May 23, 1933. C. PAULSEN 1,910,359

PRINTING PRESS

Filed March 21, 1931 5 Sheets-Sheet 1

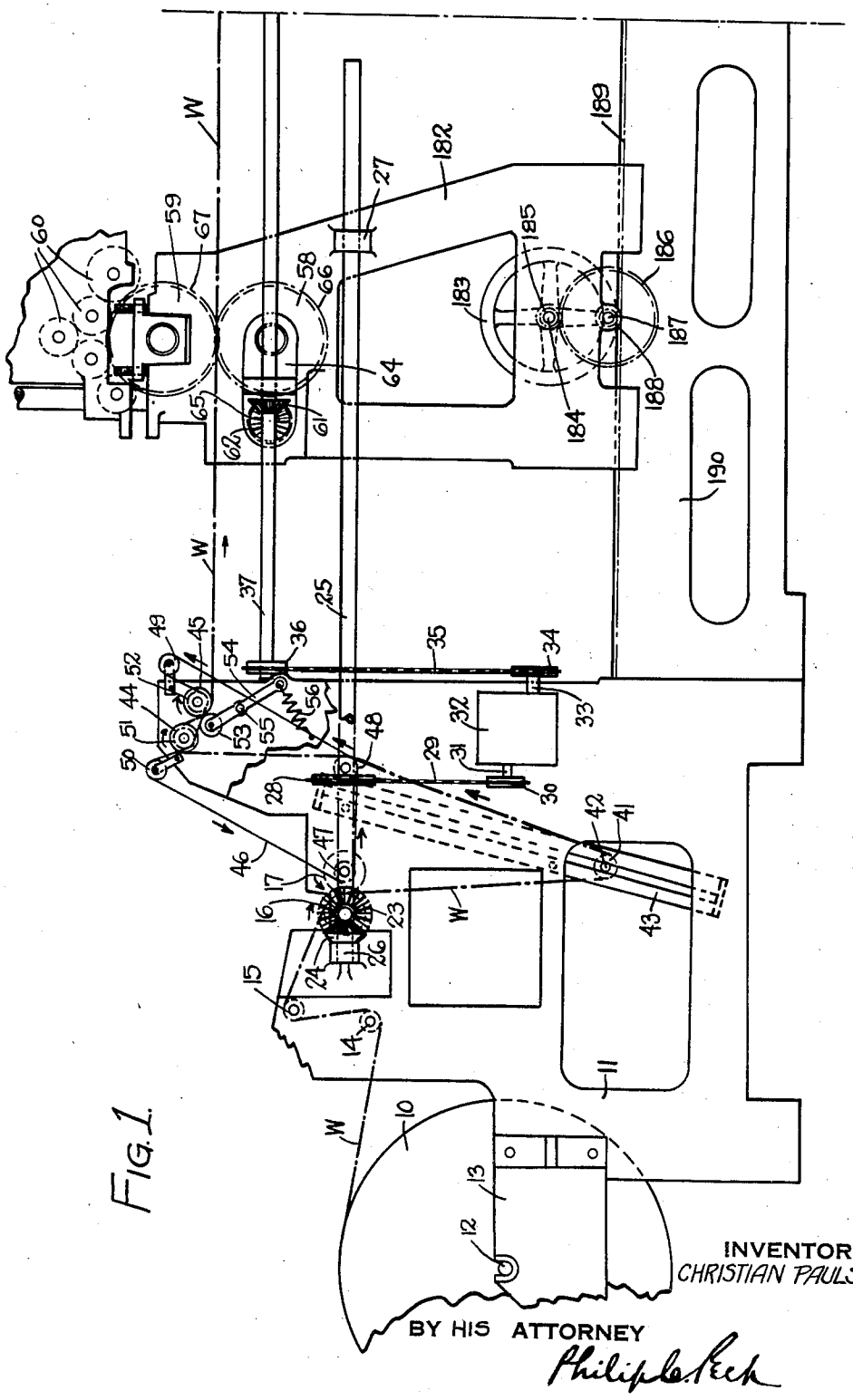


FIG. 1.

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BY HIS ATTORNEY
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May 23, 1933. C. PAULSEN 1,910,359

