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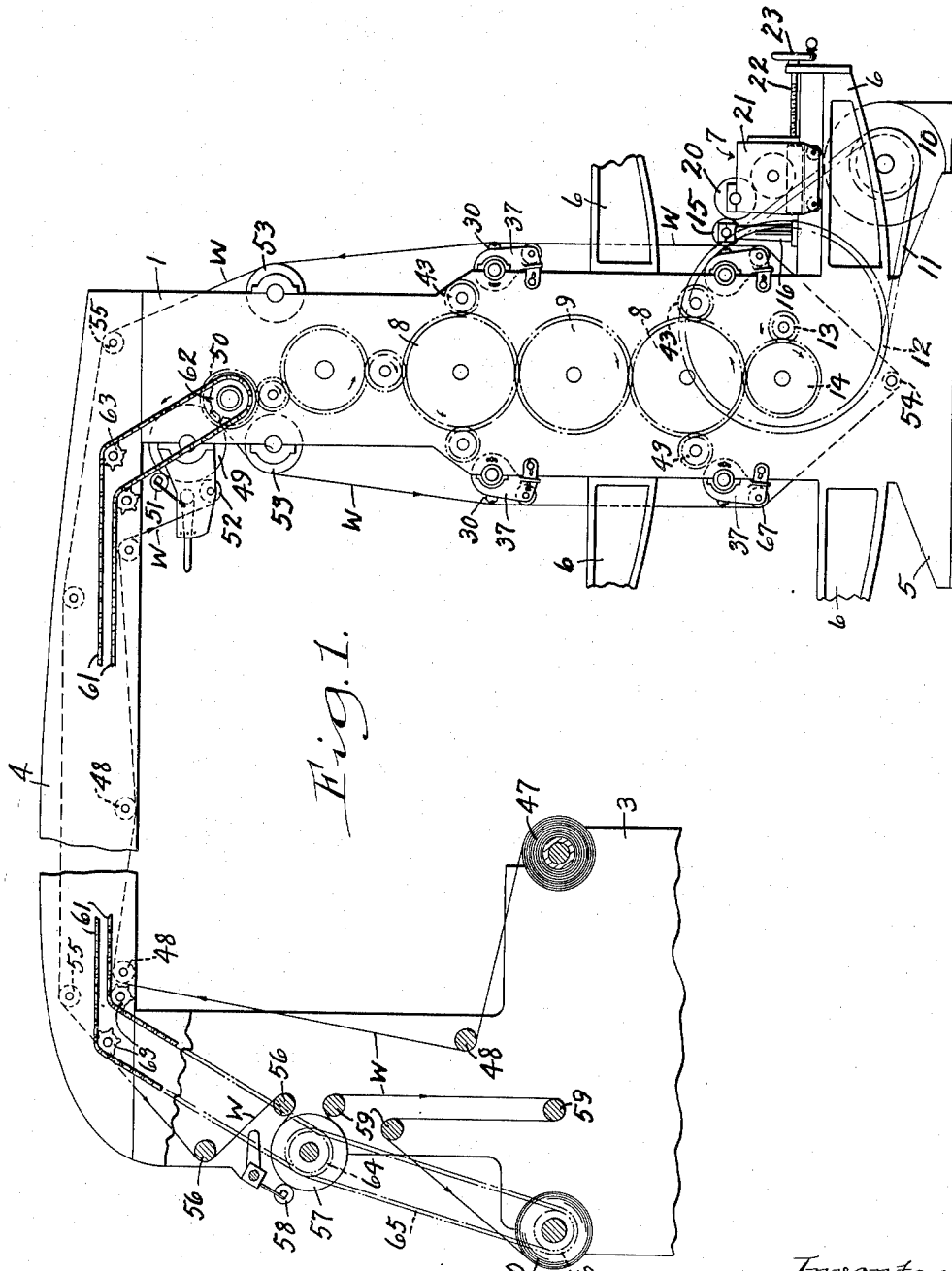
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WORK SUPPORTING MEANS FOR ROTARY ANILINE PRINTING PRESSES

