfecting printing press, the combination of a pair of rotary printing couples, a roll support at one side of said printing couples for the roll of web being printed, delivery stacking mechanism, passageways at the distanced sides of said printing couples and between said printing couples, one of said passageways located between one of said printing couples and said roll-support, a passageway between asid roll support and said delivery stacking mecha-

nism, three inker frames for said respective printing couples, and means for moving said respective inker frames laterally into said respective first-named passageways.

6. In a multi-color web perfecting printing press, the combination of a pair of rotary printing couples each comprising an impression cylinder and plate cylinders, a roll support at one side of said printing couples for the web being printed, delivery stacking mechanism, passageways at the distanced sides of said printing couples and between said printing couples, one of said passageways located between one of said printing couples and said roll-support, a passageway between said roll support and said delivery stacking mechanism, three inker frames for said respective printing couples, means for moving said respective inker frames laterally into said respective first-named passageways, means for guiding the web being printed from the impression cylinder of said one of said printing couples loopwise about the impression cylinder of the other of said printing couples and above said one of said printing couples, smut-web rolls, and a smut-web extending therefrom loopwise about said impression cylinder of said other of said printing couples, said smut-web rolls and said smut-web located wholly within said loop of said web being printed.

7. In a multi-color web perfecting printing press, the combination of a roll support for the roll of web to be printed, a sheet stacking means at one side of said roll support, a passageway between said roll support and said sheet stacking means, a pair of rotary printing couples arranged side by side at the other side of said roll support, each of said printing couples comprising an impression cylinder, passageways at the respective sides of said rotary printing couples and between said rotary printing couples, three inker frames for said respective rotary printing couples, means for moving said inker frames laterally into said last-named passageways, means guiding the printing paper from said roll support loopwise through said pair of rotary printing couples to said sheet stacking means in opposite general directions for forming a loop about the impression cylinder of that printing couple most distanced from said roll support, smut-web rolls, and a smut-web extending loopwise therefrom about said last-named impression cylinder, said smut-web rolls and said smut-web located wholly in said loop of said printing paper.

8. In a web perfecting printing press, the combination of a pair of rotary printing couples each comprising an impression cylinder, said impression cylinders located side by side in slightly spaced relation, a pair of smut-web rolls in the vertical plane of the space between the distanced sides of said impression cylinders, a printing web roll-stand, means for cutting the printing web into sheets, delivery means for the printed sheets, said printing web roll-stand and said delivery means located at one side of said printing couples, drawing means for the printed product located above one of said impression cylinders, guiding means for guiding the product being printed about the other of said impression cylinders as a loop between said one of said impression cylinders and said drawing means, and means for guiding said smut-web about said other of said impression cylinders loopwise between said smut-web rolls, said smut-web and said smut-web rolls located within said loop of said product being printed, and constructed and arranged whereby the bights of said loops of said product being printed and of said smut-web are presented toward one end of the printing press and the open ends of said loops are presented toward the other end of said printing press, at which latter end said printing web roll-stand and said delivery means are also located.

In testimony whereof, we have hereunto signed our names.

LESLIE W. CLAYBOURN.
STEWART L. SHARPLESS.