PRINTING PRESS

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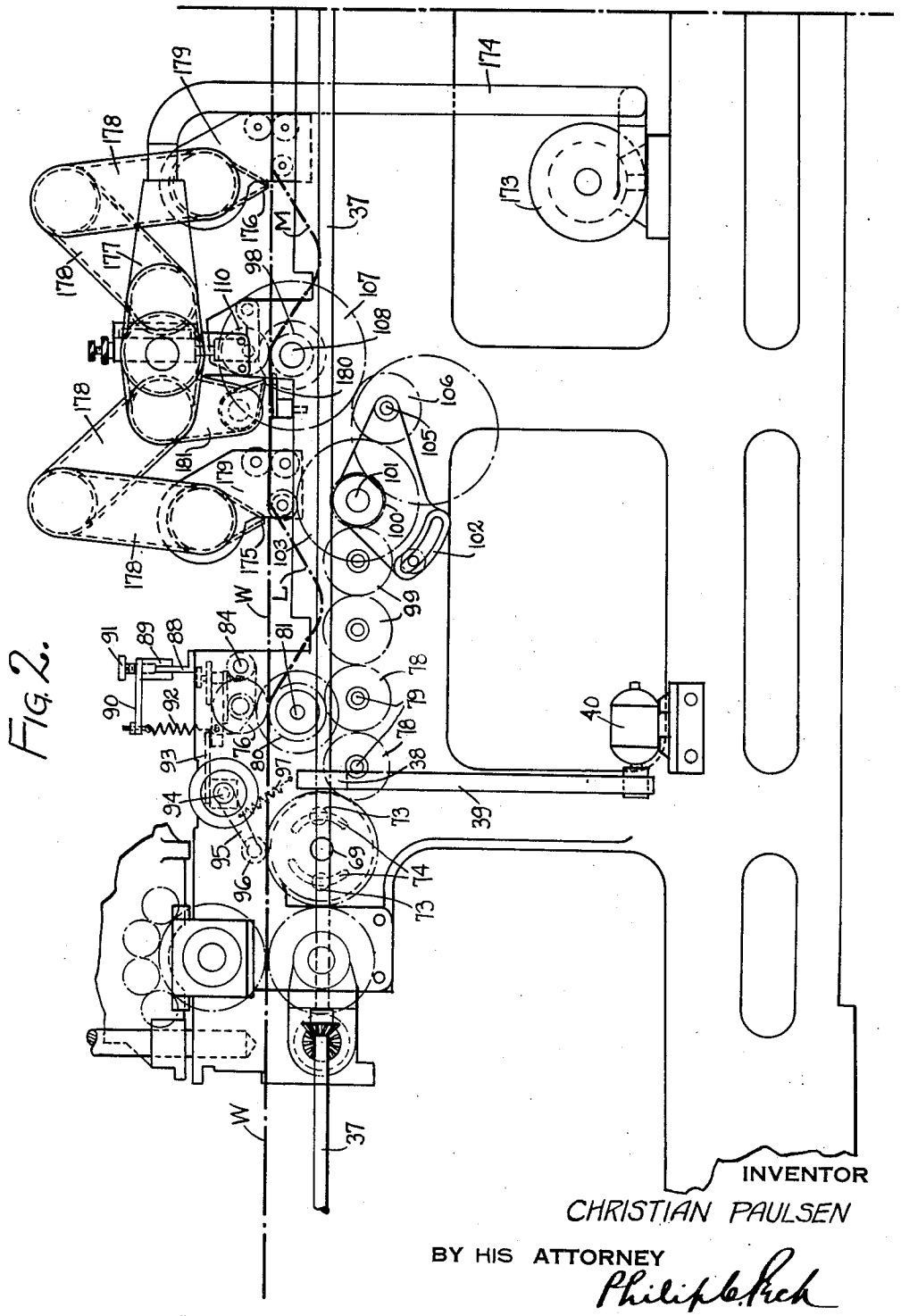


FIG. 2.

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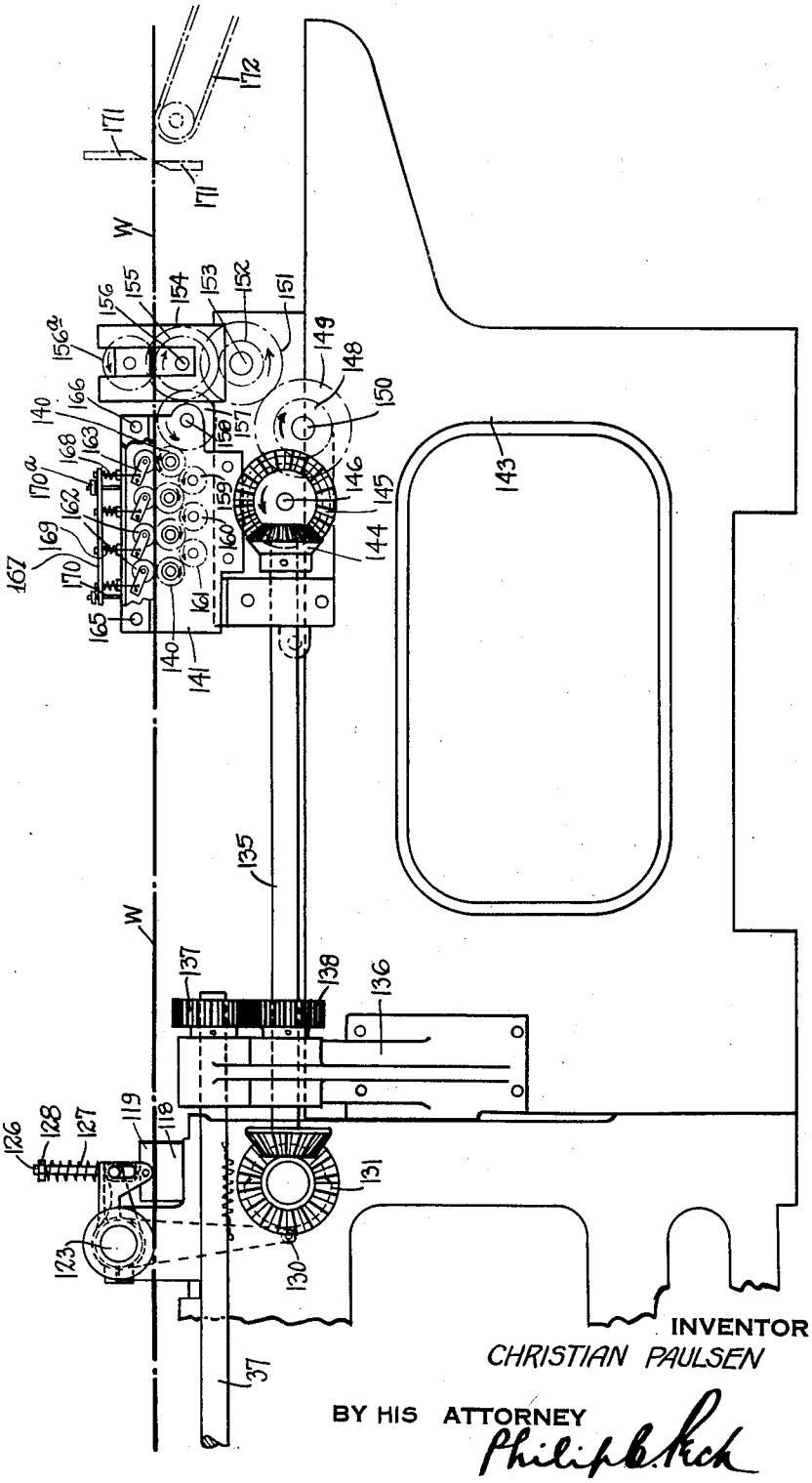


FIG. 3.

