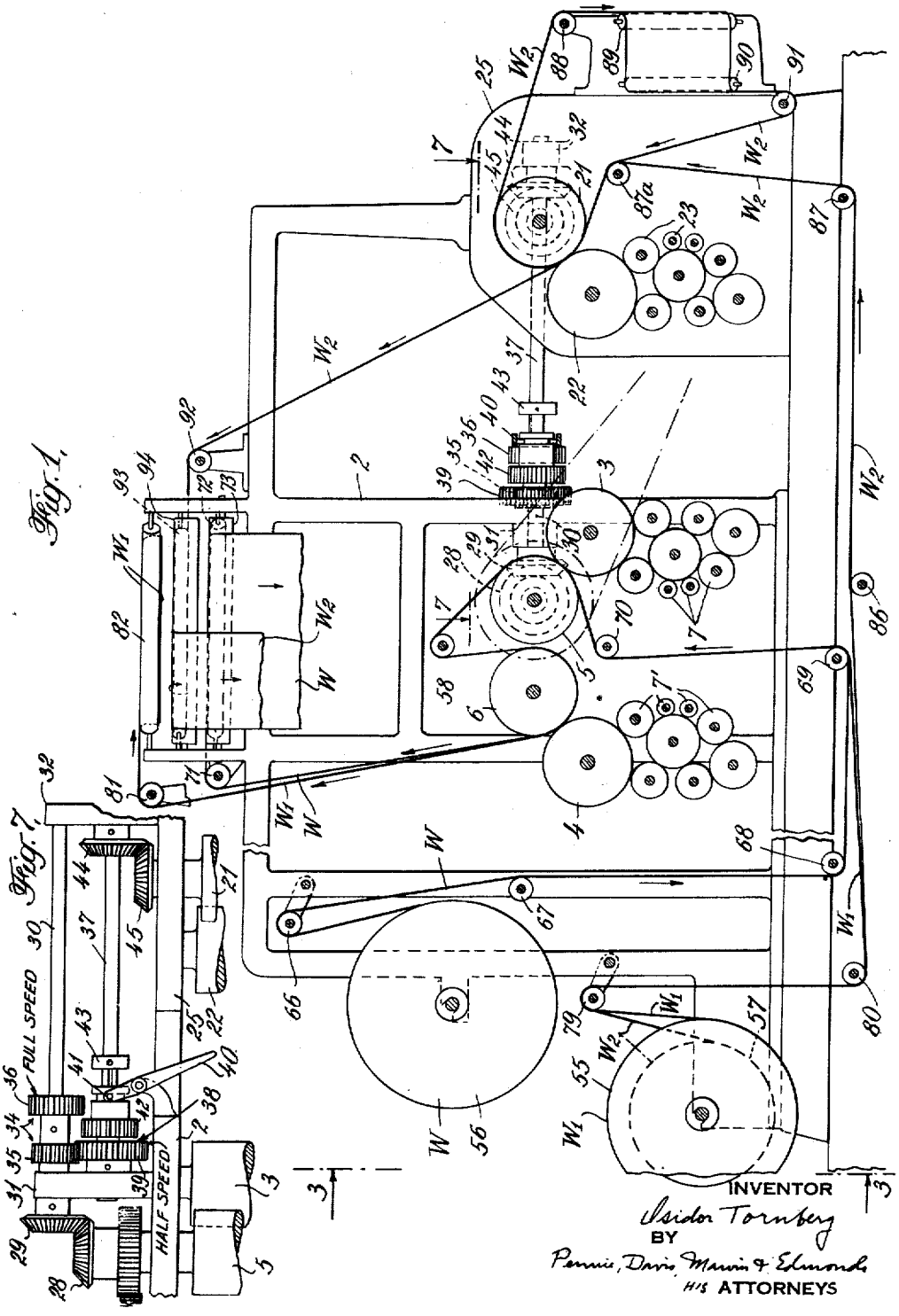
Sept. 25, 1945. I. TORNBERG 2,385,659

WEB ACCELERATING MECHANISM

Filed April 26, 1943 5 Sheets-Sheet 1



Sept. 25, 1945. I. TORNBERG 2,385,659

WEB ACCELERATING MECHANISM

Filed April 26, 1943 5 Sheets-Sheet 2

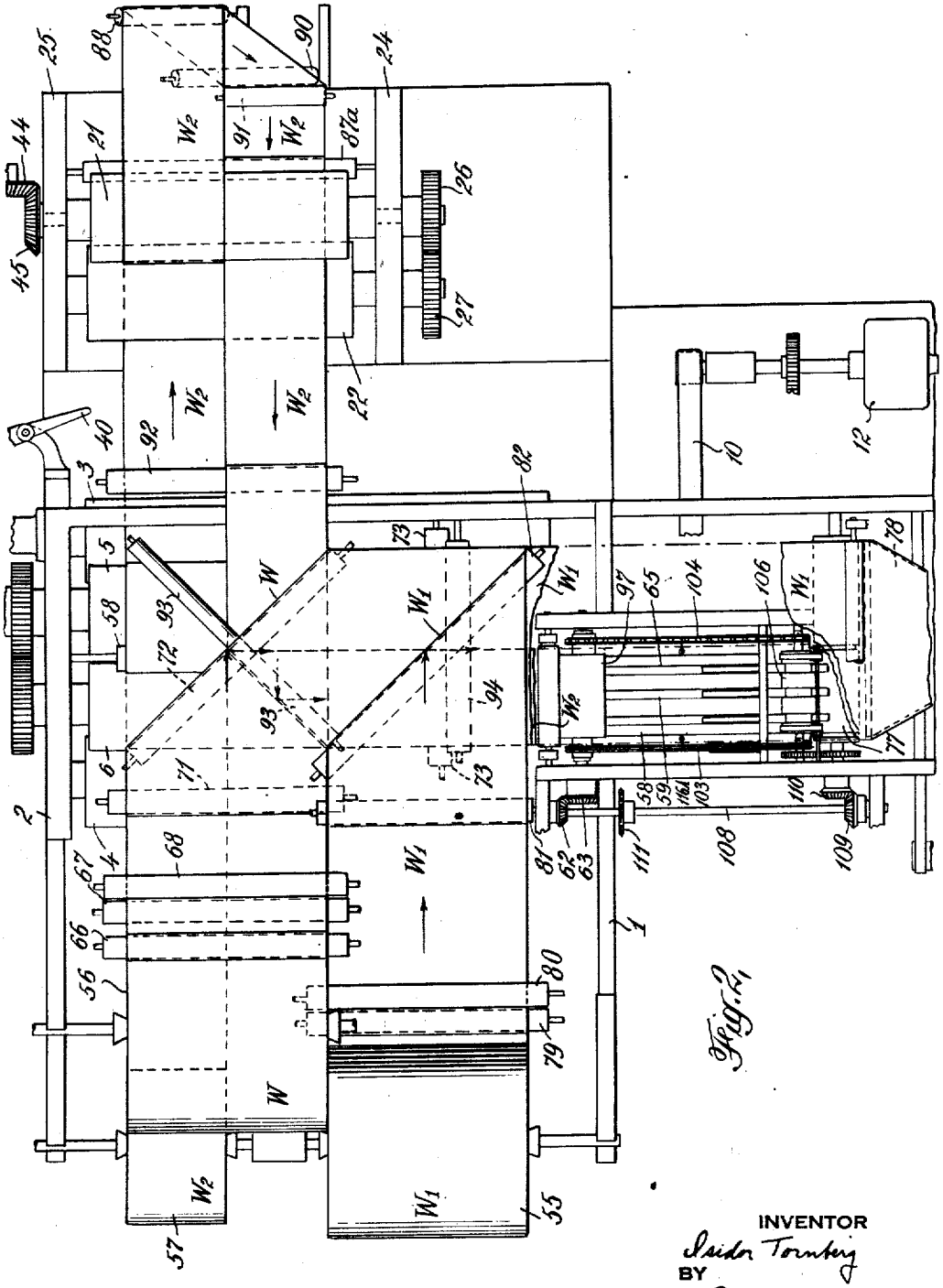


Fig. 2.

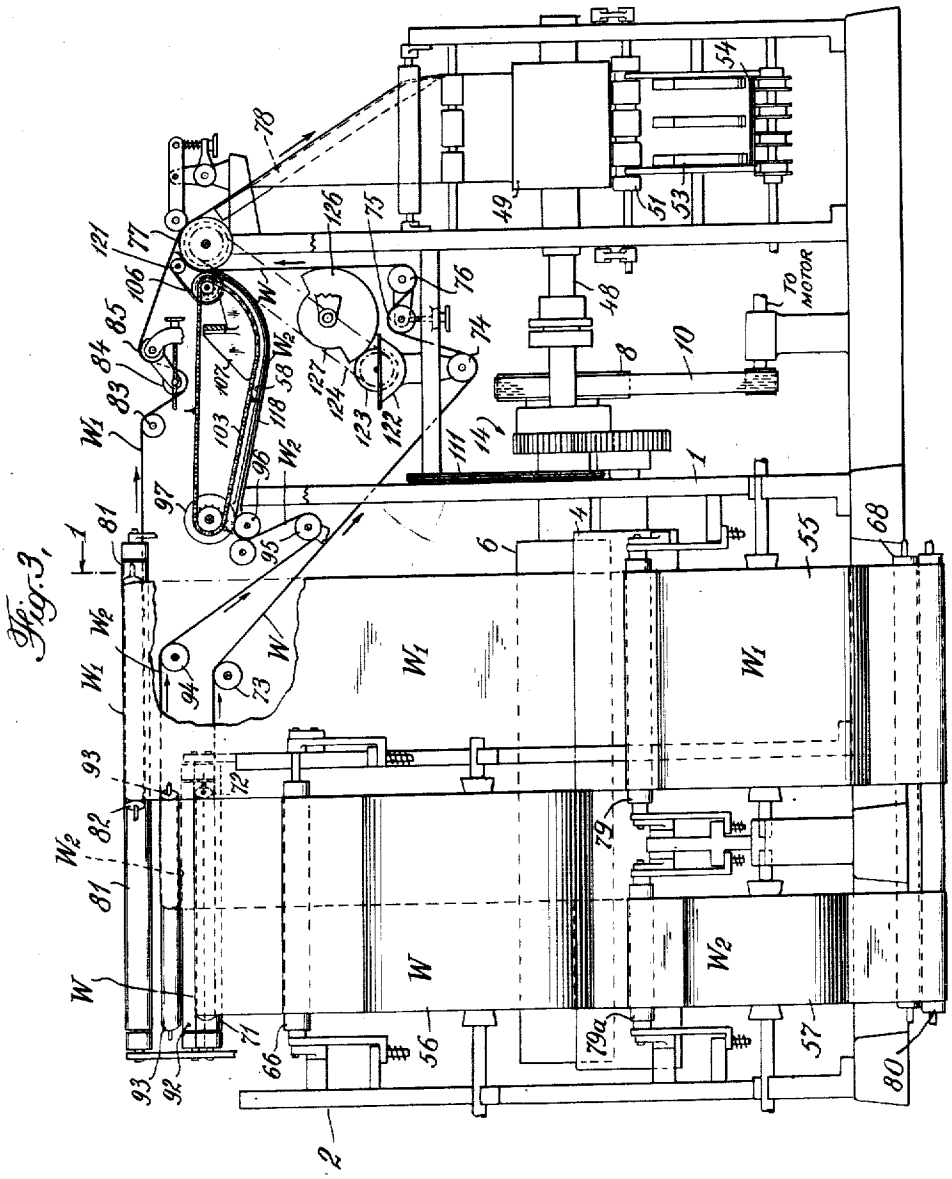
INVENTOR
Isidor Tornberg
BY
Pennie, Davis, Marvin & Edmonds
HIS ATTORNEYS

Sept. 25, 1945. I. TORNBERG 2,385,659

WEB ACCELERATING MECHANISM

Filed April 26, 1943 5 Sheets-Sheet 3

Fig. 3.



INVENTOR
Isidor Tornberg
BY
Pennie, Davis, Marvin & Edmonds
HIS ATTORNEYS

Sept. 25, 1945. I. TORNBERG 2,385,659

WEB ACCELERATING MECHANISM

Filed April 26, 1943 5 Sheets-Sheet 4

Fig. 4.

