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C. A. MEISEL

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CONVERTIBLE PRINTING PRESS

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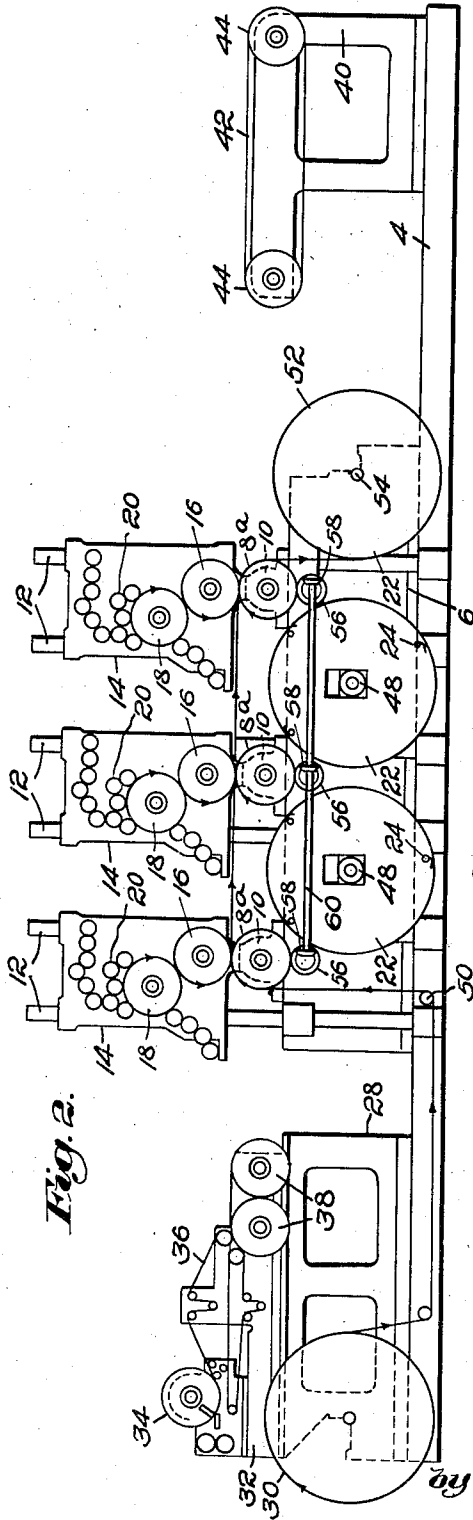


Fig. 2.

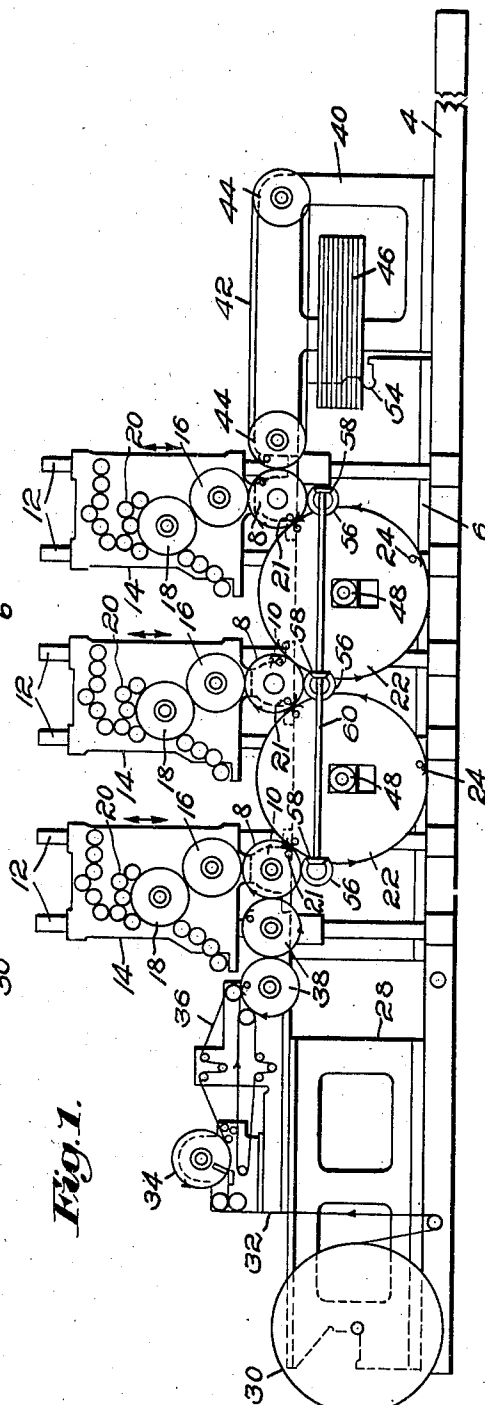


Fig. 1.