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3 Sheets-Sheet 1



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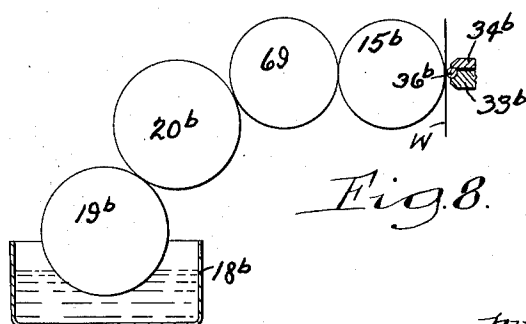
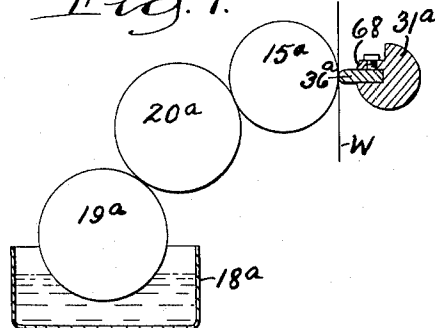
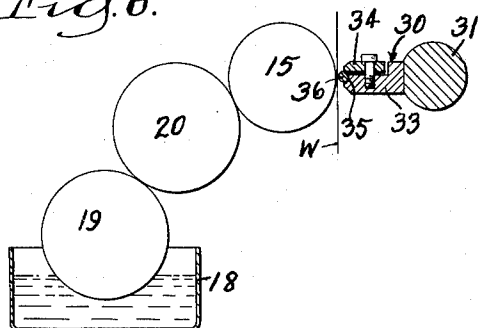
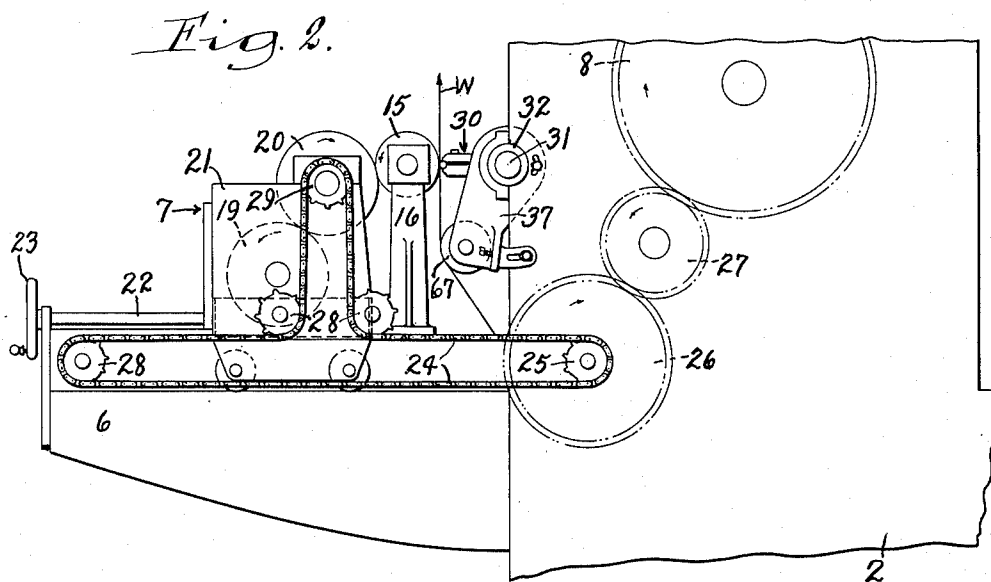
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3 Sheets-Sheet 2



