April 16, 1957 R. W. WOOD 2,788,738

PRINTING PRESS FOR PRINTING NEWSPAPERS AND THE LIKE

Filed Aug. 3, 1950 3 Sheets-Sheet 1

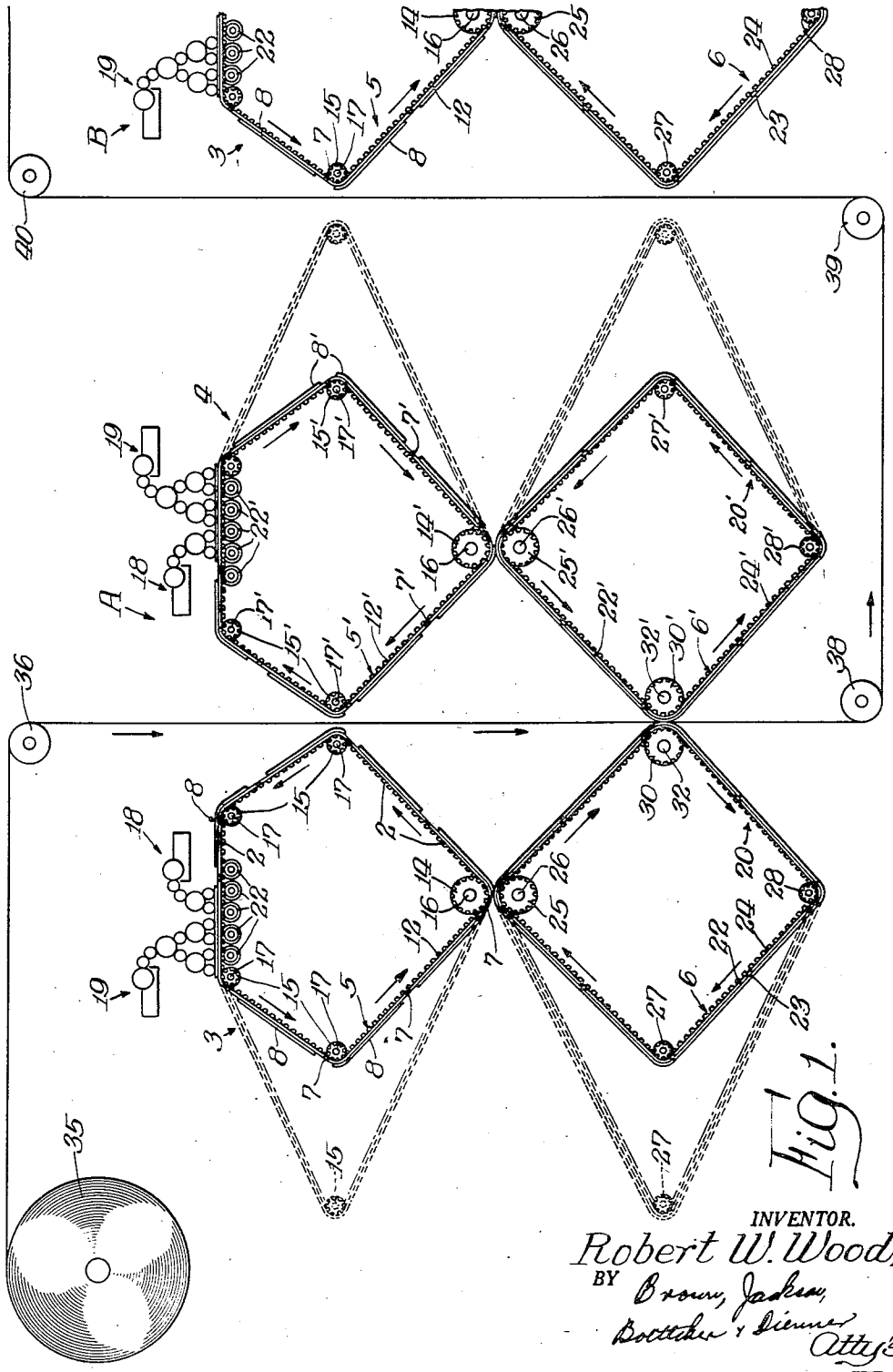


Fig. 1.

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PRINTING PRESS FOR PRINTING NEWSPAPERS AND THE LIKE

Filed Aug. 3, 1950 3 Sheets-Sheet 2

Fig. 2.

