J. A. BOYCE.

APPARATUS FOR ASSOCIATING, CUTTING, COLLECTING, FOLDING, AND DELIVERING NEWSPAPERS.

APPLICATION FILED SEPT. 30, 1907.

950,014. Patented Feb. 22, 1910.

2 SHEETS—SHEET 1.

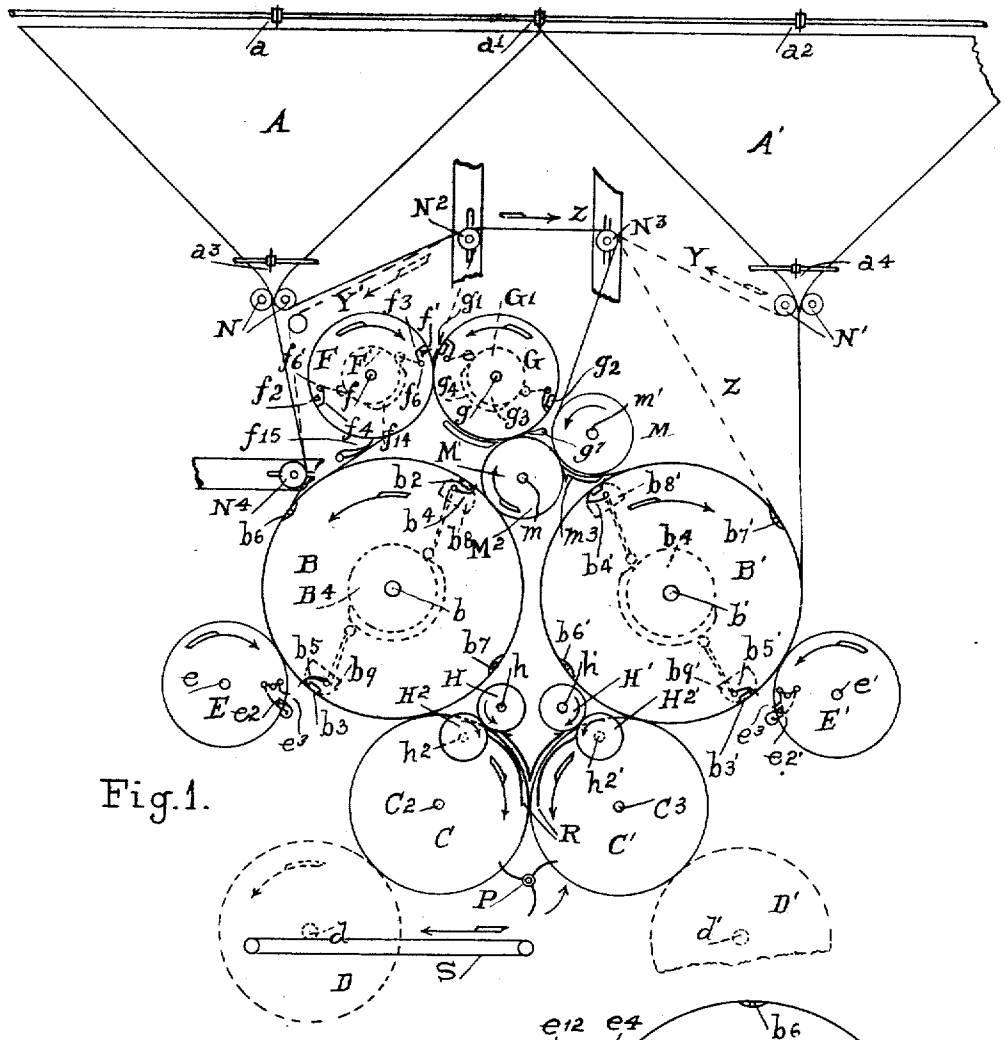

Fig. 1.

