

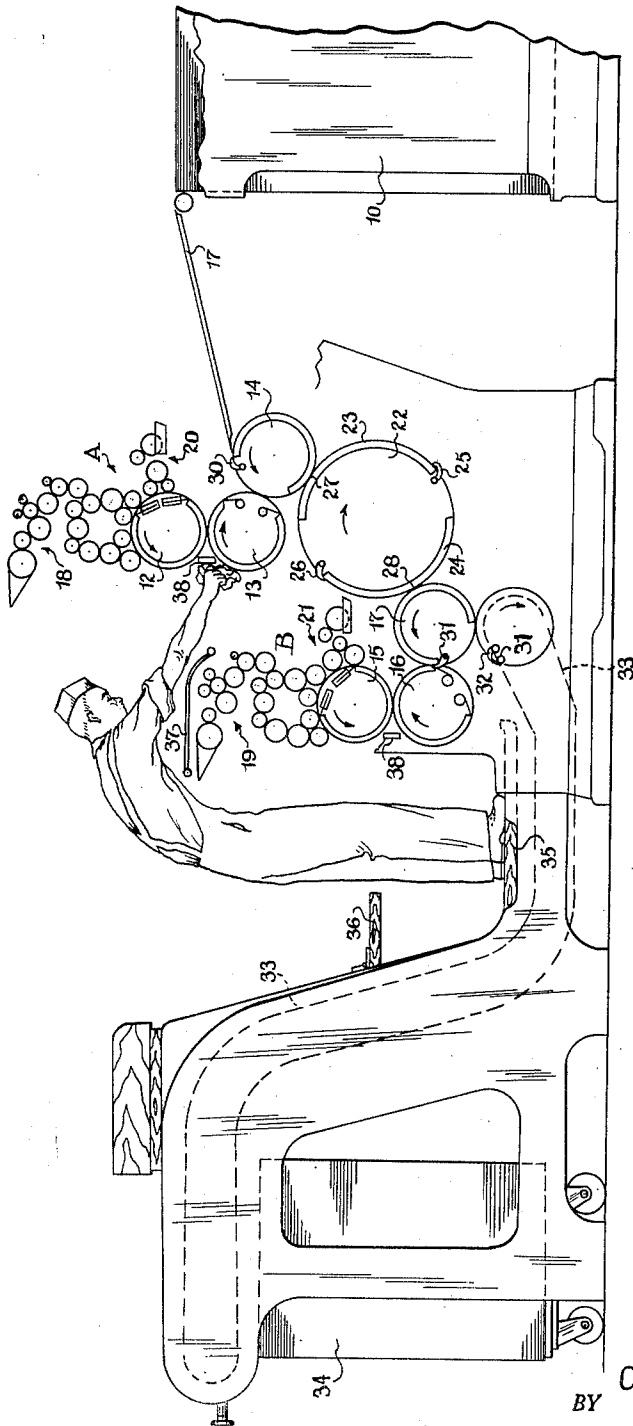
Feb. 20, 1951

C. W. HARROLD

2,542,867

TWO-COLOR ROTARY OFFSET SHEET PRESS

Filed July 30, 1946



INVENTOR.

CHARLES W. HARROLD

BY

Kivie, Hudson, Boughton & Williams
ATTORNEYS

UNITED STATES PATENT OFFICE

2,542,867

TWO-COLOR ROTARY OFFSET SHEET PRESS

Charles W. Harrold, University Heights, Ohio, assignor to Harris-Seybold Company, Cleveland, Ohio, a corporation of Delaware

Application July 30, 1946, Serial No. 687,106

5 Claims. (Cl. 101-137)

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This invention relates to improvements in multicolor presses, especially two-color offset presses intended for handling relatively small sheets of paper.