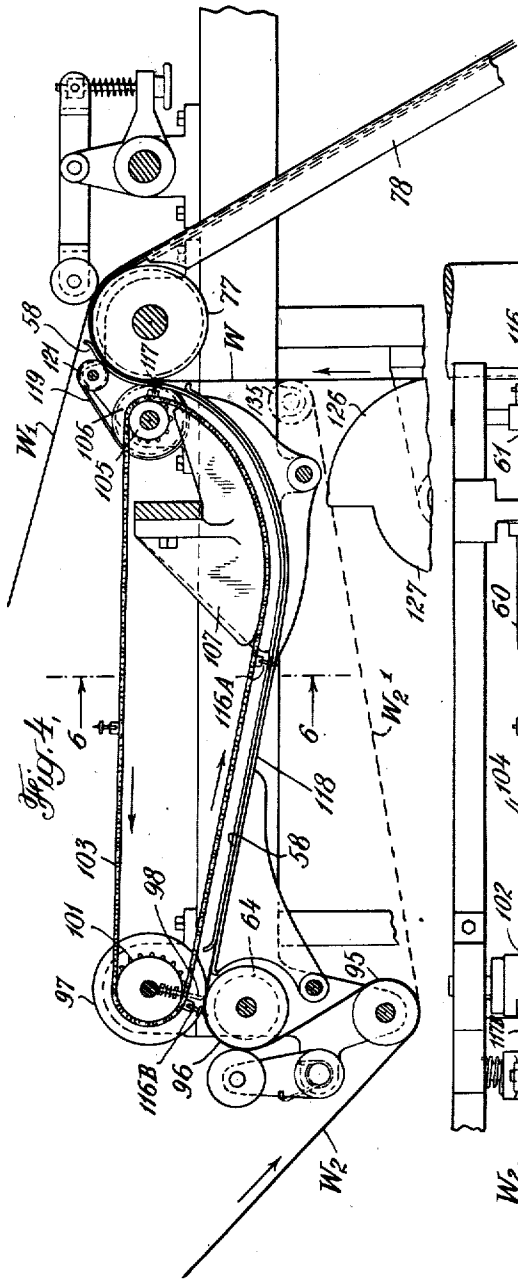
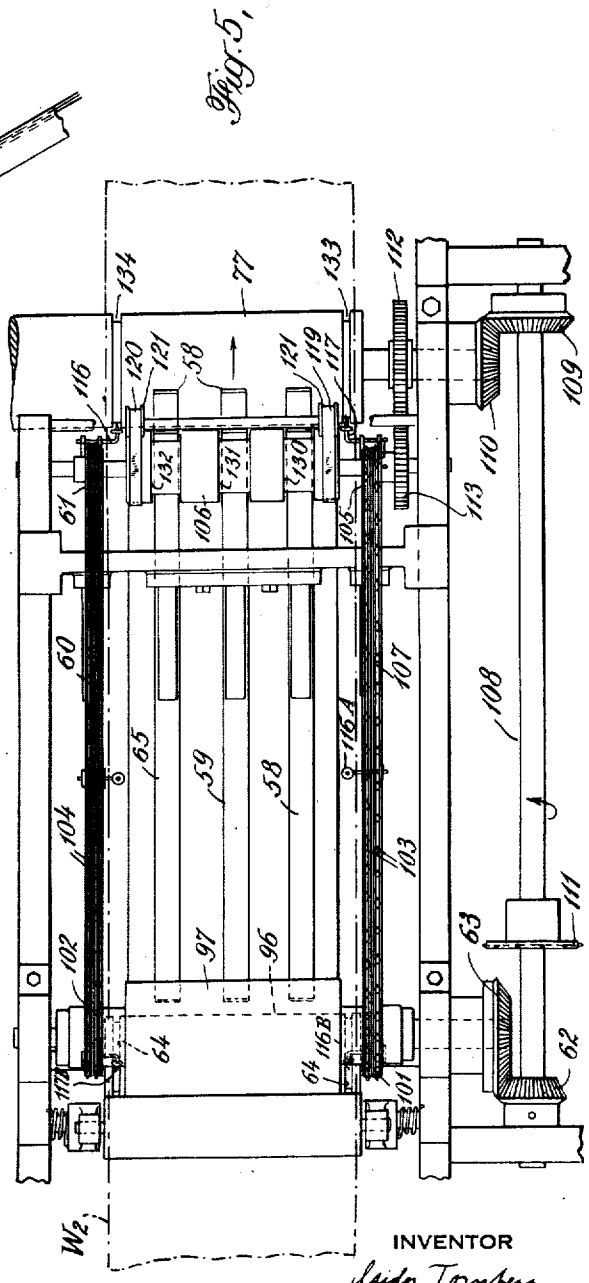


Fig. 5.



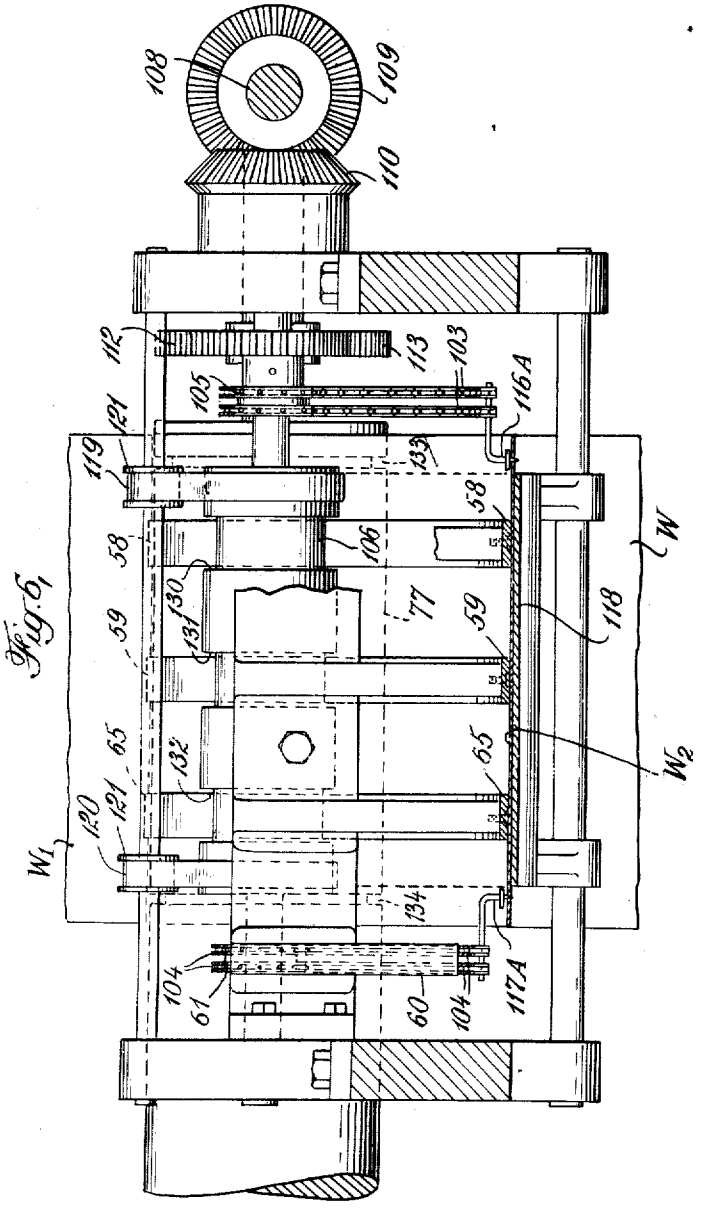
INVENTOR
Ivar Tornberg
BY
Pennie, Davis, Marvin & Edmonds
HIS ATTORNEYS

Sept. 25, 1945. I. TORNBERG 2,385,659

WEB ACCELERATING MECHANISM

Filed April 26, 1943 5 Sheets-Sheet 5

Fig. 6.