*Inventor:*  
**Charles A. Meisel.**  
by Harry Booth Townsend Miller & Weidner  
*Attys.*

## UNITED STATES PATENT OFFICE

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## CONVERTIBLE PRINTING PRESS

Charles A. Meisel, Milton, Mass., assignor to  
Meisel Press Manufacturing Company, Boston,  
Mass., a corporation of Massachusetts

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9 Claims. (Cl. 101—181)

This invention relates to printing presses, and the object is to provide a press which by simple adjustments may be adapted for printing either on sheets or on a web.

5 My invention will be well understood by reference to the following description of an illustrative embodiment thereof shown by way of example in the accompanying drawing, wherein:—

10 Fig. 1 is a diagram of the press as arranged for printing sheets; and

Fig. 2 is a diagram showing it arranged as a web printing press.

By way of example I have here shown my invention as applied to an offset press of the multiple rotary type. I shall first describe the press as adjusted for printing on sheets and refer to Fig. 1. The mechanism as a whole is herein mounted on the longitudinal bearing stringers 4 on which are erected the main frames 6. At 20 intervals along the upper portion of this main frame are provided bearings to receive impression cylinders 8, and herein these bearings are shown as small frames or pillow blocks 10 erected on the main frame 6, conveniently in a manner to permit them to be readily removed for purposes which will hereinafter appear. I herein show uprights 12 adjacent each of the impression cylinders on which are mounted for vertical movement (as indicated by the double- 30 pointed arrow in Fig. 1) sub-frames 14 carrying cooperating elements of the printing couple including the printing cylinder 16 between which and the impression cylinder 8 the paper passes. Since the press shown is of the offset type, this 35 cylinder 16 is in the present instance a blanket cylinder with which cooperates the plate cylinder 18, likewise carried by the sub-frame 14, as is the inking mechanism 20. In the operative position shown in Fig. 1 the sub-frames preferably 40 rest directly upon the frames 10 accurately positioning the cylinders 8 and 16 in cooperative relation. When the sub-frame is raised by suitable means not shown, the elements of the couple are separated and the impression cylinder exposed 45 for manipulation or removal.

At least when the press is operating to print on sheets, the impression cylinder 6 carries suitable grippers 21 to engage the sheet and the sheet is transferred from the grippers of one impression cylinder to those of the other by means of 50 suitable gripper-carrying transfer cylinders 22, which are mounted between the main frames and in the position of Fig. 1 are tangent to the impression cylinders 8 at either side thereof so 55 that the sheet may be transferred from one set of

grippers to another. Thus the sheet after its first printing may be released by grippers 21 on cylinder 8 at about 4 o'clock position to be taken by grippers 24 on transfer cylinder 22 to be carried counterclockwise with the latter to about 5 its 2 o'clock position to be there delivered to the grippers 21 of the succeeding impression cylinder. At the left of the main frames 6, viewing Fig. 1, and preferably spaced therefrom are frames 28 which provide a support for the mill 10 roll 30 and which carry the horizontally slidable sub-frame 32 supporting sheet-feeding mechanism, which when in the projected position of Fig. 1 is adapted to sever sheets from the web led from the mill roll and deliver them to the left- 15 hand impression cylinder 8. This mechanism may take varying forms and is herein illustrated as embodying an adjustable cutting cylinder 34 which severs the web led thereto into sheets of suitable length which are carried by tapes 36 to 20 the first of two gripper-carrying transfer cylinders 38. The first or left-hand of these cylinders carries the sheet downwardly from about the 12 o'clock position to about the 3 o'clock position where it is delivered to the right-hand 25 transfer cylinder 38 which carries the head of the sheet from its 9 o'clock position counterclockwise to about its 3 o'clock position where it is delivered to the first of the impression cylinders 8. 30

On the bearing stringers 4 at the right-hand end of the machine is the sub-frame 40 longitudinally movable therealong and which carries a chain delivery device 42 mounted on the sprockets 44. In its inner position shown in Fig. 1 the 35 grippers of the chain are adapted to receive the sheets from the last of the impression cylinders 8 and deliver them to a delivery table 46 carried by the frame 40.