In multicolor rotary sheet fed printing presses, a preferred form of construction comprises a plurality of spaced printing units each comprising a plate cylinder, inking mechanism therefor, and an impression cylinder, and, in the case of a lithographic press, a blanket cylinder between the plate and impression cylinders and dampening mechanism for the plate cylinder. Gripper means are provided for conveying the sheets through each unit and from each unit to the next. Ordinarily such means comprises grippers on the impression cylinders and one or more gripper equipped transfer cylinders between successive impression cylinders. Furthermore it is preferred practice in such presses to utilize similar printing units each having the inking mechanism generally above the plate cylinder and the plate cylinder generally above the cylinder with which it cooperates, thus providing what may be termed an upright arrangement which is efficient in operation and convenient to service.

In printing presses generally it is necessary for the operator to perform a number of operations upon the cylinders and inking mechanisms of each printing unit to prepare the press for printing and to maintain the press in operation. Such operations include installing and removing plates, adjusting the position of plates, cleaning and adjusting ink rolls, cleaning and adjusting ink fountain, and, on a lithographic press, gumming up and washing off the plate, installing, removing and washing the blanket, and adding or removing packing under the plate and blanket. In unit-type presses of the kind described, it is customary to provide space and a work platform for the operator between adjacent units so that he may perform these operations conveniently and efficiently.

In practice the requirements of accurate register and adequate working space have usually been met by providing gripper transfer means between units in the form of one or three cylinders of the same diameter as the printing cylinders or a single cylinder of twice the diameter of the printing cylinders.

In presses designed to print on relatively large sheets and therefore having relatively large printing cylinders the known arrangements are satisfactory but as the size of sheet for which the press is designed decreases, and the diameter of the printing and transfer cylinders diminishes

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correspondingly, a range of sheet sizes and corresponding cylinder diameters is reached where a press designed according to the best known principles has such small space between units that it is impossible or impracticable for the operator to insert himself into that space and therefore he is unable efficiently to perform his necessary duties.

If the units in such a smaller size press are arbitrarily spaced far enough apart to accommodate the operator between them, departures from the most desirable construction of transfer means are necessitated, such as the use of a large number of transfer cylinders or a long conveyor. Such devices give rise to difficulties from the standpoint of accuracy of register and furthermore they are expensive to construct and the floor space occupied by a press employing them is undesirably large in proportion to the size of sheet being printed.

As a result of the above considerations, multi-unit presses of the kind referred to have heretofore not been commercially available or practicable in a range of sizes extending from a sheet size of about 17 x 22 inches or smaller up to about 25 x 38 inches, or from a cylinder diameter of about 8 inches up to about 14 inches.

In accordance with the present invention the usual working space between the units of a two-color press is substantially eliminated, thereby promoting the compactness and economy which is so desirable in a small press. At the same time by disposing the second unit at a low level as compared with the first, the operator may stand at the delivery side of the second unit and reach over that unit in order to work upon the cylinders and the inker of the first unit. Thus, by bringing the units close together, disposing the second unit at a low level as compared to the first and utilizing a single double-size transfer cylinder, which preferably takes a sheet from the lower left-hand quadrant of the first impression cylinder and delivers it to the upper right-hand quadrant of the second impression cylinder, the difficulties heretofore encountered in producing a compact conveniently operated two-color press with accurate registration of sheets are overcome.

One of the objects of the invention therefore is the provision of a compact convenient two-color press of relatively small size having separate printing units and positive means for conveying the sheets through them.

Another object is the provision of a compact convenient two-color press utilizing relatively

small printing cylinders and a multiple size transfer cylinder.

Another object is the provision of a press of the character stated wherein an operator standing at a single operating station is enabled to perform work upon both units of the press.

Other objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the single figure of the accompanying drawing.

In the drawing 10 represents a pile feeder from which sheets are directed either singly or in a stream down a feed board 11 to the first unit "A" of the press. The three cylinders of the two units are of conventional form although of relatively small size as compared to the cylinders of the large commonly known unit-type multicolor offset presses. In unit "A" the plate cylinder is shown at 12 substantially vertically above the blanket cylinder 13 whereby enough of the blanket cylinder is exposed to enable the operator to work upon it, while the impression cylinder 14 is disposed to one side of blanket cylinder 13.