INVENTOR
Isidor Tornberg
BY
Pennie, Davis, Marvin & Edmonds
HIS ATTORNEYS

Patented Sept. 25, 1945

2,385,659

UNITED STATES PATENT OFFICE

2,385,659

WEB ACCELERATING MECHANISM

Isidor Tornberg, Plainfield, N. J., assignor to Wood Newspaper Machinery Corporation, Plainfield, N. J., a corporation of Virginia

Application April 26, 1943, Serial No. 484,635

14 Claims. (Cl. 270—11)

This invention relates to web feeding mechanism for printing presses and more particularly concerns improved mechanism for feeding sections cut from a web moving at a low speed to one or more webs traveling at a higher speed.

The majority of rotary newspaper printing presses are built to accommodate four type plates across and two type plates around each type cylinder. Thus one plate covers approximately one-fourth the axial length of each cylinder and one-half its peripheral surface. In printing newspapers with a press having a given number of cylinders, products can be printed up to a maximum number of pages equal to the number of plates the cylinders are capable of carrying. However, if these products are printed on what is called a "straight" run, the number of pages of the product is only one-half of the total page capacity of the press, since plates on diametrically opposite sides of each cylinder are identical. This means that a product is delivered for each one-half revolution of the printing cylinders. On such a run it is possible to vary the size of the product in jumps of two pages each by increasing or decreasing the width of the web running through the press in one-page width jumps. When it is desirable to obtain a larger product, it is necessary to do what is known as "collect." This means that a first section of the product is carried around the cutting cylinder of the folding mechanism and associated with a second section of the product, the two sections being folded and delivered together in a well known manner. In a "collect" operation, plates on diametrically opposed sides of the printing cylinders are different. With a "collect" run, the size of the product must be varied in jumps of four pages each. Since the size of the product may vary from day to day, the necessity for changing the product size in four-page jumps is quite a serious handicap, particularly in small printing plants such as are employed to print small town newspapers.

In general, this invention relates to mechanism which will permit the increase of a product in two-page jumps when the press is making a "collect" run. This is accomplished by printing an extra web traveling at one-half the speed of the regular web or webs, cutting sheets from the extra web, accelerating such sheets to full web speed and consolidating such sheets with alternate sections of the product formed from the other webs. Thus, for example, the extra web may be printed in a two-page wide printing couple driven at half speed with respect to one or more main printing couples. A one-page wide web serves this supplementary couple, and after being printed on one side, the web is turned, run through the same couple and printed on the other side. If the main printing unit comprises two couples with each plate cylinder four plates wide, this would under ordinary circumstances provide papers of two, four, six and eight pages of "straight" runs, and products of eight, twelve and sixteen pages on "collect" runs. By introducing sheets cut from the half speed web printed on the supplemental couple, the "collect" runs can be increased in two-page rather than four-page jumps. Also, by mechanism provided to permit operation of the supplemental couple at full speed as well as at half speed, the "straight" runs could also produce a ten-page product and the "collect" runs could also produce a twenty-page product.

Attempts have been made in the past to accomplish the desired result of a "collect" run with one section containing two more pages than the other, but none has been successful, due to the failure of the web sheet associating mechanism to positively place the odd sheet in proper position relative to the full speed webs. One procedure previously attempted has been to partially cut the sheets from the half-speed web and lead each such sheet between two full speed webs where it would be gripped between such webs, thereby breaking the sheet free and bringing it to full speed. Variations in the strength of the ties holding the odd sheet to its web cause it to be set askew to one side or the other, or delay its coming up to full speed, so that the proposed procedure was unsuccessful.

According to the present invention, the odd sheet is completely cut from the half speed web and positively accelerated to full web speed, and it is so placed with respect to the other webs that mis-register cannot occur.

In describing the invention in detail, reference will be made to the accompanying drawings in which an embodiment thereof has been illustrated.

In the drawings:

Fig. 1 is a partial side elevation of a rotary printing press constructed and arranged to embody the invention, this elevation being taken along the line 1—1 of Fig. 3 and viewed in the direction of the arrows;

Fig. 2 is a plan view of the press shown in Fig. 1;

Fig. 3 is an end elevation of the press;

Fig. 4 is an elevation on an enlarged scale of the web sheet cutting, accelerating, and combining mechanism of the press illustrated;

Fig. 5 is a plan view of the mechanism shown in Fig. 4;

Fig. 6 is a sectional view on an enlarged scale taken along the line 6—6 of Fig. 4 and viewed in the direction of the arrows; and

Fig. 7 is a plan view taken along the line 7—7 of Fig. 1 and showing the variable speed drive mechanism for the supplemental couple of the press.

My invention is applicable to any operation wherein it is desired to accelerate sheets or sections of web and consolidate them successively with a web or webs traveling at a higher speed. Since the invention is particularly applicable to rotary printing presses for the purposes described above, I have illustrated the invention in connection with a typical embodiment in which the webs are supplied by a rotary newspaper printing press. Obviously, the web sheet cutting, accelerating, and consolidating mechanism of the invention could be employed in connection with webs supplied from other sources.

Referring to the drawings and particularly to Fig. 1, the side frames 1 and 2 rotatably mount printing cylinders 3 and 4, which cooperate respectively with impression cylinders 5 and 6 and constitute two couples comprising the main printing elements of the press unit. Ink rollers 7 and 7' diagrammatically represent inking mechanism for supplying ink to the plate cylinders 3 and 4, respectively. Since the inking mechanism is of a known type, it is not necessary to show or describe it in detail. The main printing couples may be driven by a motor 12 connected through a chain 10 to a sprocket 8 on the shaft of the impression cylinder 5 (Figs. 2 and 3). In accordance with usual practice, suitable gearing indicated at 14 in Fig. 3 is provided to drive the impression cylinder 6 from the impression cylinder 5 and to drive the printing cylinders 3 and 4 from the respective impression cylinders 5 and 6.