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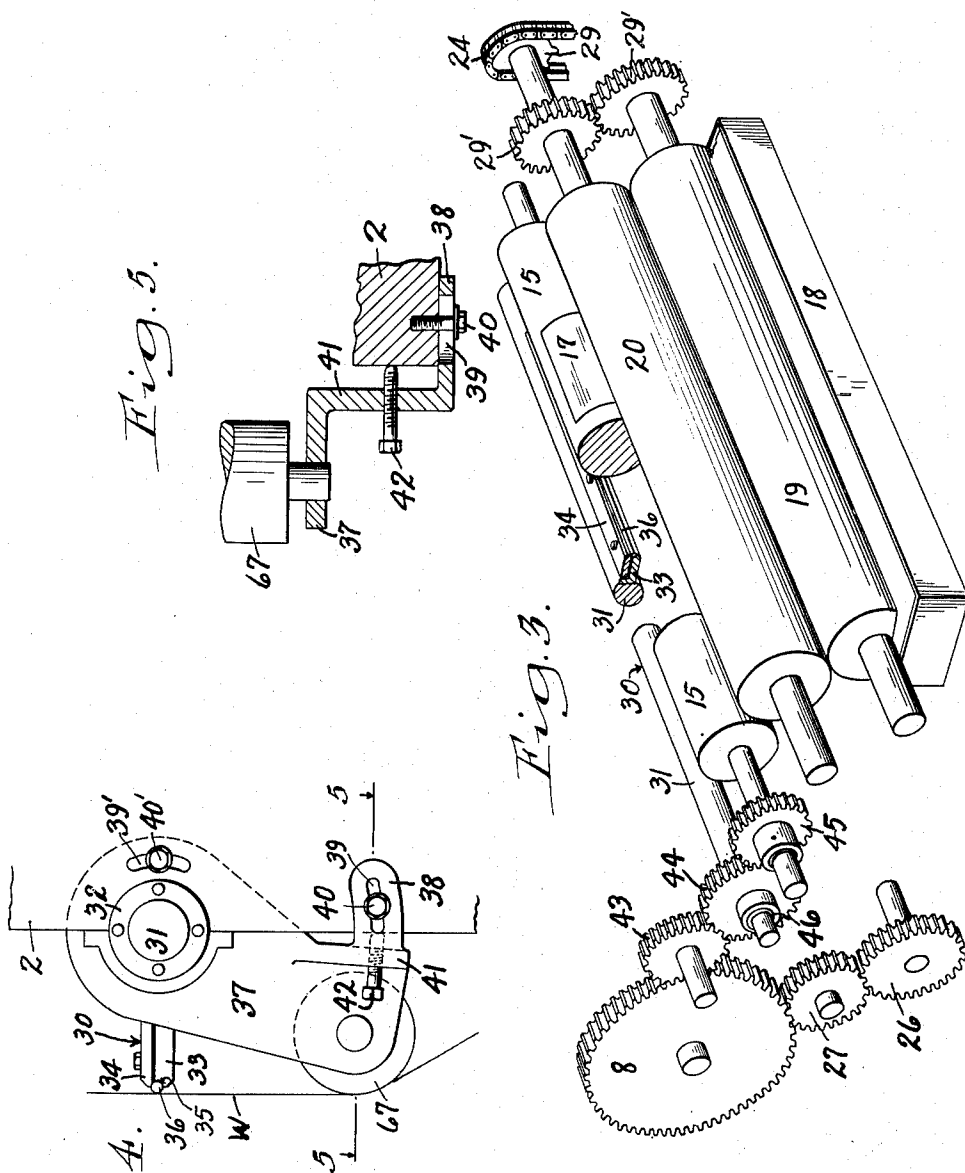
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WORK SUPPORTING MEANS FOR ROTARY ANILINE PRINTING PRESSES

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,623,458

WORK SUPPORTING MEANS FOR ROTARY
ANILINE PRINTING PRESSES

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7 Claims. (Cl. 101-212)

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This invention relates to improvements in printing presses, more particularly to improvements in aniline printing presses of the rotary, travelling web type in which the printed impressions are applied to the travelling web by printing plates or type carried by a rotary plate cylinder, with or without a rotary off-set cylinder.

It is a general object of the invention to provide for printing presses of the type mentioned, an improved arrangement of the impression means for impressing the printed matter upon the travelling web, whereby there is less wear and danger of injury to the printing plates, thus increasing the productive life thereof. The productive operation of the press is greatly increased by eliminating the necessity for stopping the press to remove accumulations of printing ink or other foreign matter upon the impression apparatus, and a higher quality of printing and greater uniformity in the quality of the printing at different lengths of the printed web is assured.

Another object is to provide for machines of the type mentioned, an improved impression arrangement particularly adapted for use with printing webs of a porous nature, whereby the inevitable seepage of printing ink which passes through the small holes or pores in the web is effectively prevented from accumulating on the impression mechanism, and whereby such minor fortuitous deposits of seepage ink upon the impression element may be quickly and automatically disposed of by wiping action of the web thereon.

A further and more particular object of the invention is to provide for printing machines of the type mentioned, an improved construction and arrangement of the impression mechanism whereby the travelling web being printed travels with reference to and slides over a smooth, curved impression surface against which it is pressed by the rotary plate cylinder carrying the usual printing plates of known standard type which are ordinarily of resilient rubber or other resilient yielding material.

Still another object of the invention is to provide for printing machines of the class mentioned, an improved impression arrangement embodying a stationary printing or impression bar against which the travelling web is pressed by the printing plates or type carried by a rotary impression cylinder.

A further object of the invention is to provide for printing presses of the class mentioned, an improved impression arrangement for printing on travelling webs such as webs of paper, cellulose

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material, foil, and the like that are ordinarily porous having many small apertures or pores through which the printing ink may pass, while maintaining the quality of the printing at a uniform high standard and without necessitating stopping the press to remove from parts of the press accumulations of printing ink that has passed through the webs.

A further object of the invention is to provide in printing presses of the class mentioned, an improved impression mechanism whereby the impression surface against which the travelling web is pressed is continuously automatically maintained in smooth, unobstructed, even condition and free from all accumulations of printing ink or other foreign matter, so as to maintain the quality of the printing at a uniform high standard irrespective of the length of the run.