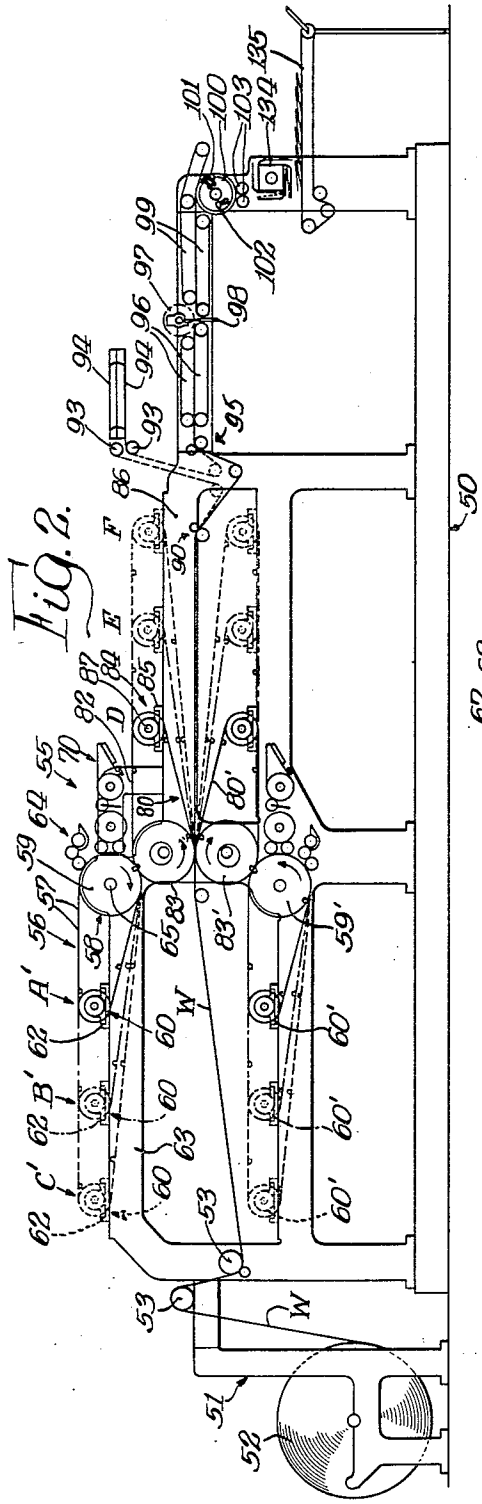
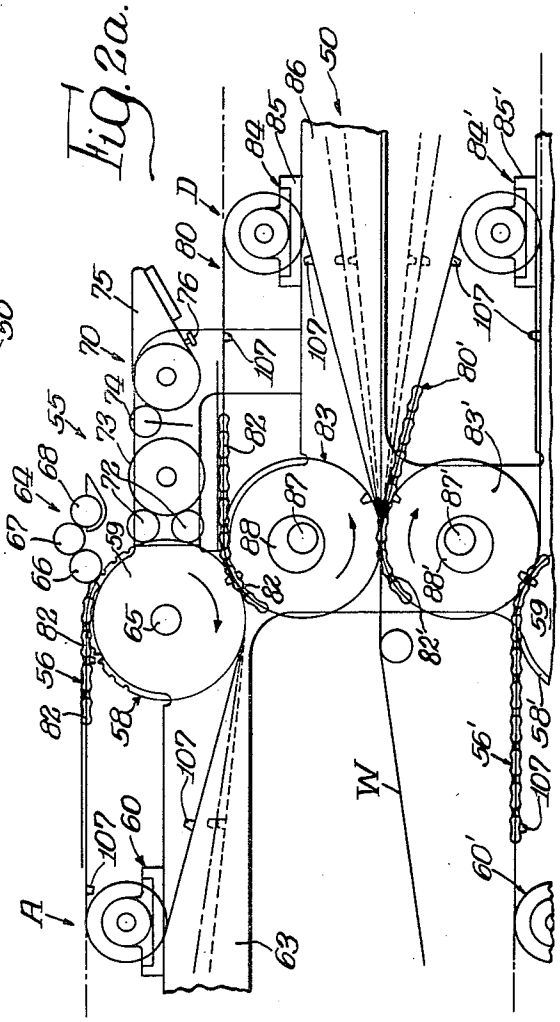


Fig. 2a.



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Filed Aug. 3, 1950 3 Sheets-Sheet 3