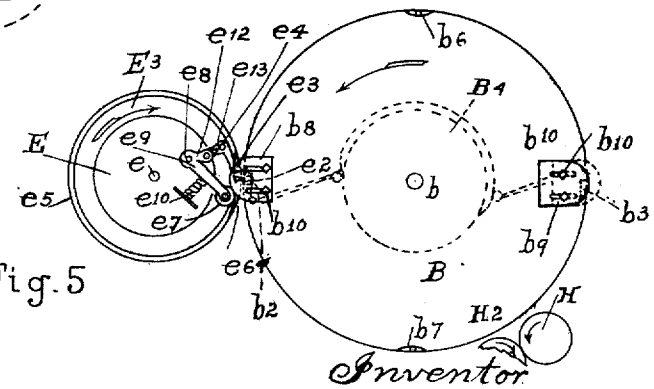

Fig. 5

Witnesses.
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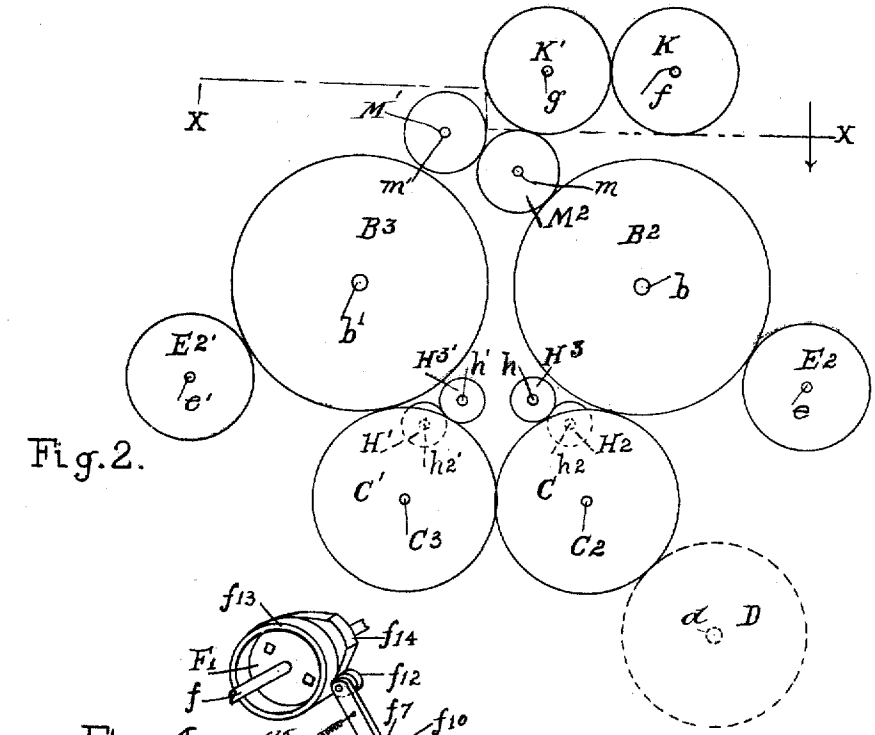

Fig. 2.

Fig. 4.