A further and more particular object of the invention is to provide for machines of the class referred to, an improved impression device including a stationary impression or printing rod that can be made of any desired length, and an impression rod of one length substituted for one of another length whereby webs of different widths can be printed in a satisfactory manner.

Another object of the invention is to provide for printing presses of the class mentioned, an improved mount for a stationary impression or printing rod, not only supporting said rod firmly in operative position but providing means whereby it can be readily adjusted into the position where the most satisfactory printing effects are obtained.

Many printing papers used in aniline printing presses, especially those printed in several colors in decorative designs and sometimes known as holiday or Christmas wraps are usually porous in nature, often having many small apertures through which the printing ink may pass while the printed impression is being made. This is particularly true of light or tissue papers varying in weight from nine or ten pounds up to twenty or thirty pounds or more. In old types of printing presses, the ink thus passing through the apertures of the porous paper becomes deposited on the surface of the impression cylinder being dried thereon and giving rise to irregularity or "bumpiness" in the surface of the impression cylinder resulting in a lowering of the quality of printing, in the necessity for shutting down the press for removing the accumulations of printing ink, and in damage or undue wear to the printing plates and other parts of the printing mechanism. These defects and disadvantages are en-

tirely overcome by the improved impression mechanism of this invention embodying the improved stationary impression or printing bar or rod of extremely small diameter and arc of impression contact.

Other objects and advantages of the invention will be in part pointed out in the following detailed disclosure of certain illustrative but preferred embodiments of the invention, and will be in part obvious as the disclosure proceeds.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a more comprehensive disclosure of the nature, objects and advantages of the invention, references had to the following detailed description of the illustrative embodiments, and to the accompanying drawings in which:

Fig. 1 is a fragmentary side elevation of a printing press embodying the invention, parts being broken away and omitted for clearness of disclosure and parts being diagrammatically shown.

Fig. 2 is a fragmentary enlarged side elevation similar to that of Fig. 1 but viewed from the opposite side of the printing press.

Fig. 3 is an enlarged partially diagrammatic perspective view of one of the printing units embodying the invention, parts being broken away for clearness of disclosure.

Fig. 4 is an enlarged detail elevation showing the mounting of the impression bar with adjusting means therefor.

Fig. 5 is an enlarged detail section taken substantially on the broken line 5—5 of Fig. 4 looking in the direction of the arrows.

Fig. 6 is a partially diagrammatic view showing the inking mechanism, the impression bar and the mounting therefor being shown in transverse section.

Fig. 7 is a view similar to Fig. 6, showing in transverse section a modified form of the impression bar with mounting therefor.

Fig. 8 is a view similar to Fig. 6 showing a further modified arrangement.

Referring to the drawing for a detailed description of the invention and first to the embodiment thereof shown in Figs. 1 to 6 inclusive, it will be seen that the invention is shown as being applied to a printing press of the rotary aniline type, although it will be understood that the invention may be applied to other types of printing presses. Vertical frame members 1 and 2 preferably of metal are laterally spaced apart while additional vertical frame members 3 are longitudinally spaced from the members 1 and 2. Upper horizontal frame members 4 are attached respectively to the upper ends of the vertical frame members 1 and 2 and to the upper ends of frame members 3. These frame members may be of any preferred known design and serve as support for the various operating elements of the printing press. The vertical frame members may be provided with supporting pedestals 5 adapted for attachment to a floor or other convenient support on which the printing press may be mounted.

Each of the vertical frame members 1 and 2 is provided with a plurality of supporting brackets 6 attached thereto in any convenient manner and extending both forwardly and rearwardly of the frame members. There may be as many of these supporting brackets as desired for supporting the

desired number of printing units, two such brackets being shown vertically spaced one above another at each of the opposite sides of each vertical post or frame member. A printing unit 7 is supported upon each pair of supporting brackets 6, only one such printing unit being shown in the drawing. These printing units are supported one above another both at the forward and rearward sides of the vertical frame members. It will be understood that all of the printing units 7 are of the same construction and are similarly arranged and operated.

Intermeshing rotary toothed gears arranged in a train or series are rotatably mounted upon the vertical frame members 1 and 2, embodying driving gears 8 for driving the printing units 7 and one or more intermediate idler gears 9. These gears are driven in any convenient manner as for example by an electric motor 10 connected by a driving belt 11 with a pulley 12 directly connected to a toothed driving pinion 13 meshing with an idler gear 14 which in turn meshes with and drives the adjacent driving gear 8.