Mounted beside the main printing unit is a two-plate wide supplemental printing couple, the principal parts of which are an impression cylinder 21, a plate cylinder 22 and an inking mechanism 23. The cylinders 21 and 22 are rotatably mounted in frames 24 and 25 (Fig. 2), and are geared together by the gears 26 and 27. The supplemental couple may be driven either at half the speed of the main printing unit or at the full speed of such unit. This is accomplished by suitable variable speed gear changing mechanism, best shown in Fig. 7. A bevel gear 28 is secured to the end of the impression cylinder 5 and meshes with a bevel gear 29, carried on a shaft 30 which is rotatably mounted in the brackets 31 and 32 secured to the frame 25 of the supplemental couple and the frame 2 of the main unit. A duplex gear 34, having a half speed portion 35 and a full speed portion 36 is secured to the shaft 30. Rotatably mounted in the brackets 31 and 32 is a jack shaft 37 which has splined thereon a gear changing element 38 whose teeth 39 mesh with the teeth 35 of the duplex gear 34 in the position shown to drive the supplemental couple at half speed. If it is desired to run the supplemental couple at full speed, the lever 40 is moved to the left, and through the trunnion 41 moves the gear changing element 38 to the right so that the gear teeth 42 mesh with the gear teeth 36 to change the speed of the supplemental couple to that of the main unit. The collar 43 limits the motion of the element 38 to the right, and when the full speed gearing is connected, the half speed gearing is disconnected. A bevel gear 44 secured to the jack shaft 37 meshes with a bevel gear 45 connected to the impression cylinder 21, thereby completing the drive from the main unit to the supplemental couple.

The other end of the impression cylinder 6 drives the folding mechanism through a drive connection 48 (Fig. 3). The folding mechanism is of known construction and includes a folding cylinder 49 cooperating with the usual cutting cylinder to sever and fold the finished product. Folding rollers 51 place the folded product in fan buckets 53 from which they are delivered on a delivery belt 54 in a manner well known in this art.

With the arrangement shown in the illustrated embodiment, it is generally desirable to use two half-width webs, that is, two two-page wide webs, to serve the main unit, and a single one-page wide web to serve the supplemental couple. The web W from the roll 56 passes over a spring roller 66, idler rollers 67, 68, 69 and 70, enters the main unit between the impression cylinder 5 and the plate cylinder 3 where it is printed on one side, passes over the idler roller 58 and between the impression cylinder 6 and plate cylinder 4 where it is printed on the other side and comes out over the idler roller 71. From the idler roller 71 the web W is carried over the turning bar 72, the idler rollers 73 and 74 (Fig. 3), the compensator roller 75 and the idler roller 76 to the drag roller 77, where it is consolidated with the other web W—1 and passes down the former 78 to the folding mechanism. In a similar manner, the web W—1 from the roll 55, running beside the web W, is led around a spring roller 79, idler rollers 80, 69 and 70, through the main unit where it is printed on both sides and up to the idler roller 81, where it goes to the turning bar 82, over the idler roller 83, the compensator roller 84, and the idler roller 85 to the drag roller 77.

The web W–2 from the roll 57 is handled in a similar manner, running over the spring roller 79a (Fig. 3) in line with the spring roller 79, the idler roller 80, then over the rollers 86, 87 and 87a where it goes through the printing couple 21—22. The web W–2 is then taken over the roller 88, the turning bars 89 and 90 which turn the web over, the idler roller 91, and back over the roller 87a and through the couple 21—22 where it is printed on the opposite side by a plate alongside of the plate which first printed the web W–2. The web W–2 then passes over a roller 92 and a turning bar 93, a roller 94 and a compensator roller 95 to a cutting couple 96—97, where half speed sheets are completely cut from the web and carried by a sheet accelerating mechanism to be described to the drag roller 77.

The half speed sheet accelerating mechanism is used when it is desired to make one section of the paper one sheet or two pages larger than the other section, thus increasing the size of the product to that extent. For this purpose the supplemental couple is run at half speed, which means that the web W–2, before it reaches the cutting couple 96—97, runs at half the speed of the webs W and W–1. Referring particularly to Figs. 4, 5 and 6, a knife 98 is provided in the cutting cylinder 97, cooperating with the backing-up roller 96, which may be made of a material such as hard rubber. The knife 98 severs the web W–2 into sheets. A cheekwood, backed up by springs in the cutting cylinder 97, may be provided to push the severed sheets off the knife 98 in a well known manner.

The shaft of the cutting cylinder 97 carries two sets of double sprockets 101 and 102 rotatably

mounted thereon at the opposite ends of the cylinder, as shown in Fig. 5. Duplex chains 103 and 104 respectively run over the sprockets 101 and 102. The chain 103 travels along a curved guide 107 and over a double sprocket 105 fixed to a stripping cylinder 106. The chain 104 is similarly arranged to travel parallel to the chain 103 over the curved guide 60 and a double sprocket 61 fixed to the other end of the stripping cylinder 106. The guides 107 and 60 have a varying radius of curvature that decreases from a maximum at the ends thereof where the chains first contact the guides to a minimum where the guides terminate adjacent the sprockets 105 and 61.

The drag roller 77 is driven from a jack shaft 108 by bevel gears 109 and 110, the driving power being supplied through a gear or sprocket 111 connected by suitable driving connections to the main unit drive. A gear 112 secured to the drag roller 77 meshes with a gear 113 secured to the cylinder 106. Thus the double chains 103 and 104 are driven by the double sprockets 105 and 61, pass beneath and along the under surfaces of the guides 107 and 60, and around the freely rotatable sprockets 101 and 102 on the cutting cylinder shaft, the direction of movement of the chains being indicated by the arrows in Fig. 4. The drive connection for the chains 103 and 104 is such that they move at a speed equal to half the speed of the webs W and W–1. The cutting cylinder 97 is driven from the jack shaft 108 through the bevel gears 62 and 63 at a speed such that its peripheral velocity equals the speed of the web W–2. The backing-up roller 96 is driven from the cutting cylinder 97 at the same peripheral velocity through a suitable gear connection, not shown.