I have described the arrangement of the parts 40 when the press is utilized to print on sheets. Fig. 2 shows the arrangement when printing on a web. The transfer cylinders 22 are here shown as journaled in vertically movable boxes 48 and thus may be dropped to the position of Fig. 2 45 to separate them from the impression cylinders. The sub-frame 32 may be racked back on the frame 28 to the position of Fig. 2 separating the sheet-feeding mechanism from the first of the impression cylinders and likewise the frame 40 50 may be racked out to the right separating the sheet delivery mechanism from the last impression cylinder of the series. The web from the mill roll A may be led over a guide roll 50 and thence serially beneath the several printing cyl- 55

inders 16 to a rewind roll 52 for which a mounting 54 is provided at the right-hand end of the frames 6.

If the margins between the successive impressions on the web was sufficiently large to accommodate the spaces on the impression cylinders occupied by the gripper mechanisms, no further change would be necessary. Commercially, however, this would seldom, if ever, be the case and therefore provision must be made for providing a longer effective circumferential length of impression surface. This may be most easily effected by removing the gripper-carrying impression cylinder 8 bodily and substituting a plain impression cylinder therefor. I have indicated this by marking the impression cylinders 8a in Fig. 2. Conveniently the cylinder 8 together with the pillow blocks 10 which support it, its shaft and any gears secured thereto, may be removed as a unit and a similar unit substituted therefor differing therefrom merely in the absence of grippers and such mechanism as is utilized for operating the same.

The various cylinders ordinarily will be driven by means of gears on their shafts, the pitch lines of which correspond to the surfaces thereof, as is common in the printing press art and as will be well understood. In the diagrams I have not attempted to distinguish between cylinders as such and the gears attached thereto as it would merely complicate the drawing without being correspondingly useful. The impression cylinders carry gears with which may mesh driving gears 56 driven through bevels 58 from a shaft 60 extending longitudinally along the frame 6. The gear on the impression cylinder 8 may mesh with a gear on the blanket cylinder 16 when the sub-frame 14 carrying the latter is in the operative position shown in Fig. 1 and by this connection the elements of the printing couple are driven in proper timed relation. The transfer cylinders 22 may have gears meshing with the gears on the impression cylinders 8, thus insuring the movement of the grippers which they carry in proper timed relation to the movement of the grippers on the impression cylinders. When the transfer cylinders are dropped to the position of Fig. 2, the gears are unmeshed and the transfer cylinders remain stationary. The sheet-feeding mechanism carried by the sub-frame 32 may take motion from a driving gear on the shaft of the right-hand transfer cylinder 38 which, when the parts are in the position of Fig. 1 and the press is operating as a sheet fed press, meshes with the gear on the shaft of the first impression cylinder 8. When the sub-frame 32 is retracted to the position of Fig. 2, the gears are unmeshed and the driving connection broken. Similarly the shaft of the left-hand sprocket 44 of the chain delivery mechanism may carry gears meshing in the position of Fig. 1 with the gear on the shaft of the last impression cylinder 8 and, when sub-frame 40 is retracted to the position of Fig. 2, the gears are unmeshed and the driving connection broken.

It will be seen from this description that I provide a press which may be shifted from a sheet-fed job to a web job, or vice versa, with substantially no more labor or handling than is incident to any change of a press of generally similar type from one run to another.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to

be considered in all respects as illustrative and not restrictive; reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

1. A printing press adapted for operation alternatively on sheets or webs comprising a series of couples, each comprising a printing cylinder and an impression cylinder, a sheet feeder cooperating with the first of the impression cylinders, sheet transfer means between successive impression cylinders and sheet delivery means cooperating with the final impression cylinder, said feeding transfer and delivery devices being retractible from said cylinders, and means for training a web in a path passing serially through the lines of contact of said couples.

2. A multi-couple press having a plurality of printing couples including interchangeable impression cylinders, one set of such cylinders having sheet grippers and shiftable sheet-feeding, sheet transfer and sheet delivery devices having positions wherein they cooperate with the grippers to feed sheets through the couples and retracted positions permitting training of a web through the couples.