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PRINTING PRESS

Filed March 21, 1931 5 Sheets-Sheet 4

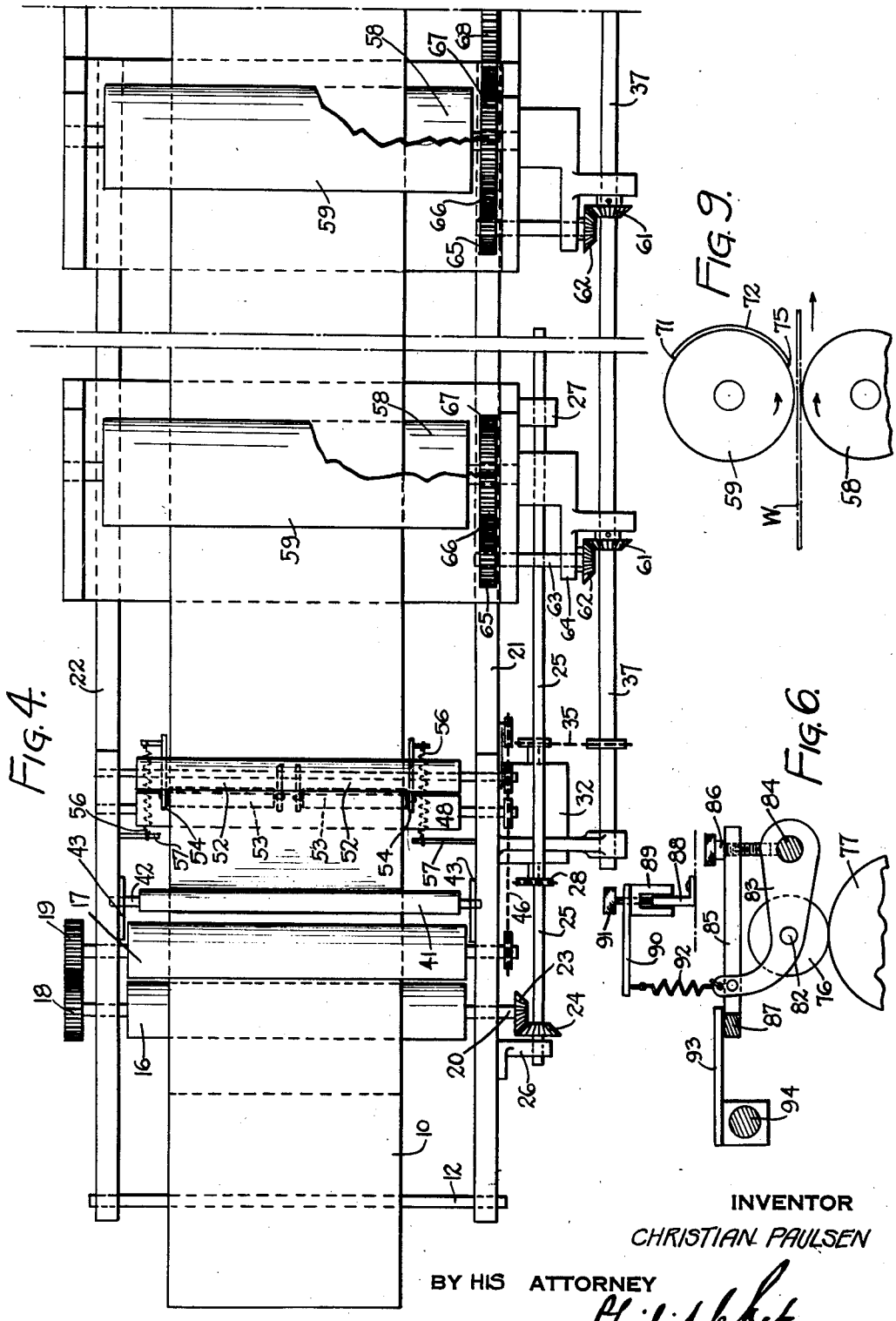


FIG. 4.

FIG. 9.

FIG. 6.

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Filed March 21, 1931 5 Sheets-Sheet 5