Each printing unit 7, as best seen in Figs. 1, 2, and 3, has a rotary plate cylinder 15 suitably mounted in supporting pedestals 16 carried by the brackets 6 and preferably being mounted for adjustment longitudinally of the brackets. This plate cylinder 15 may be of the usual known form carrying at its peripheral surface any required number of printing plates 17 of well-known construction and attached to the plate cylinder in any well-known manner. In aniline presses these printing plates are usually constructed of resilient rubber or similar resilient material. Although but one printing plate is shown in the drawing for illustrative purposes, it will be understood that as many plates as desired may be appropriately carried by the plate cylinder in the usual well-known manner, and may be arranged to print the entire width of the print web.

Inking mechanism is provided for each printing unit 7 including an ink fountain 18 carrying the printing ink in which an ink roll 19 is immersed, the exposed surface of which contacts with the surface of an adjacent transfer roll 20 which transfers the printing ink from the roll 19 to the printing plates 17 carried by the plate cylinder 15 in usual well-known manner. These ink rolls 19 and 20 are rotatably mounted in any convenient manner as for example in end plates 21 of the printing unit. The inking mechanism of each printing unit is preferably mounted for adjustment longitudinally of the supporting brackets 6 and may be adjusted to any desired operative position by means of a screw threaded adjusting device 22 which may be operated by a hand wheel 23. By means of this arrangement, plate cylinders of different diameters may be used in each printing unit and the inking mechanism and supports for the plate cylinders appropriately adjusted to accommodate the plate cylinders of different sizes.

Driving means for the inking rolls 19 and 20 is provided by a sprocket chain 24 (see Fig. 2) and a driving sprocket 25 connected to and driven by a toothed gear 26 meshing with an idler gear 27 which in turn meshes with the adjacent driving gear 8 of the main gear train. The sprocket chain 24 runs over idler sprockets 28 and engages the sprocket 29 connected to the supporting shaft of the transfer roll 20. Intermeshing toothed gears 29' connected respectively to the inking rolls 19 and 20 drive the roll 19 in unison with the transfer roll 20. It will be seen that this

driving arrangement permits the inking mechanism to be adjusted longitudinally of the supporting brackets 6 without disturbing the driving connections.

As best shown in Figs. 3 and 6, an improved impression device indicated generally at 30 cooperates with the plate or printing cylinder 15 to urge the print web into printing engagement with the said cylinder. This impression device includes a metallic supporting bar or shaft 31 firmly supported in bearings 32 attached to and supported by the vertical frame members 1 and 2. Firmly attached to the supporting bar 31 preferably by welding, is a metallic supporting bracket 33 preferably extending continuously along the operative length of the supporting bar. This supporting bracket is formed in its upper surface with a seat or groove for receiving a clamping bar 34 which may be detachably attached in any convenient manner to the supporting bracket 33 as by means of set screws or bolts as shown in Fig. 6. The outer extremities of the supporting bracket 33 and of the clamping bar 34 are formed along their length with opposed cylindrical depressions or seats 35 for receiving the printing or impression bar 36. The receiving seat 35 is shaped to conform to the outer surface of the impression bar 36 which in the preferred embodiment shown in Figs. 3 and 6 is substantially cylindrical. The receiving seat 35 ordinarily extends for the full length of the supporting bracket 33 and clamping bar 34 and its extent is somewhat greater in transverse section than 180°. The impression bar being also cylindrical is thus partially encompassed and locked in operative supported position in the seat 35 by means of the clamping bar 34.

In the embodiment shown in Figs. 1 to 6, the printing or impression bar 36 is in the form of a drill rod which is of hardened steel accurately ground and shaped so as to be clamped in operative position and to present an outer smooth curved or convex impression surface spaced outwardly somewhat beyond the ends of the supporting bracket 33 and clamping bar 34. The impression surface thus presented in this embodiment is substantially cylindrical. Other materials than hardened steel may for some purposes be used for this impression bar, such for example as hard strong metals such as brass, or in some cases plastic material may be employed. Hardened steel is the best material at present known for this impression bar and is therefore preferred. When made of hardened steel, the diameter of the impression bar may vary somewhat in practice and may be in the vicinity of one-eighth inch to one-fourth inch in diameter.

Even though constructed of the hardest and most durable materials, such an impression rod of extremely small diameter may be subject to some wear after long continued use. With the above construction, it is obvious how the clamping device may be released and the rod rotatably shifted through a small angular segment to present a new surface to the web.