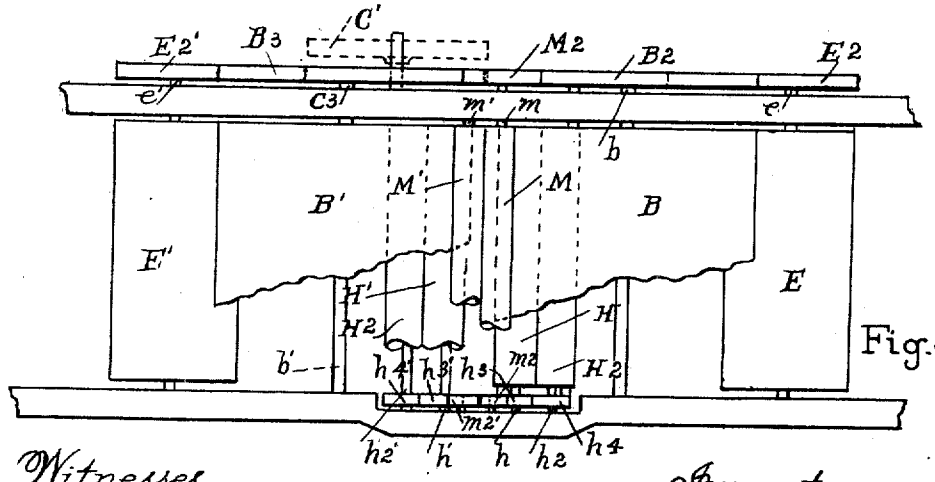

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN A. BOYCE, OF SPRINGFIELD, ILLINOIS.

APPARATUS FOR ASSOCIATING, CUTTING, COLLECTING, FOLDING, AND DELIVERING NEWSPAPERS.

950,014. Specification of Letters Patent. Patented Feb. 22, 1910.

Application filed September 30, 1907. Serial No. 395,152.

To all whom it may concern:

Be it known that I, JOHN A. BOYCE, a resident of the city of Springfield, in the county of Sangamon and State of Illinois, and a subject of His Majesty Edward VII, King of Great Britain and Ireland, have declared my intention to become a citizen of the United States, as evidenced by the certificate of the county clerk of Sangamon county, Illinois, now on file in the Patent Office; be it further known that I have invented a certain new and useful Apparatus for Associating, Cutting, Collecting, Folding, and Delivering Newspapers, of which the following is such a full, clear, and exact description as will enable others skilled in the art to which it appertains to make and use my said invention.

The apparatus herein set forth is adapted for use in coöperation with rotary perfecting presses such as are well known in the art.

This invention relates primarily to the relative arrangement of the mechanisms as hereinafter set forth and the purposes of the invention are; to provide an apparatus adapted to coöperate with rotary printing couples equipped with plates having columns lengthwise of the plate cylinders; and equally adapted to coöperate with rotary printing couples equipped with plates having columns circumferential to the plate cylinders; the apparatus used with printing couples having circumferential columns, differing from the apparatus used with printing couples having lengthwise columns only in that the width of the formers and the diameters of the carrier and cutter cylinders vary according to the different lengths and diameters of the plate cylinders; to provide associating devices, cutter devices, carrier devices and folder devices in such relation to each other that they will be effective to produce papers with or without supplements in case lengthwise columns are used, and in case circumferential columns are used; and to provide a plurality of associating devices, carrier devices, combined cutter and collecting devices, and folder devices adapted to produce papers in sections, collect the sections and fold them together and deposit all of the folded papers on a single delivery device.

The mechanical elements of this apparatus are in the main substantially the same as the elements described in my application for patent for improvement in apparatus for printing and folding papers, Serial Number 336,856, filed October 1, 1906, and to which reference is hereby made. The annexed drawings are therefore in the nature of diagrams designed to show the position, relation, and coöperation of the various instrumentalities.

In the diagrams cylinders and rollers are represented by circles; gear wheels are represented by the pitch circles of the wheels, and folder blades, cutter blades, cutting woods, strippers, pins, etc. are represented conventionally.

Referring to the drawings, in which similar reference characters designate like parts in the several views: Figure 1 is a diagram showing in front-end-elevation an apparatus comprising formers, main-carrier cylinders, supplement cutter and carrier devices, main cutter and collecting cylinders, folder rollers and a delivery device; and illustrates the run of the webs and sheets when papers with supplements are being produced from webs printed by printing couples equipped with plates having lengthwise columns, and also illustrates the run of webs and sheets printed by printing couples equipped with plates having columns circumferential to the plate-cylinders, when producing a paper in sections and collecting the sections and folding them together. Fig. 2 is a diagram showing in end elevation, as viewed from the rear, the gears connected with the main carrier cylinders, the combined cutter and collecting cylinders and the folder rollers and the train of gears driving said cylinders and rollers. Fig. 3 is a diagram showing in top plan the mechanism situated below the line x, x, of Fig. 2. Fig. 4 is a diagrammatic perspective view, on an enlarged scale, of the preferable means for operating the pins of the supplement cutter and carrier cylinders and the main carrier cylinders, and Fig. 5 is a diagrammatic view, on an enlarged scale, of the means for operating the pins of the combined cutter and collecting cylinders.