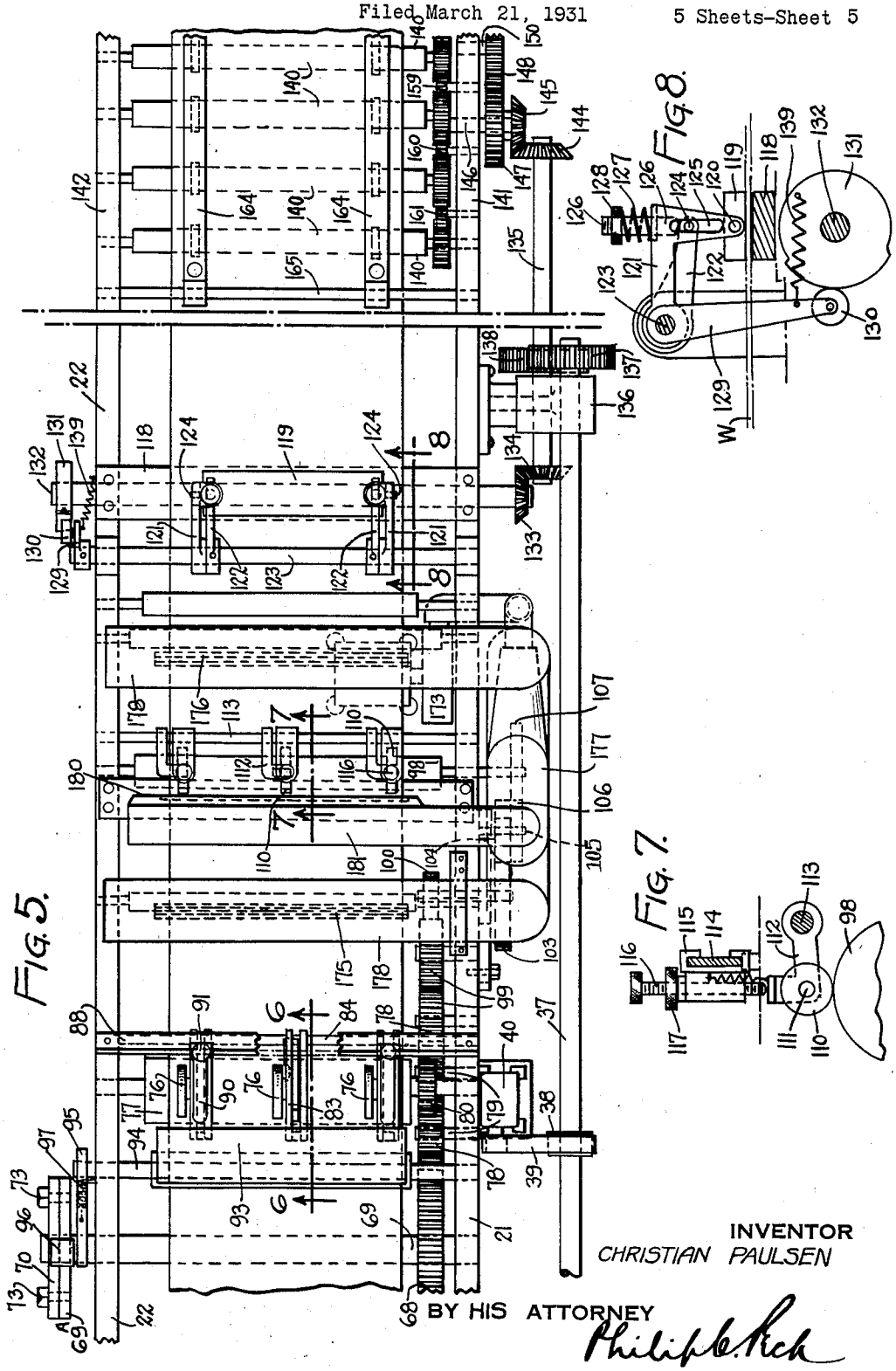


FIG. 5.

FIG. 8.

FIG. 7.

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Patented May 23, 1933 1,910,359

UNITED STATES PATENT OFFICE

CHRISTIAN PAULSEN, OF CLIFTON, NEW JERSEY, ASSIGNOR TO NEW ERA MANUFACTURING COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

PRINTING PRESS

Application filed March 21, 1931. Serial No. 524,363.

My invention relates to rotary web printing-presses, and particularly to that type of machine that will produce various lengths of printed sheets that are severed and folded after the web has passed through the printing operation.

The object of my invention, among other things, is to provide an improved and simplified multi-color rotary printing-press of the universal type in which different lengths of sheets may be printed thereon according to the length of the plate or form on the printing cylinder with novel means for controlling the length of the feed of the web to meet the requirements of the job on the press. Rotary presses as now built are operated at high speeds, and according to my improvements the length of the sheet issuing from the press is constant through an accurate and simplified control of the feed of the web to the printing couple or couples, as the case may be, with variations in the length of the sheet irrespective of the length of the web used and the length of the printing-plates used.

According to my invention, the feed mechanism for the web will advance the web at the same peripheral speed as the printing cylinder for a length equal substantially to the printing plate, but will retract the web through the press when the printing plate is clear from the impression cylinder, while preserving accurate registry at the high speeds required.

A further object of my invention is to provide an improved pull-back mechanism for the travelling web arranged between the variable feeding devices withdrawing the paper from the web roll and the printing couples, which mechanism will maintain the web under accurate control in conjunction with the feed mechanism for advancing the web through the press, which mechanism may be adjusted for any desired length within the capacity of the press or from zero to the maximum circumference of the printing cylinder.

Other objects and advantages will be hereinafter described and particularly pointed out in the appended claims, and I have shown a preferred embodiment of my invention in the accompanying drawings in which—

Fig. 1 is a side elevation of the paper web unwind devices, pull-back mechanism and the first printing unit;

Fig. 2 is a side elevation of the second printing unit, intermittent feed rollers, change gears, register roll and air-blast nozzle arrangement for controlling the web;

Fig. 3 is a side elevation of the intermittently actuated gripper mechanism, continuously driven friction feed-rollers, the cutter knives and sheet delivery;

Figs. 1, 2 and 3 taken together show the entire press, looking from left to right throughout the three sheets of drawings.

Fig. 4 is a top plan view of the paper unwind and two printing units;

Fig. 5 is a top plan view of the intermittent feed rollers, air nozzles, register roll, intermittent grippers and friction feed-rollers;

Fig. 6 is a detail section taken on the line 6—6 of Fig. 5;

Fig. 7 is a detail section taken on the line 7—7 of Fig. 5;

Fig. 8 is a detail section taken on the line 8—8 of Fig. 5; and

Fig. 9 is a detail side elevation of a printing unit.

Similar numerals refer to similar parts throughout the several figures.

Referring to Figs. 1–5, the web of paper W in the form of the roll 10 is rotatably mounted in the side frame 11 with the stock arbor 12 removably supported in the bracket 13 fastened to the side-frame 11 (Fig. 1). The web W is led under the spring tension roll 14 and over the idler roll 15, and then passes between the feed rollers 16 and 17 rotated in unison through the pair of spur gears 18 and 19 respectively (Fig. 4). The shaft 20 of the feed roller 16 journalled in the side-frames 21 and 22 carries the bevel gear 23 driven by the bevel gear 24 keyed to the counter shaft 25 journalled in the brackets 26 and 27. The shaft 25 carries the sprocket 28 driven by the chain 29 passing around the sprocket 30 mounted on the vari-

able shaft 31 of the variable drive transmission 32. The constant shaft 33 of the variable drive transmission 32 carries the sprocket 34 driven by the chain 35 passing around the sprocket 36 mounted on the main line drive shaft 37 driven by the pulley 38, endless belt 39 which is actuated by the electric motor 40 (Figs. 2 and 5). These rollers 16 and 17 constitute a variable speed drive for unwinding the web W from the roll 10 which can be set in the transmission 32 to feed any length of paper desired within the limits of the press requirements.