In unit "B" the plate cylinder 15, blanket cylinder 16, and impression cylinder 17 are disposed in approximately the same relation to each other as the corresponding cylinders of unit "A." As illustrated, impression cylinder 17 of unit "B" is on the same level as blanket cylinder 16, while impression cylinder 14 of unit "A" is disposed at a slightly lower level than blanket cylinder 13, the purpose being to enable the sheet transfer mechanism hereinafter referred to, to clear the latter blanket cylinder. This deviation from precise similarity is not essential and, if desired, the cylinders in the two units may be identically arranged. Furthermore, although the cylinders of each unit as shown are arranged so that lines joining their axes form a triangle having an angle of about 90 degrees or slightly more at the blanket cylinder axis, this angle may be varied as desired, but preferably within such limits as enable the cylinders to be separated by movement of the blanket cylinder only. The inking mechanisms 18 and 19 of the two units are disposed above the plate cylinders, and the dampening mechanisms 20 and 21 are located to one side of their respective plate cylinders in advance of the inking mechanisms.

The two printing units are arranged relatively close together and at different levels, preferably being disposed along a diagonal line making an angle between about 30 degrees and about 60 degrees with the horizontal, thereby eliminating the usual space occupied by an operator between units and providing access to the higher unit over the lower unit from a position adjacent the latter. As illustrated, the diagonal line through the units makes an angle of about 45 degrees with the horizontal. It is to be noted that the disposition and arrangement of the units and their component parts is such that the blanket cylinder of unit "A" and the inking mechanism of unit "B" are approximately on the same general level, that is the blanket cylinder is at least high enough in relation to the inker to enable the operator to reach over the inker of unit "B" to work on the plate and blanket cylinders of unit "A." The difference in the levels of the two units may be greater than illustrated but is preferably not so great as to cause the higher unit cylinders to be out of reach of the operator or to be farther than desirable from the lower unit cylinders.

Sheets are transferred from unit "A" to unit "B" by gripper mechanism in the form of a double size transfer cylinder 22, that is a cylinder which has a diameter twice that of the other cylinders of the press. Cylinder 22 has two sheet supporting surfaces 23 and 24 and two sets of grippers 25 and 26. Its surface speed is of course the same as that of the cylinders 14 and 17. It takes sheets from cylinder 14 at the point 27, which is in the lower left-hand quadrant of cylinder 14 as viewed in the drawing, and delivers sheets to cylinder 17 at the point 28 in the upper right-hand quadrant of that cylinder. The arrangement of cylinders is such as to bring the two units as close together as is practical, space for the dampening mechanism 21 and accessibility of the cylinders 12 and 13 being the principal limiting factors.

The direction of rotation of the various cylinders is indicated by arrows in the drawing. Sheets are taken from feed board 11 by grippers 30 on impression cylinder 14, printed by the blanket on blanket cylinder 13, transferred from grippers 30 to one or the other of the two sets of grippers 25 and 26 on transfer cylinder 22, presented by those grippers to the grippers 31 of impression cylinder 17, the other color printed by the blanket on blanket cylinder 16 and the sheet then transferred to grippers 32 on gripper bars 31 carried by a pair of endless chains 33 running over sprockets, not shown, and finally delivered by the latter grippers onto the top of a delivery pile 34.

A work platform 35 extends across the width of the machine above the delivery chains 33 somewhat below the level of the blanket cylinder 16. An operator standing or crouching on the platform 35 may perform work on the cylinders 15 and 16, such as placing or removing a plate or a blanket, washing the plate and blanket, gumming up the plate, etc. He may also perform work on the inker 19. In addition, while standing on the platform he may reach over the inker 19, as indicated in the drawing, and perform work on the cylinders 12 and 13 or inker 18. A second platform 36, above and somewhat to the rear of platform 35 may be used at times by some operators for working on the top part of the inker of unit "A," but for a man of average height platform 35 is all that is required.