The chains 103 and 104 have suitable paper carrying pins 116 and 117 rigidly mounted thereon. As best shown in Fig. 6, these pins are rigidly fixed to the chains and extend inwardly therefrom to positions inside the edges of the paper sheet and then downwardly so as to pierce the sheet near its marginal edges. In the illustrated embodiment, there are four pins disposed at equally spaced points on each double chain.

As shown in Fig. 4, the cutting couple 96—97 is severing a sheet from the half speed web W–2, and the front edge of this sheet is pierced by a pin 116–B, it being understood that a similar pin 117–B on the other chain, 104 simultaneously pierces the opposite edge of the sheet. The pins 116–B and 117–B extend into the grooves 64 in the backing-up cylinder 96 as they pierce the web, as illustrated in Fig. 5.

A lower guide pan 118 is provided for supporting the severed sheets after they have been cut and are progressing forward, and as best shown in Fig. 4 this pan continues around parallel and close to the guides 107 and 60 to a point adjacent the center line between the stripping cylinder 106 and the drag roller 77. The sheets are held against the guide pan 118 by upper guides 58, 59 and 65, which are spaced laterally across the sheet, as shown in Figs. 5 and 6. The guides 58, 59 and 65 extend respectively in grooves 130, 131 and 132 in the cylindrical surface of the stripping cylinder 106, leave this cylinder at its point of tangency with the drag roller 77 and continue parallel to the drag roller surface to a point close to that at which the web W—1 contacts the drag roller, as shown in Fig. 4.

From the position of the pin 116—B to that of the pin 116—A, the severed sheet travels in a straight line. As the chains 103 and 104 begin to travel around the guides 107 and 60, the outer ends of the pins where they engage the sheet are accelerated due to the shortening radius of curvature of the path of the chains as determined by the guides, so that when the leading end of the sheet reaches the center line between the cylinder 106 and the drag roller 77, where the path of the chains is circular and has a radius just half that of the sheet carrying part of the pins, the sheet is traveling at twice the speed at which it was cut from the web W—2, or exactly full web speed. This is due to the fact that the pitch radius of the chain sprockets 105 and 61 is exactly half the radius of the path of travel of the points on the pins that engage the sheet, that is, half the radius of the stripping cylinder 106. The pins 116 and 117 enter slots 133 and 134 respectively in the drag roller 77 and punch through the web W which comes up from below as shown in Fig. 4. Suitable tapes 119 and 120, running around a portion of the stripping cylinder 106 and over suitable pulleys 121 serve to strip the several sheet off the pins 116 and 117 and carry it around on the surface of the drag roller 77. These tapes as well as the guides 58, 59 and 65 press the severed sheet against the web W and place it between the webs W and W—1 as the three webs go over the drag roller 77.

In order to positively paste in the odd sheet, a pasting arrangement may be employed including a glue fountain 122 (Fig. 3) carrying a roller 123 driven from the drag roller 77 by a suitable chain 124. The roller 123 applies glue or other suitable adhesive to the edge of a disc 126 which is driven by suitable means at such a speed that its peripheral velocity equals the speed of the web W. The disc 126 is cut away at 127 so that it places adhesive on the web W in such a manner that alternate sections of this web will carry a line of glue adjacent one edge thereof, while the intermediate sections will not. The adhesive applying mechanism drive is so timed that adhesive is applied to the web W on those portions thereof which register with the severed sheets cut from the half speed web W—2, but is not supplied to the other sections of the web W.

In operation, the cutting couple 96—97 cuts successive sheets from the half sped web W—2 and the chain and pin mechanism accelerates these sheets successively to full web speed. The linear speed of the chains 103 and 104 is the same as that of the half speed web W—2 and is thus also equal to the peripheral velocity of the cutting cylinder 97. Each accelerated sheet is separated from the following sheet by an interval equal to the sheet length. Each sheet reaches full web speed when its leading edge advances to the center line between the cylinder 106 and the roller 77, and at this point it may be pasted along one edge to the full speed web W if desired. The web W—1 is then applied over the webs W and W—2 and the superimposed webs travel over the former 78 to the folding and cutting mechanism. The sheets from the half speed web are fully severed therefrom before they are accelerated and snapping of the web is thus prevented. The sheets are positively placed in correct registry with the full speed webs by accelerating and transfer mechanism. It will be observed that as the pins 116 and 117 accelerate each sheet to a full web speed, these pins pierce the full speed web W and so lock the sheet to the web. At the same time, the sheet is stuck to the web W and carried therewith over the drag roller 77 into contact with the web W—1. The

described arrangement places the extra sheet in alternate sections of the product, and thus permits formation of a product having one more sheet in one section than in the other. When the sections are collected in the cutting and folding apparatus, the result is a completed paper, the size of which may be increased by one sheet or two pages over that of a product in which the web W—2 from a supplemental couple is not employed.

In the disclosed embodiment, the supplemental couple can, if desired, be run at full speed and the web therefrom fed directly into contact with the full speed webs W and W—1 from the main printing unit. Such a connection has been indicated in Fig. 4 wherein the web W—2' has been shown in dotted lines passing directly from the roller 95 and around a roller 136 into contact with the web W. Where this arrangement is used, the drive for the chains 103 and 104 is disconnected and the tapes 119 and 120 are removed or moved back away from the surface of the drag roller 77.

Although described in connection with a specific embodiment, it will be understood that the invention is generally applicable to all situations where it is desirable or necessary to accelerate flexible sheets and consolidate them with rapidly moving webs.

I claim:

1. Apparatus for conveying and accelerating a sheet comprising a flexible element, means for propelling said flexible element at a constant linear velocity along a path including a curved portion of progressively decreasing radius of curvature, and sheet carrying means extending outwardly from said flexible element radially of said curved portion of said path whereby sheets carried by said sheet carrying means are accelerated as the flexible element moves along said curved portion of its path.

2. Apparatus for conveying and accelerating a sheet comprising a continuous flexible conveyor element traveling over two spaced rotatable members, means for guiding the span of said element moving from the first of said rotatable members to the second along a curved path of progressively decreasing radius of curvature terminating in the curvature of a second rotatable element, sheet propelling arms extending radially outward from spaced points on said flexible element, and means for guiding the sheet propelled by said arms along a path parallel to that of said element.

3. Apparatus for conveying and accelerating a sheet comprising a continuous flexible conveyor element traveling over two spaced rotatable members of different radius, means for guiding the span of said element moving from the larger rotatable member to the smaller along an initially straight path and then along a curved path of progressively decreasing radius of curvature terminating in the curvature of said smaller rotatable element, sheet propelling arms extending radially outward from spaced points on said flexible element a distance substantially equal to the radius of said smaller rotatable element, and means for guiding a sheet propelled by said arms along a path parallel to that of said element.