From the feed rollers 16 and 17, the web W passes downwardly around the roll 41 of very light construction hanging in the paper loop to keep the web from snarling.

The shaft 42 of the roll 41 is slidably carried between the double tracks 43 secured to the side-frames 21 and 22 (Figs. 1 and 4) to keep the roll 41 in transverse alinement and the paper loop from swaying during the up and down movement of the roll 41 when the press is in operation. From the roll 41 the web W passes upwardly to the pull-back mechanism which intermittently retracts the web through the printing units.

This pull-back mechanism comprises the roller 44 over which the web W passes (Fig. 1), and the under roller 45, both rollers being driven in the direction of the arrows by the chain 46 driven by the sprocket 47 on the end of the shaft of the feed-roller 17 and idler sprockets 48, 49 and 50 rotatably carried by the side-frame 21; the chain 46 engages the sprockets 51 and 52 respectively mounted on the rollers 44 and 45 respectively, all as shown in Figs. 1 and 4.

Two idler rollers 53 arranged in transverse alinement are pivoted on the upper ends of the levers 54 fulcrumed on the cross-shaft 55, the lower ends of the levers 54 carrying the tension springs 56 fastened to the short bars 57 secured to the side-frames 21 and 22 (Figs. 1 and 4). These rollers 53 under spring tension not only press the web W against the roller 45 (revolving in a direction opposite to the forward feed of the web) but also act to pull the web W backwardly whenever a slack occurs in the paper as after each impression in the printing units whenever the intermittent feed rollers hereinafter to be described are raised out of contact with the web W to permit the latter to be withdrawn or retracted.

As shown in Fig. 1, the web W then passes to the first and second printing units which are substantially alike, and a description of one will suffice for both. These units comprise the lower impression cylinder 58 and the upper printing cylinder 59 carrying the superposed inking mechanism 60.

As many printing units may be installed in my press as required for the different colors, and the web W may be perfected on the reverse side by reversing the cylinder lay-out with the inking mechanism on the under side in which event the reverse side printing would be done last. The web W passes between the cylinders 58 and 59 driven in unison from the main drive shaft 37 which carries the bevel gear 61 engaging the bevel gear 62 mounted on the stub-shaft 63 journalled in the bracket 64 fast to the side-frame 21. The inner end of the shaft 63 carries the pinion 65 that drives the gear 66 fastened to the shaft of the impression cylinder 58, the gear 66 meshing with the gear 67 on the shaft of the printing cylinder 59.

Referring to Figs. 2, 4 and 5, the gear 66 of the last printing unit meshes with the gear 68 mounted on the cross-shaft 69 journalled in the side-frames 21 and 22. The end of the cross-shaft 69 carries two co-acting cams 69^A and 70 mounted in parallelism on the shaft 69. The cam 69^A is fast to the shaft 69 with its leading end timed to cover the leading end 71 of the form 72 on the printing cylinder 59 (Fig. 9). The cam 70 is adjustably secured to the cam 69^A by the pair of screw-bolts 73 working in the curved slots 74 cut in the cam 70, the bolts 73 being secured in the cam 69^A (Figs. 2 and 5). The cam 70 is adjusted until its high part is timed to cover the rear end 75 of the form 72 (Fig. 9).

This double-cam arrangement actuates the upper intermittent feed rollers 76 (three being shown in Fig. 5) by the following mechanism: The under feed roller 77 is driven at the same peripheral speed as the cylinders 58 and 59 through the gear 68, intermediate gears 78 on the studs 79, and the gear 80 on the end of the shaft 81 which carries the under feed roller 77.

The upper feed rollers 76 are idlers on the studs 82 mounted on the levers 83 which pivot on the cross-shaft 84 (Figs. 5 and 6). The other ends of the levers 83 are pinned to the arms 85 carried by the pivot pins 86 and pivot blocks 87. Directly above the pivot arms 85 is the cross member 88 with forked brackets 89 and extension arms 90 with adjusting screws 91 and springs 92 fastened to the upper ends of the levers 83 to pull the pivot blocks 87 in close contact with the plate 93 (Fig. 6). This plate 93 is fastened to the rock-shaft 94 journalled in the side-frames 21 and 22, and this rock-shaft 94 carries at one end the cam-arm 95 to which is pinned the broad cam-roller 96 to bear on both cams 69^A and 70 through the force of the pull spring 97 fastened to the cam-arm 95 and side-frame 22 (Figs. 2 and 5), as well as by the force of the springs 92.

In operation the cam 69^A is timed to force the intermittent feed rollers 76 and 77 to grip the web W a few degrees before the

form 72 starts to print so that the web is alive when gripped between the cylinders 58 and 59, thereby assuring proper synchronism for the travel of the web W and form 72 throughout the printing operation, since the cam 70 has been set to hold the upper feed rollers 76 down on the web until the form 72 has passed out of contact with the paper web; then the cam 70 will allow the feed rollers 76 to lift through the action of the springs 92 and 97. Assuming that the feed of the paper web W from the register roll 98 hereafter to be described with the form 72 covering only one-third of the circumference of the printing cylinders 59, it will be observed that the web W will feed forwardly during the printing operation three times as fast as the normal travel of the web due to the setting of the register roll 98 and as advanced thereby.

Hence a loop L will be formed in the web beyond the intermittent feed rollers 76 and 77 (Fig. 2) at each impression; but as soon as the feed rollers 76 are raised the loop L will be taken up by the forward travel of the register roll and the pull-back roller 45 coacting with the spring-tensioned rollers 53 so that printing is accomplished in solid colors throughout the whole length of the web W.