As mentioned above the supporting member on bar 31 for the impression bar 36 is mounted in supporting bearings 32 attached to the press frame, but this supporting bar does not rotate in its supporting bearings except for adjustment of the printing bar 36 with reference to the rotary printing cylinder or plate cylinder 15. Adjusting mechanism for this purpose as best shown in Figs. 1, 2, 4, and 5, includes crank arms 37 firmly attached to the supporting bar 31 and positioned

respectively adjacent to the vertical frame members 1 and 2. Each crank arm 37 is provided with an extension 38 positioned adjacent to the respective frame member and having an elongated slot 39 receiving a binding screw 40 threaded to the frame. Also each crank arm is formed adjacent to its free end with a flange 41 supporting the extension 38 and having an aperture in which is threaded an adjusting screw bolt 42 having its free end positioned in contacting relation with the frame member. By means of this adjusting mechanism, the supporting shaft or bar 31 may be rotated slightly thus effecting angular adjustment of the impression bar 36 with reference to the adjacent printing cylinder 14. By means of the adjusting screw 42 micrometric adjustments of the impression bar can be made and the bar held securely in adjusted position by means of the binding or locking screws 40. If desired, an additional locking screw 40' threaded into the crank arm 37, may be provided, being positioned in an elongated slot 39' in the frame member.

For driving the rotary printing or plate cylinder 15 (see Fig. 3) driving connections from the main driving gear 8 are provided including a toothed idler gear 43 meshing with the gear 8 and with a second idler gear 44 meshing with a driving pinion 45 keyed or otherwise firmly attached to the supporting shaft of the rotary cylinder 15. The idler gear 43 may be rotatably mounted in any convenient manner in bearings in the press frame members, and the idler gear 44 is rotatably mounted by a bearing 46 formed on the supporting bar 31. It will be understood that the rotary printing cylinder of each printing unit will be driven in the same manner from the main train of driving gears.

As best generally shown in Fig. 1, the web W of paper or other material as mentioned above, is led from a supply roll or mill roll 47 rotatably supported in any convenient manner upon the press frame and is guided by guide bars or guide rolls 48 supported by the frame, to a feed roll 49 rotatably supported near the upper extremity of the vertical frame members 1 and 2. The feed roll 49 may be driven as shown by a toothed gear 50 meshing with a similar gear connected to the feed roll and driven from the main train gears. The web W passes partially around this feed roll 49 and is urged into feeding contact with the surface thereof by a spring pressed wheel or roller 51. The web W passes over a guide roller 52 mounted adjacent to the feed roll 49 and thence around the feed roll to an additional guide roll 53 mounted on the vertical frame members. Any preferred known feeding mechanism may be employed for feeding the web at this point and its purpose is to supply the web at substantially the same rate of travel at which it passes through the printing units. From the feed roll 49 the web passes downwardly through the several printing units, over a lower guide roll 54 and thence upwardly through the printing units at the other side of the vertical frame members. After passing through all of the printing units, the web passes over another guide roller 53 then over additional guides or guide rollers 55 supported on the horizontal frame members 4 and over additional guides 56 and around another feed roll 57 which may be similar to the feed roll 49, the web being pressed into close contact with the surface of this feed roll by a spring pressed wheel or roll 58. The principal function of the feed roll 57 is to assist in maintaining a tight web condition throughout

the press as it passes through the several printing units. Therefore, the rate of web feed by this feed roll is substantially the same as that of the web passing between the rotary printing cylinders 15 of each printing unit and the cooperating impression bar 36. The said feed roll 57 not only maintains the web under the proper tension in its passage through the press including the printing units, but it also assists in maintaining the rate of web travel the same as the peripheral speed of the printing cylinders thus avoiding any slippage of the web with reference to the printing surface with consequent smearing of the printed work. After the web W passes the said roll 57, it is guided by guide rolls or bars 59 to a rewind roll 60 rotatably mounted in the vertical frame members 3.

The driving mechanism for the feed roll 57 and the rewind roll 60 is provided by a sprocket chain 61 driven by a sprocket wheel 62 connected to and driven by the gear 50 which is driven by the main train gears. The driving sprocket chain 61 passes over appropriate guide sprockets 63 supported by the horizontal frame member 4 and around a driven sprocket wheel 64 connected to the shaft which supports the feed roll 57. An additional sprocket wheel is also connected to the supporting shaft of the feed roll 57 and is connected by another sprocket chain 65 which extends around a sprocket wheel 66 of the rewind roll 60 for driving the latter. A slip clutch (not shown) may be included in the driving connections for the rewind roll so as to maintain the rate of web rewind constant as the diameter of the roll increases.