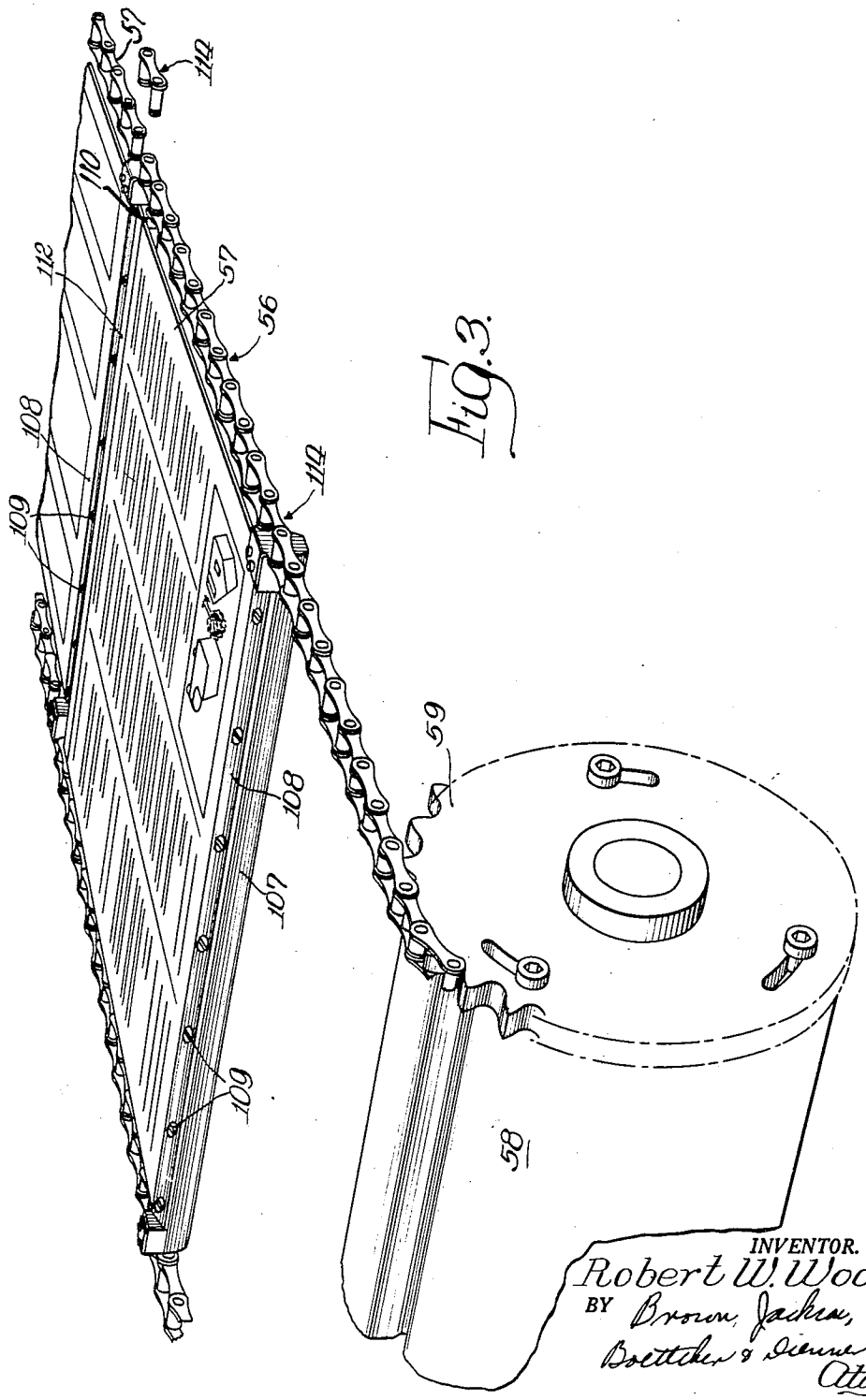


Fig. 3.

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2,788,738

PRINTING PRESS FOR PRINTING NEWSPAPERS AND THE LIKE

Robert W. Wood, Lake Bluff, Ill.

Application August 3, 1950, Serial No. 177,476

2 Claims. (Cl. 101—171)

The present application is a continuation-in-part of my application, Serial No. 97,290, filed June 4, 1949, which was abandoned February 15, 1950, and relates to improvements in printing presses for printing newspapers, magazines, circulars, and other forms of printed matter in page form.

It is the primary object of my present invention to provide a press and a method by which a newspaper, magazine, or like publication may be produced on a single web of paper by printing thereon a plurality of pages in successive relation on the web, after which the printed web may be cut into sheets which are folded to form a newspaper, tabloid, or other forms of folded signatures.

So far as I am aware, it is the present practice in printing newspapers to provide one web for each of a plurality of perfecting units, in which each of the perfecting units comprise two plate cylinders and two impression cylinders, with each of the perfecting units effecting printing on each side of a web passing therethrough.

The essential principle of my present invention, distinguishing it from known practice, resides in using a single web upon which successive pages are printed, and on which any selected number of pages to be printed for a particular issue may be controlled by the number of plates utilized in the printing press, rather than, as before, by employing a greater or lesser number of perfecting units. It will be apparent that each successive page printing on a single web could be arranged with respect of other like printed webs to form a larger newspaper without departing from the concept of my present invention. It will further be apparent that by my present invention the use of bulky equipment is avoided and a single printing unit is sufficient for printing an entire printed issue or portion thereof in lieu of the necessity of using a plurality of perfecting units as presently practised for that purpose.

The aforesaid object and advantages can be conveniently accomplished in different ways, and for purposes of the present disclosure I have selected to illustrate my invention embodied in an offset press. Briefly, an offset printing press for purposes of practicing the method aforesaid and defining a machine within my present invention may essentially comprise a plate carrier and a transfer blanket carrier, both in the form of endless conveyors or belts. The plate belt or conveyor provides for the support of, or carries, a plurality of suitable flexible lithographic plates arranged in the order desired for the printing of pages on a web, and which plates are adapted to be dampened and inked as by suitable dampening and inking means provided for that purpose. The blanket conveyor comprises or carries a transfer blanket of conventional material suitable for the purpose. The plate belt or conveyor and blanket belt or conveyor are driven in synchronism and arranged so that the successive plates on the plate conveyor, after they have been dampened and inked, transfer or impress successive ink images to

the blanket. The successive ink images on the blanket are then offset onto a web having contacting surface engagement with the blanket so that the ink images thereon are transferred successively to the web. For this purpose a platen cylinder may be arranged appropriately with the blanket conveyor to form a printing couple therewith. In perfecting printing of a web, duplicate plate and blanket belts or conveyors, as above described, may be provided and arranged so that the two blanket conveyors receive the web therebetween and, in which instance, the blankets each serve as a platen for the other in offsetting their ink images to opposite surfaces of the web. It will be readily apparent from the above that, if desired, any suitable number of successive apparatuses of the character described may be arranged in longitudinal or vertical banks so that the web may be drawn successively through such apparatus to provide for the printing of a plurality of colors on the web or other suitable matter, as determined by the plates carried by the plate conveyors or belts of the apparatus. In the apparatus described, the plate and blanket conveyors are preferably made of a plurality of detachably connected plate and blanket sections, each of a length equal to a multiple of a given dimension of a page to be printed, so that they may be readily altered to provide publications of different numbers of pages.