4. Apparatus for conveying and accelerating a sheet comprising a continuous flexible conveyor element traveling over two spaced rotatable members, means for guiding the span of said element moving from the first rotatable element to the second along an initially straight path and then along a path of progressively decreasing radius of curvature terminating in the curvature of said second rotatable element, sheet propelling arms extending radially outward from spaced points on said flexible element, means for delivering sheets to said arms at said straight portion of the path of said conveyor element, means for guiding sheets propelled by said arms along a path parallel to that of said conveyor element, and means for removing sheets from said arms when said conveyor element reaches the point of minimum radius of curvature of said curved path.

5. Apparatus for conveying and accelerating sheets comprising, a flexible conveyor element traveling along a path having an initial straight portion followed by a curved portion of progressively decreasing radius of curvature ending in a circular portion, sheet engaging pins on said conveyor element extending radially outward therefrom, said pins engaging the leading ends of sheets fed thereto and accelerating said sheets as the radius of curvature of said conveyor path decreases, and means adjacent the circular portion of said conveyor path for stripping said sheets from said pins.

6. Apparatus for conveying and accelerating sheets comprising, an endless flexible conveyor element traveling along a path having an initial straight portion followed by a curved portion of progressively decreasing radius of curvature ending in a circular portion, sheet engaging pins on said conveyor element extending radially outward therefrom for a distance substantially equal to the radius of said circular portion of said conveyor path, said pins engaging the leading ends of sheets fed thereto and accelerating said sheets as the radius of curvature of said conveyor path decreases, and means adjacent the circular portion of said conveyor path for stripping said sheets from said pins.

7. In apparatus of the type described, in combination, means for propelling a web at full speed, means for propelling a second web at a lower speed, and means for cutting sheets from the lower speed web and feeding them into contact with the full speed web comprising web severing means for completely severing successive sheets from the web propelled by said lower speed means, a continuous flexible conveyor element traveling at uniform velocity over two spaced rotatable members, means for guiding the span of said conveyor element moving from the first of said rotatable members to the second along an initial straight path and then along a curved path of progressively decreasing radius of curvature terminating in the curvature of the second rotatable element, sheet propelling arms extending outward from spaced points on said flexible element radially of the curved portion of its path for engaging the sheets severed by said web severing means and accelerating said sheets as said conveyor element moves along said curved portion of its path, and means for transferring the accelerated sheets from said sheet propelling arms into contact with a web propelled by said full speed means when the sheet reaches said second rotatable element.

8. In apparatus of the type described, in combination, means for propelling a web at full speed, means for propelling a second web at a lower speed, and means for cutting sheets from the lower speed web into contact with the full speed web comprising a cutting couple for completely

cutting successive sheets from the web propelled by said lower speed means, a flexible conveyor element moving adjacent said cutting couple and traveling along a path having an initial straight portion followed by a curved portion of progressively decreasing radius ending in a circular portion, sheet engaging pins on said conveyor element extending outwardly therefrom radially of the curved portion of said path, said pins engaging the leading ends of sheets cut by said cutting couple and accelerating said sheets as said conveyor element moves over said curved portion of its path, and means adjacent the circular portion of the path of said conveyor element for stripping said sheets from said pins and bringing said sheets into contact with the web propelled by said full speed means.

9. In apparatus of the character described, in combination with at least one main web and a supplemental web, means for propelling the main web at full speed and means for propelling the supplemental web at a lower speed, means for cutting sheets from the supplemental web and feeding them into contact with the main web comprising a cutting couple including a pair of cylindrical members, at least one endless flexible conveyor element traveling at uniform velocity over a rotatable element concentric with and adjacent one of the cylindrical members of said cutting couple and over a second rotatable element spaced from said cutting couple, means for guiding the span of said conveyor element traveling away from said cutting couple along a curved path of progressively decreasing radius of curvature terminating in said second rotatable element, sheet engaging means on said conveyor element extending radially outwardly therefrom for engaging a sheet of said supplemental web cut by said cutting couple adjacent its leading edge and accelerating such sheet as said conveyor element passes along said curved path, means for moving said main web adjacent said second rotatable element, and means for transferring a sheet of said supplemental web from said sheet engaging means into contact with said main web when the portion of said conveyor element carrying said sheet engaging means has reached said second rotatable element.

10. In apparatus of the character described, in combination with at least one main web and a supplemental web, means for propelling the main web at full speed and means for propelling the supplemental web at a lower speed, means for cutting sheets from the supplemental web and feeding into contact with the main web comprising a cutting couple including a pair of cylindrical members, at least one endless flexible conveyor element traveling at uniform velocity over a rotatable element concentric with and adjacent one of the cylindrical members of said cutting couple and over a second rotatable element spaced from said cutting couple, means for guiding the span of said conveyor element traveling away from said cutting couple along a straight path and then along a curved path of progressively decreasing radius of curvature terminating in said second rotatable element, sheet engaging means on said conveyor element extending radially outward therefrom for engaging a sheet of said supplemental web cut by said cutting couple adjacent its leading edge and accelerating such sheet as said conveyor element passes along said curved path, means for guiding sheets propelled by said sheet engaging means along a path adjacent and parallel to the path of said conveyor element, means for moving said main web adjacent said second rotatable element, means for applying adhesive to spaced sections of said main web, and means for transferring a sheet from said sheet engaging means into contact with the adhesive bearing portion of said main web when the portion of said conveyor element carrying said sheet engaging means has reached said second rotatable element.

11. Apparatus of the character described comprising a pair of spaced parallel continuous conveyor elements traveling along a path including an initial straight portion and a final curved portion of progressively decreasing radius of curvature, spaced sheet engaging arms on and extending outwardly from said conveyor elements radially of said curved portion of said path for engaging web sheets fed thereto and propelling said sheets at increasing speed as said conveyor elements move along the curved portion of said path, whereby said sheets are accelerated as the radius of curvature of said path decreases, guides extending parallel to said conveyor elements and engaging both surfaces of the sheets propelled by said sheet engaging arms along the curved portion of the path of said conveyor elements, and means for removing accelerated sheets from such arms.