3. A multi-couple press having a plurality of printing couples including interchangeable impression cylinders, one set of such cylinders having sheet grippers, gearing for driving the cylinders, shiftable sheet feeding, sheet transfer and sheet delivery devices having driving gears, said devices having positions wherein their driving gears are meshed with the gearing of the couples and wherein they cooperate with the grippers to feed sheets through the press and a retracted position wherein the gears are out of mesh and the devices are positioned clear of the locations of the impression cylinders to permit training of a web through the couples.

4. A printing press comprising a printing cylinder, interchangeable impression cylinders for cooperation therewith, one of the impression cylinders having sheet-carrying grippers, devices having cooperating grippers adapted respectively to supply a sheet to and to carry a sheet away from the grippers of the impression cylinder, said devices being retractible to permit training of a web through the press.

5. A printing press comprising a plurality of printing cylinders, interchangeable mechanisms for cooperation therewith providing support for the paper as it passes the cylinders, one of said mechanisms including grippers for carrying a sheet, and devices having cooperating grippers adapted respectively to supply a sheet to and to carry a sheet away from said grippers, said devices being retractible to permit training of a web through the press.

6. A press comprising a main frame, impression cylinders supported at intervals along the length thereof in such manner as to be readily removable therefrom, cooperating printing cylinders and attendant inking mechanism therefor, at least the cylinders being shiftable to provide access to the impression cylinders, a transfer cylinder mounted on the main frame between the impression cylinders of each successive pair and movable to separate them from the impression cylinders, and sub-frames at the ends of the press carrying respectively a sheet feeding and a sheet delivery mechanism, the said sub-frames being shiftable between inner positions wherein they serve to supply a sheet to and to carry away a sheet from the terminal impression cylinders

respectively and retracted positions permitting the training of a web through the press.

5 7. A press comprising a main frame, impression cylinders supported at intervals along the length thereof in such manner as to be readily removable therefrom, sub-frames supporting cooperating printing cylinders and attendant inking mechanism above the impression cylinders, the sub-frames being vertically movable to bring  
10 the printing and impression cylinders into and out from contact, a transfer cylinder mounted on the main frame between the impression cylinders of each successive pair and movable to separate them from the impression cylinders, and sub-frames at the ends of the press carrying respectively  
15 a sheet feeding and a sheet delivery mechanism, the said sub-frames being shiftable between inner positions wherein they serve to supply a sheet to and to carry away a sheet from the  
20 terminal impression cylinders respectively and retracted positions permitting the training of a web through the press.

8. A press comprising a main frame having at intervals therealong bearings for supporting a  
25 series of impression cylinders, sub-frames supporting cooperating printing cylinders and attendant inking mechanism above the impression cylinders, the sub-frames being vertically movable to bring the printing and impression cylinders  
30 into and out from contact, a transfer cylinder mounted on the main frame between the impression cylinders of each successive pair and movable to separate them from the impression cylinders, and sub-frames at the ends of the  
35 press carrying respectively a sheet feeding and a sheet delivery mechanism, the said sub-frames being shiftable between inner positions wherein they serve to supply a sheet to and to carry away

a sheet from the terminal impression cylinders respectively and retracted positions permitting the training of a web through the press.

9. A press comprising a main frame having at intervals therealong bearings for a series of im- 5 pression cylinders, cylinders mounted in the bearings having gears thereon, cooperating printing cylinders and attendant inking mechanism therefor, at least the cylinders being shiftable to provide access to the impression cylinders, a  
10 transfer cylinder mounted in the main frame between each two successive impression cylinders and having a driving gear, the transfer cylinder being movable between a position wherein it is operatively related to said impression cylinders  
15 and wherein its gear meshes with the gears thereon and a retracted inoperative position removed from the surfaces of said cylinders and wherein its gear is out of mesh with the gears thereon, a sheet feeding mechanism at one end of the  
20 press having a driving gear and movable between an inner position wherein said gear meshes with the gear on the first impression cylinder and the mechanism delivers a sheet to the surface of the impression cylinder and a retracted position  
25 wherein the gears are out of mesh and the mechanism removed from the surface of the cylinder to provide for leading a web thereto, and a sheet delivery mechanism at the other end of the  
30 press having a driving gear and movable between a position wherein said gear meshes with the gear on the last impression cylinder and the mechanism receives a sheet at the surface of said cylinder and a retracted position wherein the  
35 gears are out of mesh and the mechanism removed from the surface of the cylinder to provide for leading a web therefrom.

CHARLES A. MEISEL.