In the application of my invention to an offset press, the plate and blanket conveyors are necessarily of equal lengths to provide for the successive offset of ink images from each plate to the same blanket portion or panel of the blanket conveyor. In the application of my invention to letterpress printing, the plate conveyor would, of course, carry flexible letter press printing plates, such as rubber plates or the like, for impressing ink images directly onto the web.

A preferred feature of my invention is to provide an endless plate conveyor, the length of which can be readily changed to provide the desired number of printed pages on a web, and in which the plate sections of the conveyor are suitably supported at the point of ink impression or transfer, as, for example, in an offset press, to a transfer blanket or directly to the web as in letterpress printing.

A further preferred feature of my invention resides in the provision of means for the plate and blanket sections, making up the plate and blanket conveyors, for detachably holding thereon suitable printing plate means and blanket transfer means, respectively.

A further preferred feature of my invention resides in the provision of endless plate or blanket conveyor assemblies in which the plate and blanket conveyors are formed by a plurality of detachably connected plate or blanket sections of lengths equal to a multiple of a given dimension of pages to be printed in which registering means is provided to effect registration of the plate or blanket sections at the portions of the conveyors at the time an ink transfer or impression is made.

A further preferred feature is to provide, for the purposes last noted, a cylinder for each conveyor serving to define a return bend for the conveyor, in which the cylindrical surface of the cylinder serves as a supporting surface for the plate or blanket sections of the conveyor, and in which the cylinder and plate or blanket sections have registering means therebetween for effecting registration of the plate or blanket sections on the cylinder. In such construction of the conveyor, the plate printing means or the transfer blanket means, carried by the plate and blanket sections, is supported by the cylinder to provide for the effective transfer or impression of an ink image at that portion of the conveyor. Further in connection with the plate conveyor, suitable inking fountain means, as for letterpress printing, or dampening and ink-

ing fountain means, as for offset printing, may be arranged in juxtaposition of the cylinder so as to provide for the convenient and satisfactory application of ink or dampening solution and ink to the printing plate means carried by the plate sections.

The above and other objects, advantages, and features of my present invention will appear from the detailed description.

Now, in order to acquaint those skilled in the art with the manner of constructing and utilizing printing presses in accordance with my present invention, I shall describe, in connection with the accompanying drawings, certain preferred embodiments of my invention.

In the drawings:

Figure 1 is a diagrammatic end view of a printing apparatus constructed in accordance with my invention;

Figure 2 is a side elevational view, largely diagrammatic, of a second form of printing apparatus constructed in accordance with my invention;

Figure 2A shows on an enlarged scale the portion of the press of Figure 2 at the printing couple formed by the endless plate and blanket conveyors of the press; and

Figure 3 is a detail perspective view showing the construction of plate and blanket conveyors of Figures 1 and 2, and the manner in which they are registered with a rotatable member of the printing press.

Referring now to Figure 1 of the drawings, I have shown a printing apparatus comprising a first multiple printing unit, indicated generally by the reference character A, and a second multiple printing unit, indicated by the reference character B. The multiple printing units A and B each further comprise duplicate single printing units, indicated generally by the reference numerals 3 and 4. Only the single printing unit 3 of the multiple printing unit, illustrated at B, is shown, since it is a duplicate of the apparatus A, and which apparatus A will be hereinafter described in detail.

The printing unit 3, as shown, comprises an endless plate conveyor means, indicated generally by the reference numeral 5, and an endless transfer blanket conveyor means, indicated generally at 6. The endless plate conveyor means 5 preferably comprises a plurality of individual flexible panel members, indicated generally at 2, which are suitably hinged end to end as at 7. A suitable number of panels 2 may be used to provide a plate conveyor means of the desired length. Each panel member 2 of the endless plate conveyor means 5 is adapted to carry a flexible lithographic printing plate, as indicated at 8. The lithographic plates 8 are of known construction and may, for example, be of flexible plastic sheet material, thin sheet metal, paper, rubber or of any other suitable substance sufficiently flexible so that the plates are adapted to travel around the bend defining the path of travel of the endless plate conveyor means. The several panels 2 of the endless plate conveyor means 6 may be of any suitable construction to enable them to pass around the bends of the path of travel of the conveyor, and for this purpose may comprise a plurality of small link members pivotally connected end to end, or may, if desired, be made of flexible sheet material. The several panels 2, as diagrammatically illustrated in the drawing, along the lengthwise edges thereof have clogs or cleats 12 which are adapted to have meshing engagement with drive gears, one of which is shown at 14, and a plurality of idler gears, indicated generally at 15. A drive gear 14 is carried at each end of a shaft 16, extending transversely of the endless plate conveyor means 3, and the idler gears 15 are preferably so arranged as to lie in substantially the same vertical planes as the end drive gears 14. The idler gears 15 may be carried at the opposite ends of shafts 17, extending parallel with drive shaft 16, and spaced to provide for travel of the conveyor in the path shown. Preferably, the shafts 16 and 17 have drums mounted thereon to provide for the support of the conveyor. The drive gear 14 of the unit 3, as illustrated in

Figure 1, is adapted to be driven in a counterclockwise direction so that the endless conveyor is adapted to be driven in a like direction, as indicated by the arrows. Certain of the idler gears 15, as shown, are arranged so as to provide a horizontal run adjacent the upper end of the unit 3 for passage past a stationary dampening fountain, indicated generally at 18, and a stationary inking fountain, illustrated at 19. The dampening and inking fountains 18 and 19 may be of any desired construction and provide for the transfer of dampening solution and printing ink to the lithographic plates carried by the endless plate conveyor in the travel of the plates past the dampening and inking fountains. Preferably, a plurality of rollers, indicated generally at 22, are provided immediately below the upper run of the endless plate conveyor below the dampening and inking fountain so as to provide for the uniform application of the dampening and inking mediums to the lithographic plates.