12. Apparatus of the character described comprising, a pair of spaced parallel continuous conveyor elements traveling along a path including an initial straight portion and a final curved portion of progressively decreasing radius of curvature, spaced sheet engaging arms on and extending outwardly from said conveyor elements radially of said curved portion of said path for engaging sheets fed thereto and propelling said sheets at increasing speed as said conveyor elements move along the curved portion of said path, whereby said sheets are accelerated as the radius of curvature of said path decreases, a lower guide extending parallel to and transversely between said conveyor elements for supporting sheets propelled by said sheet engaging arms, at least one upper guide between said conveyor elements for holding the sheets propelled by said sheet engaging arms in contact with said lower guide along the curved portion of the path of said conveyor elements, and means for removing sheets so accelerated from said sheet engaging arms when said arms reach the part of said conveyor path having the minimum radius of curvature.

13. In apparatus of the character described, in combination with at least one main web and a supplemental web, means for propelling the main web at full speed and means for propelling the supplemental web at half speed, means for cutting sheets from the supplemental web and feeding them into contact with the main web comprising a cutting couple including a pair of parallel cylindrical members, rotatable elements concentric with and adjacent the opposite ends of one of said cylindrical members, a stripping cylinder parallel to and spaced from the cylindrical members of said cutting couple, rotatable elements concentric with and adjacent the opposite ends of said stripping cylinder, a pair of spaced parallel concentric flexible conveyor elements running at uniform velocity over said rotatable elements, means for guiding one span of said conveyor elements over a path including a curve of progressively decreasing radius of curvature terminating in the curvature of said stripping cylinder rotatable elements, spaced sheet engag-

ing pins on and extending outwardly from said conveyor elements for a distance substantially equal to the radius of said stripping cylinder rotatable elements, said pins engaging sheets cut from said supplemental web by said cutting couple and propelling said sheets at a velocity that is accelerated as said conveyor elements travel along said curved path, guides extending between said conveyor elements and around said stripping cylinder for stripping sheets from said pins as said pins move adjacent said stripping cylinder, and means for conducting said main web adjacent said stripping cylinder and into contact with such sheets.

14. In apparatus of the character described, in combination with at least one main web and a supplemental web, means for propelling the main web at full speed and means for propelling the supplemental web at half speed, means for delivering sheets from the supplemental web into contact with the main web comprising a cutting couple including a pair of parallel cylindrical members, rotatable elements concentric with and adjacent the opposite ends of one of said cylindrical members, a stripping cylinder parallel to and spaced horizontally from the cylindrical members of said cutting couple, rotatable elements concentric with and adjacent the opposite ends of said stripping cylinder and having a smaller radius than said stripping cylinder, a pair of spaced parallel continuous flexible conveyor elements running at uniform velocity over said rotatable elements, means for guiding the lower span of said conveyor elements along a path including an initial straight portion starting at said cutting couple and a final curved portion of progressively decreasing radius of curvature terminating in the curvature of said stripping cylinder rotatable elements, spaced sheet engaging pins on said conveyor elements extending outwardly from said elements radially of said curved path for a distance substantially equal to the radius of said stripping cylinder rotatable elements, said pins engaging sheets cut from said supplemental web by said cutting couple and propelling said sheets to said stripping cylinder while accelerating said sheets to full speed, means for conveying said main web adjacent said stripping cylinder, and means extending along the cylindrical surface of said stripping cylinder and outwardly therefrom to a point adjacent said main web for transferring accelerated sheets from said pins to said main web.

ISIDOR TORNBERG.

CERTIFICATE OF CORRECTION.

Patent No. 2,385,659. September 25, 1945.

ISIDOR TORNBERG.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 23, for the word "several" read --severed--; line 48, for "sped" read --speed--; page 4, second column, line 74, claim 8, after "web" insert --and feeding them--; page 5, first column, line 4, same claim, after "traveling" insert --at uniform velocity--; line 55, claim 10, after "feeding" insert --them--; page 6, first column, line 20, claim 14, for "delivering" read --cutting--; same line, after "web" insert --and feeding them--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of January, A. D. 1946.

Leslie Frazer

(Seal) First Assistant Commissioner of Patents.

ing pins on and extending outwardly from said conveyor elements for a distance substantially equal to the radius of said stripping cylinder rotatable elements, said pins engaging sheets cut from said supplemental web by said cutting couple and propelling said sheets at a velocity that is accelerated as said conveyor elements travel along said curved path, guides extending between said conveyor elements and around said stripping cylinder for stripping sheets from said pins as said pins move adjacent said stripping cylinder, and means for conducting said main web adjacent said stripping cylinder and into contact with such sheets.

14. In apparatus of the character described, in combination with at least one main web and a supplemental web, means for propelling the main web at full speed and means for propelling the supplemental web at half speed, means for delivering sheets from the supplemental web into contact with the main web comprising a cutting couple including a pair of parallel cylindrical members, rotatable elements concentric with and adjacent the opposite ends of one of said cylindrical members, a stripping cylinder parallel to and spaced horizontally from the cylindrical members of said cutting couple, rotatable elements concentric with and adjacent the opposite ends of said stripping cylinder and having a smaller radius than said stripping cylinder, a pair of spaced parallel continuous flexible conveyor elements running at uniform velocity over said rotatable elements, means for guiding the lower span of said conveyor elements along a path including an initial straight portion starting at said cutting couple and a final curved portion of progressively decreasing radius of curvature terminating in the curvature of said stripping cylinder rotatable elements, spaced sheet engaging pins on said conveyor elements extending outwardly from said elements radially of said curved path for a distance substantially equal to the radius of said stripping cylinder rotatable elements, said pins engaging sheets cut from said supplemental web by said cutting couple and propelling said sheets to said stripping cylinder while accelerating said sheets to full speed, means for conveying said main web adjacent said stripping cylinder, and means extending along the cylindrical surface of said stripping cylinder and outwardly therefrom to a point adjacent said main web for transferring accelerated sheets from said pins to said main web.

ISIDOR TORNBERG.

CERTIFICATE OF CORRECTION.

Patent No. 2,385,659. September 25, 1945.

ISIDOR TORNBERG.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 23, for the word "several" read --severed--; line 48, for "sped" read --speed--; page 4, second column, line 74, claim 8, after "web" insert --and feeding them--; page 5, first column, line 4, same claim, after "traveling" insert --at uniform velocity--; line 55, claim 10, after "feeding" insert --them--; page 6, first column, line 20, claim 14, for "delivering" read --cutting--; same line, after "web" insert --and feeding them--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of January, A. D. 1946.

Leslie Frazer

(Seal) First Assistant Commissioner of Patents.