Obviously, if both feeder and delivery were located at the feeder end of the press, as is the case in some presses, the operator might stand on the floor if desired, instead of on a platform. Whether the operator stands on the floor or upon either of the platforms 35, 36 he essentially occupies a single operating station from which both units are accessible.

The location of the operator's platform or working space between the printing unit B and the delivery conveyor 33, in connection with the close coupling of the two units A and B, is highly convenient and advantageous because the operator by turning one way can detect deficiencies in the quality of the printing on the sheets being delivered while the press is running and by merely turning the other way he can make adjustments or changes in either or both of the units to correct such deficiencies. For example, he can remove lint from the blanket cylinder, add a little moisture with a sponge to the plate cylinder where a tendency to scumming appears, or adjust the ink fountain to apply more or less ink to particular areas of the printing. In the normal two-color press on the contrary, having working space between units, the operator must leave the position between the delivery and second unit and go to

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the platform between units to make such corrections on the first unit, and then return to check the result of the corrections.

In order to protect the operator from contact with inking mechanism 19 a guard 37 is provided extending across the press and the customary guard bars 38 are provided at the inrunning side of the plate and blanket cylinders of each unit, these bars being removable to facilitate attachment and removal of the plates and blankets.

While I prefer to employ a double size transfer cylinder between units, the invention in its broader aspect contemplates the use of other conveying devices such for example as a plurality of cylinders or an endless conveyor between the impression cylinders or an endless conveyor which runs around both impression cylinders provided the sheets are conveyed through the units with the required degree of accuracy to maintain the printing in proper register.

Having thus described my invention, I claim:

1. In a multicolor rotary sheet fed offset printing press, two printing units each comprising a plate cylinder, a blanket cylinder, an impression cylinder and inking mechanism disposed generally above the plate cylinder, the plate cylinder of each unit being disposed substantially vertically above the blanket cylinder of that unit, the impression cylinders of the two units extending laterally in the same direction from said blanket cylinders, the cylinders of the two units being of a diameter no greater than fourteen inches, the two units being disposed so closely adjacent each other laterally that the foremost portion of the first unit and the rearmost portion of the second unit are substantially in the same vertical plane so as to substantially eliminate working space between them, the two units being at different levels such that the blanket cylinder of the higher unit is at least high enough to be at about the same level as the inking mechanism of the lower unit and not so high as to place its lower extremity materially above the top of said inking mechanism of said lower unit, said press having a working space for an operator alongside the lower unit extending down to a level below the axis of the blanket cylinder of that unit, whereby an operator standing in the said space may have access to the plate and blanket cylinders of the lower unit, and by reaching over the inker of the lower unit

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may perform work on the plate and blanket cylinders of the higher unit, and means comprising sheet grippers for conveying sheets through and between the two units.

2. Mechanism as claimed in claim 1, wherein said sheet conveying means comprises grippers on said impression cylinders and a double size gripper equipped transfer cylinder adapted to transfer sheets from one unit to the other between a point in the lower half of the upper impression cylinder and a point in the inner half of the lower impression cylinder.

3. Mechanism as claimed in claim 1, wherein said sheet conveying means is arranged to convey sheets first through said higher unit then diagonally downwardly and through said lower unit.

4. Mechanism as claimed in claim 1, wherein said sheet conveying means comprises grippers on said impression cylinders and a double size gripper equipped transfer cylinder adapted to take a sheet from the lower left hand quadrant of the upper impression cylinder and deliver it to the upper right hand quadrant of the lower impression cylinder.

5. Mechanism as claimed in claim 1, wherein a support is provided for the operator in said working space at a level below the axis of the blanket cylinder of the lower unit, whereby an operator standing on said support may have access to the plate and blanket cylinders of the lower unit, and by reaching over the inker of the lower unit may perform work on the plate and blanket cylinders of the higher unit.

CHARLES W. HARROLD.

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