As previously referred to, the endless plate conveyor means 5 may be the length necessary to accommodate the number of printing plates desired. Preferably, each panel member 2 is of a length sufficient to carry a single lithographic plate. Thus, the conveyor may readily be made up to a length in which the number of panels 2 equal the number of plates to be carried by the plate conveyor. The plate conveyor is shown in full lines of a length for carrying eight lithographic plates, and in dotted lines the conveyor has been shown of greater length for carrying a larger number of plates. The idler gear 15 at the left-hand end of the apparatus, as shown in the drawings, is adjustable to accommodate plate conveyors of various desired lengths.

The single printing unit 3 further comprises an endless transfer blanket conveyor or belt 20 which preferably comprises a plurality of flexible blanket panels 22 hinged end to end, as at 23, to each other to form a continuous belt. The blanket panels may be made of reinforced rubber or other suitable material of a character to prevent stretching, and at their lengthwise side edges are provided with cogs or treads 24 which are adapted to have engagement with a plurality of gears providing for the drive of the endless transfer blanket in a loop, as illustrated. The outer surface of the blanket panels may carry separate rubber offset transfer members or the surfaces of the panels may be suitably finished for that purpose. The gear means referred to comprises drive gears 25, with two of such gears preferably being provided one at either end of a transversely extending drive shaft 26 which preferably carries a drum providing for the support of the belt for contacting engagement with the lithographic plates carried by the endless plate conveyor 5. The gears 25 are of the same dimension as the gears 14 and suitable drive means is provided for driving the gears 14 and 25 in synchronism so that the endless plate conveyor 5 and the endless blanket conveyor means 6 travel at the same speed. The length of the endless transfer blanket is the same as the endless plate conveyor means so that the lithographic plates carried by the endless plate conveyor contact the endless transfer blanket conveyor in registered relation in each single full revolution of each of the conveyors. The gear means further comprises suitable idler gears 27 and 28 for engagement with cleats 24, and the shafts for such gears preferably carry drums for supporting the transfer blanket. As shown, an idler gear 28 is disposed opposite each drive gear 25, and each idler gear 27 is disposed opposite one each of a pair of gears 30 carried at the opposite ends of a platen shaft 32. The shaft 32 also preferably carries a drum for support of the transfer conveyor or belt. The arrangement is such that the several gears described provide for the drive and guiding of the endless transfer blanket without relative slippage thereof, as by engagement of the gear teeth of the several gears with the cogs or cleats of the panels of the transfer conveyor.

Since the endless transfer blanket is also made up of

individual transfer panel members, each preferably of a length for receiving an ink impression from each of the lithographic plates carried by the endless plate conveyor, the endless blanket conveyor means may be likewise lengthened or shortened by the inclusion or deletion of an appropriate number of such transfer panel members. When the endless plate conveyor 5 is elongated, as shown in dotted lines and as previously described, the transfer plate conveyor 6 is correspondingly elongated by the addition of further transfer panels, and the gear 27 is correspondingly disposed to provide for the support of the elongated endless transfer blanket conveyor.

It will be understood that, in addition to driving the drive gears 14 and 25 for the endless plate conveyor and the endless transfer blanket conveyor in synchronism, other of the gears, over which the belts are trained, may be driven at the proper speed to impart drive to the endless belt conveyors at more than one point, if that be desirable. The transfer conveyor 6 is driven in a clockwise direction, as viewed in the drawing, by drive gears 25.

In the printing unit 3 described, it will be observed that in the counterclockwise movement of the endless plate conveyor 5 the plates 8 carried thereby are first dampened by the dampening means 18 and then inked by the inking fountain means 19, and as the plates travel over the drive gear 14 they effect offsetting of an ink image on the plate to the transfer or blanket members of the endless transfer blanket 6.

The printing unit 4 of the printing apparatus A comprises an endless plate conveyor 5', identical to that described, and an endless transfer blanket conveyor 6', identical to the conveyor 6 of the unit 3. The several parts of the printing unit 4 bear the same reference numerals as the plate and transfer conveyors of the printing unit 3, and are denoted by the same reference numerals with prime characters. In the printing unit 4, the drive gears 14' and 25' are again driven in synchronism with the gears 14 and 25 of the printing unit 3 and, in this case, the endless plate conveyor means is driven in a clockwise direction and the endless transfer blanket conveyor 6' is driven in a counterclockwise direction. The drive gears 32 and 32' and the platen drums on the shafts for these gears are arranged in juxtaposition of each other, as shown in the drawing, so that one transfer blanket serves as the platen for the other.