From the above detailed disclosure it will be seen that the print web W passes between the printing cylinder 15 and the impression bar 36, the web being closely engaged by both of these members. In other words, the web W is pressed by the smooth convex surface of the impression bar against the printing plates or printing surface of the printing cylinder, and also the web is pressed against the impression bar by the printing cylinder. In this manner, the printed impressions are applied by the printing cylinder to the surface of the web, the ink supplied by the ink rolls being transferred to the web.

It will thus be seen that the web is engaged by a rolling contact with the surface of the printing cylinder and that the web engages the smooth convex surface of the impression bar with a sliding contact. Any printing ink passing through pores or apertures in the web as above described, will therefore not be deposited on the surface of the impression bar. One reason for this is that, considering the normal relatively high speed of web presses of this type and the extremely small arc of contact, most of the ink does not get through the pores until after they have passed the impression surface, and another reason is that the impression surface is constantly kept clean and free from the ink due to the sliding engagement of the web thereagainst. In other words, the impression surface is kept clean and free from what little ink or other foreign matter that ever reaches it by the wiping or sliding engagement of the web thereagainst. Due to this function the impression surface is kept clean and free from accumulations of ink or other objectionable matter irrespective of the length of the run or operation of the press, and a uniform high quality of printing is thus assured at all times.

Ordinarily the length of the impression bar 36 corresponds approximately to the width of the

web being printed. When it is desired to print a web of narrower width using the same plate cylinder, this can be done very easily merely by substituting a shorter impression bar corresponding approximately in length to the width of the narrow web. Frequently, it is desired to have a set of printing or plate cylinders for a pattern of a wider width, say 40" wide, and it may be that a customer desires to have some paper printed with the same pattern but of a narrower width, say 30". In such a case with this improved impression bar all that would be necessary would be to install a shorter impression bar 36 corresponding in length to the width of the narrow paper. In this manner the narrow web can be printed in a satisfactory manner from the wide set of plates without damage to or marring the plates. It will be understood that the length of the impression bar need not be exactly the same as the width of the web, but may be one-quarter inch to one-half inch shorter so that the longitudinal margins of the web project very slightly beyond the opposite ends of the impression bar.

In some cases it is desirable to provide a web guide adjacent to or near to the impression bar, and for this purpose a guide roll 67 is mounted at the free swing ends of the crank arms 37 and contacts in guiding relation a short distance from the impression bar.

In the modified embodiment of the invention shown in Fig. 7, parts corresponding to those of the embodiment above described are indicated by the same reference numerals with the addition index "a." In this embodiment the impression bar 36a is in the form of a flat plate or bar of hardened steel or of the other materials above described, the outer or impression surface being preferably convex or substantially cylindrical and accurately ground to present a smooth impression surface. This impression bar is mounted in a slot or seat in the supporting bar 31a which may be mounted for rotary adjustment in the manner above described for the supporting bar 31. An attaching lug 68 on the supporting bar overlies the impression bar which may be firmly held in position by set screws mounted in the attaching lug 68. Otherwise the construction and arrangement as well as the operation of this embodiment are the same as described above in connection with the embodiment of Figs. 1 to 6.

In the further modified embodiment of the inventions shown in Fig. 8, the parts corresponding to those of the embodiment first described above are indicated by the same reference numerals with the addition of index "b." In this embodiment the impression bar 36b and the mounting thereof may either be like the embodiment of Fig. 6 or like that of Fig. 7. The printing elements in this embodiment are arranged for off-set printing. The rotary cylinder 69 carries the printing plates or type or other printing elements to which ink is transferred by the ink roll 20b and from which the ink is transferred to the rotary printing cylinder 15b. As well known, this type of printing mechanism has a blanket of resilient rubber or similar material forming the printing surface of the cylinder, the ink being transferred to the surface of this blanket from which it is applied directly to the web W to effect the printed impressions thereon. Except as noted, the construction and arrangement as well as the operation of this embodiment are the same as above described in connection with the embodiment of Figs. 1 to 6.

Since certain changes may be made in the above construction and different embodiments of the

invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limited sense.

The invention having thus been fully described, the following is claimed:

1. A printing press of the rotary, travelling web type particularly adapted for printing upon porous papers and at the same time preventing the accumulation, upon the impression element of the printing couple, of ink passing through the web, said press comprising: in combination, a supporting frame, a printing couple, and means for guiding the web between the elements of said couple; said printing couple comprising a printing cylinder having a somewhat resiliently yielding printing surface, and an impression element comprising an elongated strip extending transversely of the direction of said web and parallel with the axis of said printing cylinder, said strip having a thin smooth bearing surface of arcuate convex cross-section, the radius of curvature of which is from about $\frac{1}{8}$ " to about $\frac{1}{4}$ ", said thin surface bearing with relatively sharp line sliding contact with the web and urging it into rolling contact with the surface of the printing cylinder, the duration of contact between the web and strip being thus reduced to the point where even rapid seepage of ink through said porous web will not reach the reverse side of the web until after that portion of the web has passed beyond contact with the strip, and said sharp line sliding contact of the web against the strip also effecting a wiping action which prevents any fortuitous accumulation of ink on the impression strip.