This register-roll 98 may be interchangeably geared to feed any length of paper for each impression not exceeding the circumference of the cylinders in the printing units. The drive for this register roll is taken from the gear 68, intermediate gears 78 and a pair of intermediate gears 99 the forward gear 99 engaging the gear 100 on the end of the cross-shaft 101 extending through the side-frames 21 and 22, and through the adjustable quadrant arm 102 on the end of the shaft 101 (Figs. 2 and 5). The gear 103 meshes with the inner gear 104 on the stud 105, and keyed together with the gear 103 is the change gear 106 that meshes with the gear 107 on the shaft 108 of the register roll 98. The mesh is controlled through the adjustable quadrant arm 102 with the number of teeth in the gear 106 determining the length of the feed of the web W through the register roll 98 in the usual way.

Coacting with the register-roll 98 are the idler rolls 110 (three being shown in Fig. 5) that are alike in construction and are shown in detail in Fig. 7. These rollers 110 are journaled on the studs 111 carried by the levers 112 pivoted on the cross-shaft 113 (Fig. 5) mounted in the side-frames 21 and 22. Above the levers 112 is the cross-bar 114 secured to the side-frames 21 and 22 and this bar 114 carries the adjusting screw bracket 115, adjusting screw 116, and lock-nut 117. The adjusting screw 116 applies pressure to the levers 112 and forces the idler rolls 110 into contact with the web W and register-roll 98. The idler rolls 110 may be used in groups of two or more according to the margin left in the web.

As the web W passes to the right from the Fig. 2 to the Fig. 3 illustration, a loop M is formed between the register-roll 98 and the intermittently actuated gripper mechanism best shown in Figs. 3, 5 and 8: The under gripper-bar 118 is secured to the side-frames 21 and 22 and the web W passes between it and the upper gripper shoe 119 which carries the pins 120 at each end to pivot on the levers 121 journalled on the hubs of the levers 122 slidably keyed to the rock-shaft 123 journalled in the side-frames 21 and 22 (Fig. 5) so that these levers 122 may be located at any point transversely of the web. The levers 122 carry side pins 124 working in the slots 125 cut in the levers 121, and are also engaged by the stud-bolts 126, coil springs 127, and adjusting nuts 128. Fastened to the end of the rock-shaft 123 is the cam-lever 129 to which is pinned the cam-roll 130 that engages the cam 131 mounted on the cam-shaft 132. The cam-shaft 132 carries the bevel gear 133 meshing with the bevel gear 134 on the cutter shaft 135 journalled in the bracket 136 fast to the side frame 21. The shaft 135 is rotated through the gears 137 and 138 keyed to the shafts 37 and 135 respectively (Figs. 3 and 5). The spring 139 fastened to the cam-lever 129 and side-frame 22 causes the cam-roll 130 to follow the cam 131.

In operation the cam 131 actuates the gripper shoe 119 to seize the web W and stop same when the cam-roll 130 is on the high part of the cam 131 which causes the coil springs 127 to be compressed with the pins 124 forced downwardly and away from the upper ends of the slots 125 (Fig. 8). As the cam 131 revolves the cam-roll 130 will ride off the high part of the cam 131 due to the action of the spring 139, but the gripper shoe 119 will remain down on the web until the pins 124 reach the upper ends of the slots 125 (Fig. 3), when the pins 124 will raise the levers 121 with the gripper shoe 119 thereby releasing the web.

While the web W is so held by this intermittently actuated gripper mechanism the loop M is formed between it and the register-roll 98, which is thereafter taken up by the fast travelling friction feed roller mechanism which will now be described. The object of intermittently stopping the web W at this point is to permit any punching, perforating or cutting operations to be performed on the web when desired.

The friction feed roller mechanism is shown in Figs. 3 and 5. The feed-rollers 140 (four being shown) are journalled in the extension frames 141 and 142 slidably mounted on the standards 143 (Fig. 3). These rollers 140 are all driven in the direc-

tion of the arrows (Fig. 3) from the cutter shaft 135 which carries the bevel gear 144 meshing with the bevel gear 145 keyed to the stub shaft 146. The shaft 146 carries the gear 147 which drives the intermediate gears 148 and 149 on the stud 150 and intermediate gears 151 and 152 on the stud 153 and the intermediate gears 154 and 155 on the lower slitter shaft 156 working with the coacting upper slitter roll 156a. The gear 155 meshes with the intermediate gear 157 on the stud 158 which gear 157 drives the last friction feed-roller 140, and through the intermediate gears 159, 160 and 161 the remaining three feed-rollers 140, all revolving in the web-advancing direction, as shown in Figs. 3 and 5. Above the feed-rollers 140 are the four cork idler friction rollers 162 pivoted in the side-frames 163 which are pinned to the brackets 164 mounted on the cross-rods 165 and 166 secured to the frames 141 and 142. Secured to the side-frames 163 are the spring-bars 167, springs 168, spring rods 169, adjusting studs 170 and adjusting nuts 170a. By this mechanism more or less pressure is exerted between the feed-rollers 140 and the idler rollers 162 so as to keep the web W taut at the end of each feed after straightening the loop M and before the intermittently-operating gripper mechanism again stops the web for the successive operations repeated for every impression on the web in the printing units.

In Fig. 3 I have diagrammatically indicated at 171 the web-severing knives with the tape delivery 172 for carrying off the severed sheets.

As shown in Figs. 2 and 5, a blower 173 through the pipe 174 furnishes an air blast for the nozzles 175 and 176 arranged transversely across the press at the forward ends of the loops L and M respectively. The air blast passes from the pipe 174 to the manifold 177 from which it is directed by a pair of air ducts 178 to the nozzles 175 and 176 which are supported on the brackets 179 adjustably and slidably secured to the side-frames 21 and 22 to accommodate for loops L and M of different sizes. The air blasts from the nozzles 175 and 176 impinge on the web W to prevent snarling at the loops, and the air blast from the nozzle 180 connected to the manifold 177 by the air duct 181 keeps the web W flat as it enters the register-roll 98 as shown in Fig. 2.