By reason of the above apparatus, it will be seen that a web, such as shown at 35, may have the paper drawn therefrom over a guide drum 36 so that the web is adapted to be drawn through the printing couple defined by the pair of opposed transfer blanket conveyors 6 and 6' to effect the transfer of the ink images on the transfer blankets to opposite surfaces of the web. The opposed ends of the plate conveyors 5 and 5' are disposed apart an ample distance to provide for the free passage of the web therebetween so that the web does not accidentally contact the plates carried by the plate conveyors.

In the machine, as illustrated in Figure 1 of the drawings, the plate conveyor carries eight plates, and each conveyor, therefore, transfers eight ink images to each of the endless transfer conveyors so that eight successive ink images are applied to opposite surfaces of the web. The plate conveyors 5 and 5' may be of a width to provide for carrying a plurality of lithographic plates in successive rows transversely of the conveyors. In such adaptation of my invention, the transfer conveyors will be of appropriate width to receive the ink image from the plates. In such instance a series of pages will be printed transversely of the web in the rows thereon. With the apparatus constructed in this manner, newspapers of varying numbers of pages may readily be printed. As previously noted, the number of plates may be varied by lengthening or shortening the plate and transfer blanket conveyors so that the web may be printed with fewer or greater number of pages.

Also, it will be readily observed that, for a given length

for the plate conveyor and transfer conveyor panels, lithographic plates of varying lengths within the maximum length of the plate conveyor panels may be utilized in the press of my invention. Also, it will be further observed that the panels of the plate and transfer conveyors may be of any desired length so that the press is considerably flexible for its adaptation to a large number of printing problems.

After the web has passed through the perfecting offset printing apparatus A, it may be guided by guide drums 38, 39, and 40 to a position for passage through a second offset printing apparatus B. The printing apparatus B may be readily adapted, as will be appreciated by those skilled in the art, for the printing of a second color to the pages already printed by the first printing apparatus A. The printing unit B is identical in its construction to that of the printing apparatus A, and the like reference numerals indicate the identical parts already described.

Referring now to Figure 2, I have shown another embodiment of my invention with the apparatus there shown, comprising a frame, indicated generally at 50, which includes at the feed end of the apparatus a roll stand, indicated generally at 51, for supporting a paper roll 52 from which a web, indicated at W, is adapted to be withdrawn for feeding into the apparatus. It will be understood that suitable tension or brake devices may be applied to the paper roll 52 so as to maintain constant web tension. Pull rolls, indicated generally at 53, are suitably journaled in the frame and are provided for drawing the web W off of the paper roll 52 for feeding of the web into the apparatus.

A printing unit, indicated generally by the reference numeral 55, is supported by the frame 50 of the apparatus and comprises an endless chain conveyor 56, formed, as will later be referred to in detail, by a plurality of plate sections 57, connected in end to end relation, and each of length equal to a multiple of a page to be printed by the apparatus. The plate sections 57 are each adapted to carry suitable printing plate means. The plate sections 57 each include suitable link chains at the opposite sides thereof, and the connected sections define endless chains which are trained over sprocket members 59 at opposite ends of a plate cylinder 58 forming a return bend for one end of the chain conveyor. Return idler bend means, indicated at 60, for the other end of the conveyor preferably comprises suitable sprockets mounted for rotation in a bearing support 62 carried on the upper horizontal frame member 63. The bearing support 62 is suitably mounted on the frame for adjustment thereon, for reasons to be presently noted. In the full line position, indicated at A', of the bearing support 62, the endless chain conveyor 56 may be considered, in this position, to provide for conducting a printing operation with four plate sections 57, with each plate section carrying printing plate means for printing a single page. In this arrangement of the apparatus, the width of the endless chain conveyor 57 could be such that pairs of printing plates could be carried side by side, by each plate section, so that, under the conditions indicated for position A', provision would be made for printing eight pages. It will be understood that the illustrations given are only examples, and that each plate section could, if desired, be of a length equal to any desired multiple of a dimension of a page to be printed. Positions B' and C' of the bearing assembly 62 are indicated, and these positions may provide, for example, at position B', for a chain conveyor 56 comprising six plate sections 57 and, position C', eight plate sections. The plate cylinder 58, as shown, is mounted upon a shaft 65 carried by the frame, and the shaft may be driven in any suitable manner in a clockwise direction, as viewed in the drawing, whereby the sprockets 59, at opposite ends of the cylinder, drive the endless plate conveyor 56 in a clockwise direction. For purposes of the present

disclosure, the apparatus of Figure 2 may be considered to be an offset printing press so that, in this instance, the printing plate sections 57 will carry suitable flexible lithographic plates, and of a character, as previously mentioned, for enabling the plates to follow around the bends of the endless plate conveyor in the travel thereof. In order to provide for offset printing, a suitable dampening fountain, indicated generally at 64, is supported above and adjacent the plate cylinder 58, and comprises, as best shown in Figure 2A, a known applicator roller 66, a ductor roller 67, and a fountain roller 68. Suitable inking means, indicated generally at 70, is disposed posterior of dampening fountain 64 for the application of ink to the plates on the endless plate conveyor 56 and comprises, as best shown in Figure 2A, conventional form rollers 72, a vibrating ink drum 73, a ductor roller 74, and an under-shot ink fountain 75 provided with a conventional and known adjustment 76 for regulating the ink supply.