2. The printing press as set forth in claim 1 in which the printing element of the couple is an offset blanket cylinder and in which a plate cylinder is provided for rolling contact therewith.

3. The printing press as set forth in claim 1 in which the impression strip is carried at its ends in bearings in the supporting frame, the axis of said bearings being offset from the convex contact portion by a distance much greater than the radius of curvature of said surface, the axis of said bearings being on the opposite side of the printing contact point from the axis of the printing cylinder, but out of alignment with said point and last named axis, and means for adjusting said strip through an arc of rotation in its bearings in order to vary the pressure of impression contact on the web.

4. The printing press as set forth in claim 3 in which at least one crank bracket is fixed to the strip adjacent an end thereof and means are provided for adjusting said crank bracket in angularly adjusted positions on said supporting frame and locking it in a selected adjusted position during operation.

5. A printing press of the rotary, travelling web type particularly adapted for printing upon porous papers and at the same time preventing the accumulation, upon the impression element of the printing couple, of ink passing through the web, said press comprising: in combination, a supporting frame, a printing couple, and means for guiding the web between the elements of said couple; said printing couple comprising a printing cylinder having a somewhat resiliently yielding printing surface, and an impression element comprising an elongated strip extending transversely of the direction of said web and parallel with the axis of said printing cylinder, said strip having a thin smooth bearing surface of arcuate

convex cross-section, said thin surface bearing with substantially line sliding contact with the web and urging it into rolling contact with the surface of the printing cylinder, said impression strip serving to effect a wiping action of extremely brief duration on the reverse side of the web being printed, bearings in said supporting frame for the ends of said impression strip, the axis of said bearings being offset from the convex contact portion by a distance much greater than the radius of curvature of said surface, the axis of said bearings being on the opposite side of the printing contact point from the axis of the printing cylinder but out of alignment with said point and last named axis, and means for adjustably rotating the strip in its bearings in order to vary the pressure of the impression contact on the web, a pair of crank brackets, one fixed to the impression strip adjacent each end thereof, means for adjusting said brackets to selected positions of angular adjustment for varying the impression pressure, and a guide roller for said web rotatably supported at its ends in said crank brackets.

6. A printing press of the rotary, travelling web type particularly adapted for printing upon porous papers and at the same time preventing the accumulation, upon the impression element of the printing couple, of ink passing through the web, said press comprising: in combination, a supporting frame, a printing couple, and means for guiding the web between the elements of said couple; said printing couple comprising a printing cylinder having a somewhat resiliently yielding printing surface, and an impression element comprising an elongated cylindrical rod extending transversely of the direction of said web and parallel with the axis of said printing cylinder, said rod having a smooth surface and bearing with sliding contact with the web and urging it into rolling contact with the surface of the printing cylinder, said impression rod serving at the same time to effect a wiping or scraping action on the reverse side of the web being printed, and means for supporting said cylindrical impression rod comprising a transverse bar rotatably adjustably mounted at its ends in said supporting frame, and continuous longitudinally extending clamping means carried by said bar and gripping said rod throughout its length and around its periphery for an arcuate extent of somewhat greater than 180° leaving a smaller arcuate surface for contact with the web, and means for releasing said clamping means for rotatable shifting of the rod to present a new bearing surface to the web.

7. A printing press of the rotary, travelling web type particularly adapted for printing upon porous papers and at the same time preventing the accumulation, upon the impression element of the printing couple, of ink passing through the web, said press comprising: in combination, a supporting frame, a printing couple, and means for guiding the web between the elements of said couple; said printing couple comprising a printing cylinder having a somewhat resiliently yielding printing surface, and an impression element comprising an elongated slender cylindrical rod extending transversely of the direction of said web and parallel with the axis of said printing cylinder, said rod having a smooth surface and having a diameter of from about $\frac{1}{8}$ " to about $\frac{1}{4}$ ", said rod bearing with relatively sharp line sliding contact with the web and urging it toward rolling contact with the surface of the printing cylinder; and means for supporting said cylindrical impression rod comprising a transverse bar angularly

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adjustably mounted at its ends in said supporting frame, and continuous longitudinally extending clamping means carried by said bar and gripping said rod throughout its length and around its periphery for an arcuate extent of somewhat greater than 180° leaving a smaller arcuate surface for said line contact with the web.

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