The first or any other printing unit may be mounted in the frame 182 slidably secured to the side-frames 21 and 22 for properly registering the form 72 on the printing cylinder 59 whereby the leading edge 71 of the form 72 is locked to a predetermined line on the cylinder 59 to start the printing in unison on both or all the forms. Hence the printing units must be spaced from each other a multiple number of feeding lengths to properly register the successive printings on the web. To accomplish this the hand wheel 183 is secured to the cross-shaft 184 journalled in the frame 182 and the shaft 184 carries the pinion 185 engaging with the reducing gear 186 fast to the cross-shaft 187. Two pinions 188 are pinned to the shaft 187, the pinions 188 engaging the racks 189 bolted to either side of the base 190. By turning the hand wheel 183 the printing unit carried in the frame 182 may be moved to any desired position along the base relatively to the other unit or units to secure accurate registry in the several colors according to the length of the forms 72 on the respective printing-cylinders 59.

The operation of my printing-press in advancing and controlling the advance of the web W has been sufficiently indicated in the foregoing description of the essential structural features shown in the drawings embodying a web printing-press for printing two colors in accurate registry with the web always held under control throughout the printing impressions as well as during the period between printing operations. However, the general operation of my improved press may be best understood from a practical illustration as follows: Assuming that the feed of the web W for each impression is to be 16 inches in length the pressman selects the proper change gear 106 from a set showing what sized gear 106 should be used, which gear 106 engages with the gear 107 fast to the shaft 108 of the register roll 98 as shown in Fig. 2. Then the pressman pulls the web W through the press by hand from the pull-back roller 44 forwardly to the severing knife 171 (Fig. 3), while the friction feed-rollers 140 and 162 hold the web at the forward end of the press and pull-back roller 44 and tension-rollers 53 hold the web under tension at the other end. The loop formed with the roller 41 is then adjusted to the required length, and the feed rollers 16 and 17 are brought together under spring pressure to unwind the paper web W at the proper speed (16 inches for each impression), which is then adjusted to maintain the loop around the roller 41 at a uniform height. Such speed adjustment is made through the variable drive transmission 32, all as shown in Fig. 1.

The press now being in readiness for printing, the register rolls 98 and 110 (Figs. 5 and 7) having been geared through the change gear 106 pull the web W forwardly at a positive and constant speed of 16 inches for each revolution of the printing cylinder 59 which has a circumference of 25 inches and a peripheral speed of 25 inches as against the speed of 16 inches at which the register rolls 98 and 110 are set. Such differences in the speed of the web W between

the pull-back roller 44 and register rolls 98 and 110 are provided for in my improved press in the following manner: The intermittent feed-rollers 76 and 77 are geared to revolve at the same peripheral speed as the printing-cylinder 59. Upon the assumption stated that 16 inches of the web is to be printed at each impression, the intermittent feed rollers 76 are set through adjustment of the cams 69A and 70 to be brought into coacting contact with the under feed roller 77 so as to pull the web W at the peripheral speed of the cylinder 59 during the latter's printing. But obviously the feed rollers 76 and 77 are advancing the web at a speed greater than that of the register rolls 98 and 110, whereby the loop L is formed between the rollers 77 and 98 (Fig. 2). However, as soon as the intermittent feed rollers 76 are raised to release the web, the loop L will be taken up in both directions by pull-back rollers 44—45 and register-rolls 98—110, such taking up of the slack L being repeated at each printing impression of the cylinder 59. The pulling of the web backwardly through the printing units at each impression enables the press to print the whole length of the web, but when the web is advancing in printing impression by the pull of the feed-rollers 76 and 77 as well as the printing cylinders 58 and 59, the pull-back rollers 44 and 45 serve only as a tension device to keep the web W flat and taut as it enters the printing units.

The forward part of this improved press between the register rolls 98 and 110 and the severing knife 171 is devised for punching, perforating and cutting as may be desired. Its operation is substantially as follows: The gripper mechanism comprising the bar 118 and shoe 119 seizes the web W and brings same to a sudden stop during one-half of each revolution of the cam 131 (Figs. 3 and 8). As the web W is stopped by this gripper mechanism, the loop M (Fig. 2) is formed between the register rolls 98 and 110 and such gripper mechanism, due to the forward feed of the rolls 98 and 110 as heretofore described. However when the gripper mechanism 118—119 releases the web, the latter is advanced and pulled taut by the fast travelling feed-rollers 140 and 162 (Fig. 3), before the grippers 118 and 119 can act on the succeeding half-revolution of the cam 131 with the result that the web W will be advanced to take out the loop M and the web will be travelling on a straight line when the grippers 118—119 again act to stop same as hereinbefore described.

Under certain conditions of operation of my press, for example, when a printing form on the cylinder 59 has a solid border, the intermittent feed-rollers 76 and 77 may be removed or placed in inoperative position with the printing cylinder 59 serving as its own intermittent feed roller for the web while printing: in such case the pull-back rollers 44—45 reverse the travel of the web as soon as the printing form on the cylinder 59 releases the web after each impression so that the rollers 44 and 45 may retract the web.

It is apparent that the web in my improved press may be printed with one or several colors in accurate registry and then any predetermined length of the web (proportioned to the length of the form on the printing cylinders) may be withdrawn or retracted through the units before the next printing impression; also that my invention is capable of application to many varied forms of printing-presses. Hence I do not wish to be limited to the particular type of printing-press shown in the drawings, since same may be greatly changed in its structural details without sacrificing the chief advantages derived from its use.

I claim as my invention:

1. In a web printing-press, a rotary printing couple, means for rotating the printing unit at a uniform speed, means for feeding the web at substantially the same speed through the printing couple, means for advancing the web at a slower speed, and means for retracting the web when said advancing means are in action.