By reason of the construction above described, it will be observed that each lithographic plate carried by the endless chain carrier is successively transported to the plate support cylinder 58, and water and ink are applied to the lithographic plates while each is supported on the plate support cylinder 58, thus enabling the uniform and accurate control of the application of dampening solution and printing ink to the lithographic plates. Immediately below and extending generally lengthwise horizontally in end to end relation with respect to the plate conveyor 56 is an endless blanket conveyor, indicated generally at 80. The blanket conveyor 80 comprises blanket sections 82 having link chains along opposite edges thereof, and the several sections are detachably connected end to end to form the conveyor. The several blanket sections provide for the support of suitable transfer blankets for receiving the ink images of the printing plates carried by the plate sections of the plate conveyor. There are as many transfer blankets as printing plates, so that each lithographic plate offsets to its own blanket on the endless blanket conveyor 80. The endless blanket conveyor 80 is trained over a blanket plate cylinder 83 forming a return bend for the conveyor, and the cylinder has sprockets 82 at the opposite ends thereof for engaging with the links of the endless chains at the sides of the blanket conveyor. Suitable return bend means, indicated at 84, comprising, for example, an idler sprocket assembly is mounted in suitable bearing assembly 85, which is adjustable horizontally lengthwise of the apparatus on the frame portion 86 thereof. The bearing assembly 85, as shown, is adapted to be disposed in positions D, E, and F, with position D conforming to position A' of the plate conveyor, position E to position B', and position F to position C', so that each printing plate of the plate conveyor offsets to the same transfer blanket of the blanket conveyor. The blanket or offset cylinder 83 is carried by a shaft 87, with the shaft 87 being suitably mounted on the frame of the apparatus and arranged with respect to the shaft 65 to provide a point of tangency between the blankets carried by the endless blanket carrier and the plates carried by the endless plate conveyor 56. The cylindrical surface of offset cylinder 83 provides a surface for support of the blankets of the endless blanket conveyor during the ink transfer from the blanket to the web W. Preferably, the supporting shaft 87 for the blanket cylinder 83, at the opposite ends thereof, is disposed in eccentric bushings 88, whereby the offset cylinder may be adjusted relative to the plate cylinder 59 to provide for the desired pressure in effecting a printing operation.

Disposed immediately below and substantially in alignment with the endless blanket conveyor 80 is a second endless blanket conveyor 80', which is supported on the main frame of the apparatus in a similar manner as the endless blanket conveyor 80. The like reference numerals bearing prime characters are identical to the parts previously described, in view of which it is believed a further detailed description of these parts is not necessary. Immediately below the endless blanket conveyor 80', in end to end relation thereto, and directly below the endless plate conveyor 56 is a second plate conveyor 56', which is of the same construction as the endless plate conveyor 56, and the prime reference characters indicate the same parts previously described. It will be observed that the endless blanket conveyor 80' and endless plate conveyor 56' are also adjustable in length by insertion or removal of blanket or plate sections, and that three positions are shown for the bearing assemblies of the return idler bends 54' and 60' of these conveyors, whereby they may be adjusted correspondingly with the conveyors 56 and 80 to provide for the perfecting printing of pages of a publication to be printed by the apparatus. It will be observed that the blanket conveyors 80 and 80' are arranged so that the offset cylinders 83 and 83' thereof provide a point of tangency through which the web W is led in a substantially horizontal path to effect the perfecting printing of the web with successive pages with the ink images offset by the plates of the plate conveyor to the blankets of the blanket conveyor.

As previously indicated, the several conveyors, 56, 56' or 80, 80', may be of one, two or more plate widths, and assuming, for purposes of this disclosure, that such conveyors are of two page widths, then the web W from the paper roll 52 will, of course, constitute a two page width, and, in which event, the web may be split lengthwise centrally thereof at a conventional pull roll assembly, indicated generally at 90. One-half of the split web, leading from the pull roll assembly 90, may then be led over pipe rollers 93 to angle bars 94 of conventional and known construction, which places one web on top of the other at the trolley assembly 95 so that the two webs are laid together and driven to the right of the apparatus, as viewed in the drawing, by the trolley assembly 95. A suitable tape and pulley assembly 96 receives the superposed webs to transfer them to a known conventional rotary cutter 97 and a stationary knife cutter 98. The cut sheets are then transferred by the tape and pulley assembly 99 to a collecting and folding cylinder 100. This cylinder, as is well known in the art, may be constructed and timed so that it makes one revolution per sheet cut and can collect the number of sheets as a factor of the number of printing plates or plate sections of the plate conveyor of the press on the press. A gripper assembly, indicated at 101, holds the sheets to the cylinder, and a folding blade 102 tucks the sheets between folding rollers 103. A fly 134 transfers the folded sheets to a belt delivery 135.

Reference may now be had to Figure 3, where I have shown in detail a portion of the plate conveyor 56. It will be understood that the other plate conveyor 56' and the blanket conveyors 80 and 80' are of the same construction, so that the description of the noted plate conveyor suffices for all. The cylinder 58 of the plate conveyor assembly 56, as shown, is formed with a smooth cylindrical surface and is provided with the aforementioned sprockets 59 at each of the ends thereof for driving the chains 56 of the plate sections. Each plate section 57, as previously indicated, comprises the endless link chains at each side thereof and includes a cross or transverse frame member at the leading edge, indicated at 107, for connecting the two chains of a single plate section together. In the instance shown, the cross member 107 is substantially of gear tooth shape in cross section and is provided with a clamp 108, through which screws 109 project for threaded engagement with the cross member 107 to provide for securing thereto of the leading edge portion of a lithographic printing plate. The cross member 107, in addition, provides for registration of the plate section with respect of the plate cylinder 58, in that the plate cylinder 58 is formed with a recess 107a, of gear tooth cross sectional configuration,

for snugly receiving the gear tooth portion of cross member 107 to effect proper registration of the printing plate means carried by the plate sections with the plate cylinder in the operation of the apparatus. A second transverse cross member 110 extends between the opposed chains at the following end of the plate section 56, but this member lies within the upper and lower limits of the chains so as to pass smoothly over the plate cylinder 58. A second clamp bar 112 may be detachably connected in any suitable manner to cross member 110 to provide for mounting of the following or trailing end portion of a lithographic plate to the plate sections.

It will be understood that the blanket cylinders and blanket sections are also constructed in the manner above described, and embody the same or like transverse frame members, such as 107, for registration with recesses, such as 107*a*, for the offset cylinders. Thus, by virtue of this construction, the printing plates and the transfer blankets are maintained in accurate register in operation of the press. As seen in Figure 3, the plate sections at the ends of cross members 107 and 110 are provided with chain link pins and removable connecting link means 114 is provided for connecting two plate sections 57 together, in end to end relation, as shown in Figure 3. The chain conveyors thus may be lengthened or shortened as a multiple of the length of a plate or blanket section, by the insertion or removal of such plate or blanket sections in the conveyors. Preferably, the several plate and blanket sections are of lengths equal to a multiple of a given dimension of a page to be printed. It will be apparent that other forms of clamp means may be provided for detachably mounting the lithographic plates or blankets to the plate or blanket sections of the endless conveyors other than that herein described.

It is believed that, while the foregoing apparatuses have been shown largely diagrammatic in form, my invention will be readily comprehended by those skilled in the art in that the mechanical expedients of various parts embodied in the apparatus are well known in the art so that a further or detailed description of those parts is not necessary to a full understanding of my present invention.

I claim:

1. In a printing press, a printing member comprising an elongate endless conveyor, said conveyor comprising a pair of spaced parallel endless chains, a first shaft extending transversely of said chains, a first pair of spaced toothed sprockets mounted on said first shaft and each defining a return bend for one of said chains, a second shaft extending transversely of said chains in spaced parallel relation to said first shaft, a second pair of spaced toothed sprockets mounted on said second shaft each aligned with one of said first pair of sprockets, said second pair of sprockets each defining a return bend for one of said chains, a cylinder mounted on one of said shafts between the sprockets thereon, and a plurality of printing member sections adapted to be disposed in end to end relation between said chains, each of said printing member sections having means at the opposite sides thereof for detachable connection to said chains, each of said printing member sections having a toothed cross bar at the leading end thereof, said cylinder having a longitudinally extending tooth groove in the peripheral surface thereof, said groove being adapted for the reception of said cross bar on each of said printing member sections to insure registry of said printing member sections.

2. A perfecting web offset printing press comprising a pair of offset press assemblies, each of said offset press assemblies comprising an elongate endless plate conveyor carrying a plurality of lithographic printing plates, an elongate endless transfer blanket conveyor of a length equal to said plate conveyor and having contacting engagement therewith along a line transversely of said conveyors, and identical drive means for said plate and transfer blanket conveyors whereby said conveyors are driven in synchronism, and whereby ink images from the plates carried by said plate conveyor are adapted to be transferred successively in a row onto said transfer blanket conveyor, each of said conveyors comprising a pair of spaced parallel endless chains, a first shaft extending transversely of said chains, a first pair of spaced toothed sprockets mounted on said first shaft and each defining a return bend for one of said chains, a second shaft extending transversely of said chains in spaced parallel relation to said first shaft, a second pair of spaced toothed sprockets mounted on said second shaft each aligned with one of said first pair of sprockets, said second pair of sprockets each defining a return bend for one of said chains, and a plurality of printing member sections adapted to be disposed in end to end relation between said chains, each of said printing member sections having means at the opposite sides thereof for detachable connection to said chains, said chains being extensible and contractable to accommodate various numbers and sizes of printing member sections, said chains and said sprockets maintaining registry of said printing member sections, the transfer blanket conveyors of said pair of offset press assemblies being moved in opposite directions and being disposed adjacent each other, the said transfer blanket conveyors having contacting engagement with one another along a line transversely of said conveyors, the line of contact between said transfer blanket conveyors being disposed forwardly of the line of contact between each of said transfer blanket conveyors and their respective plate conveyors in the direction of movement of each of said transfer blanket conveyors, the line of engagement between said transfer blanket conveyors comprising a printing couple adapted for the reception of a web between said transfer blanket conveyors, whereby ink images on said transfer blanket conveyors are adapted to be transferred successively in a row onto opposite surfaces of the web, said conveyors all being of the same length and being driven synchronously at the same rate of speed, whereby perfect registry is maintained in each of said offset press assemblies and between said transfer blanket conveyors, whereby registry is maintained between the images transferred to opposite surfaces of the web to perfect the web.

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