2. In a web printing-press, a rotary printing couple, means for rotating the printing unit at a uniform speed, means for feeding the web to the printing couple, means for intermittently feeding the web at the peripheral speed of the printing couple during the printing period, means for advancing the web at a slower speed, and means for retracting the web when said advancing means are in action.

3. In a web printing-press, a rotary printing couple, means for rotating the printing unit at a uniform speed, means for feeding the web to the printing couple, adjustable means for intermittently feeding variable lengths of the web at the peripheral speed of the printing couple during the printing period, means for advancing the web at a slower speed, and means for retracting the web when said advancing means are in action.

4. In a web printing-press, a rotary printing cylinder having a variable printing surface on its periphery, means for feeding the web at a uniform speed with the cylinder, means for advancing the printed web at a slower speed, and means for retracting the web past said cylinder when the printed web is being forwarded by said advancing means.

5. In a web printing-press, a rotary printing cylinder having a variable printing surface on its periphery, means for feeding the web to the cylinder, means for feeding the

web at the same peripheral speed as said cylinder only during the printing period, means for advancing the printed web at a slower speed, and means for retracting the web past said cylinder when the printed web is being forwarded by said advancing means.

6. In a web printing-press, a rotary printing cylinder having a variable printing surface on its periphery, means for feeding the web to the cylinder, adjustable means for intermittently feeding the web at the same peripheral speed as said cylinder only during the variable printing period, means for advancing the printed web at a slower speed, and means for retracting the web past said cylinder when the printed web is being forwarded by said advancing means.

7. In a web printing-press, a rotary printing couple, means for feeding the web through the printing couple at a speed uniform therewith, and a web-retracting mechanism comprising means constantly rotating in a reverse direction operable to contact directly with the web during non-printing periods of the printing couple.

8. In a web printing-press, a rotary printing couple, means for feeding the web through the printing couple at a speed uniform therewith, and a web-retracting mechanism comprising means constantly rotating in a reverse direction normally inactive during the printing period but automatically operable to contact directly with the web during non-printing periods of the printing couple.

9. In a web printing-press, a rotary printing couple, means for feeding the web through the printing couple at a speed uniform therewith, and a web-retracting mechanism comprising a reversely rotating roller and a coacting spring-tensioned idler roll operable during non-printing periods of the printing couple.

10. In a web printing-press, a rotary printing couple, means for feeding the web through the printing couple at a speed uniform therewith, and a web-retracting mechanism comprising a roller constantly rotating in a direction opposite to the travel of the web and a coacting spring-tensioned idler roll operable during non-printing periods of the printing couple.

11. In a web printing-press, a rotary printing couple, means for feeding the web through the printing couple at a speed uniform therewith, means for slowly advancing the printed web to form a downwardly-extended loop therein, and an air-blast superposed over the loop to maintain same in substantial transverse alinement with the travel of the web.

12. In a web printing-press, a plurality of rotary printing couples, means for feeding the web to the printing couples at a uniform speed, separate means for feeding the web operable during printing periods of said couples, and means rotating constantly in a reverse direction for retracting the web through said couples during non-printing periods.

13. In a web printing-press, a plurality of rotary printing couples, means for feeding the web to the printing couples at a uniform speed, separate means for feeding the web operable during printing periods of said couples, means for advancing the web at a slower speed timed to partially hold same during non-printing periods, and means for retracting the web through said couples during non-printing periods.

14. In a web printing-press, a plurality of rotary printing couples, means for feeding the web to the printing couples at a uniform speed, separate means for predeterminedly varying the feeding of the web operable during variable printing periods of said couples, and means for retracting the web through said couples during non-printing periods.

15. In a web printing-press, a plurality of rotary printing couples, means for feeding the web to the printing couples at a uniform speed, separate means for feeding the web operable during printing periods of said couples, means for advancing the web at a slower speed timed to partially hold same during variable non-printing periods, and means for retracting the web through said couples during non-printing periods.

16. In a web printing-press, a plurality of printing couples each comprising constantly rotating printing and impression cylinders, each printing cylinder being adapted to print on the web during a part of its revolution, means for feeding the web through the printing couples only during impression, and means constantly rotating in a reverse direction for retracting the web through the couples during non-printing periods.

17. In a web printing-press, a plurality of printing couples each comprising constantly rotating printing and impression cylinders, each printing cylinder being adapted to print on the web during a part of its revolution, means for feeding the web through the printing couples only during impression, means for adjusting said feeding means to accommodate for variable lengths of the printing surfaces on the printing cylinders, and means constantly rotating in a reverse direction for retracting the web through the couples during non-printing periods.

18. In a web printing-press, a rotary printing couple, means for feeding the web through the printing couple at a speed uniform therewith, an intermittently operable web retracting mechanism constantly rotating in a reverse direction, and means to limit the amount of web withdrawn by said web retracting mechanism.

19. The method of changing the travel of webs of material continuously advanced under tension from a source of supply which comprises exerting a reversely-feeding movement to a portion of said web to withdraw predetermined lengths thereof without affecting the normal advancement of the web travelling under tension.

20. The method of changing the travel of webs of material continuously advanced under tension from a source of supply which comprises exerting a reversely-feeding movement to a portion of said web to intermittently withdraw predetermined lengths thereof without affecting the normal advancement of the web travelling under tension.

21. In a web printing-press, a rotary printing couple, means for feeding the web to the printing couple, means for feeding the web through said couple only during the printing period at a speed uniform therewith, means rotating constantly in a reverse direction for retracting the web during non-printing periods, and separate adjustable means for feeding the web in predetermined variable lengths proportioned to the variable printing surface of the printing couple.

22. In a web printing-press, a rotary printing couple, means for feeding the web to the printing couple, means for feeding the web through said couple only during the printing period at a speed uniform therewith, intermittently actuated web-gripping means to hold the web stationary, and other web feeding means moving at an increased speed and operable to advance the web when released by said gripping means.

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