The method of operating the apparatus when used with printing couples having lengthwise columns is somewhat different from the method of operating it when used with printing couples having circumferential columns: and in order that this differ-

ence in operation may be readily described and understood I have used in the drawings reference letters provided with exponents, to indicate different relations and operations of the mechanisms comprised in the apparatus.

The apparatus shown in the drawings is adapted to coöperate with a four-plate-wide rotary perfecting press having either printing couples with lengthwise columns, or printing couples with circumferential columns, and will operate upon webs one-page-wide, two-page-wide, three-page-wide, or four-page-wide.

The formers A and A′ may be of any approved construction and are so situated relative to the printing couples that the continuously moving web or webs perfected by the printing couples will run over the upper edge of the formers and downward along the formers. Revoluble slitters a, a^1 and a^2 are arranged to slit longitudinally, the web or webs running over the upper edges of the formers, and similar slitters a^3 and a^4 are situated near the lower end or nose of the formers respectively and are arranged to slit longitudinally the two-plate-wide web-members running downward along the formers.

The formers A and A′ serve as associating devices to associate webs or web-members running from a single deck or a plurality of decks, of a printing machine; they also serve as web-turner devices to give a quarter turn to the web, webs, or web-members running thereon and cause said web, webs, or web-members as the case may be, to run laterally relative to the initial line of travel of said web, webs, or web-members; and in case plate cylinders with circumferential columns are used, said formers also serve to fold longitudinally a single two-plate-wide web, or a plurality of two-plate-wide webs, or a plurality of two-plate-wide web-members, that is to say, if the width of a web is a multiple of the width of two plates, said web may be slitted to form a plurality of web-members each two plates wide. In short the formers are in fact combined associating, folding and web-turning devices adapted to associate and fold a web two plates in width running from a single deck of the machine or a web a multiple of two plates in width running from a single deck; or a plurality of two-plate-wide webs running from a plurality of decks; or a plurality of webs each a multiple of two plates in width running from a plurality of decks of a multiple-deck machine.

Main carrier cylinders B and B′ hereinafter more particularly described, are in proper position to receive longitudinally folded webs, or web-members, running downward from the formers A and A′ and supplement sheets running from the cutter and carrier cylinders F and G as hereinafter described.

Combined cutter and collecting cylinders E and E′ are secured on revoluble shafts e and e' and coöperate with the main carrier cylinders B and B′ respectively.

The cylinders B and B′ are fixed on revoluble shafts b and b' respectively. Spur wheels B^2 and B^3 are secured on the shafts b and b' respectively. Cog pinions C and C′ turn and are slidable on stationary studs C^2 and C^3 and mesh with the spur wheels B^2 and B^3 respectively. The pinion C may be driven by a suitably placed wheel D secured on a revoluble shaft d of the printing machine, or may be actuated by any other suitable means; or the wheel C′ may in like manner be driven by a similar wheel D′ secured on a shaft d' as may be most convenient in practice. For the present purposes the wheel D will be deemed the main drive.

Folder rollers H, H^2, H′ and $H^{2'}$ are secured on revoluble shafts h, h^2, h' and $h^{2'}$ respectively. Spur pinions H^3 and $H^{3'}$ are secured on the shafts h and h' and mesh with the pinions C and C′ respectively. Intermeshing spur pinions h^3 and h^4 (Fig. 3) are secured on the shafts h, h^2 and similar pinions $h^{3'}$ and $h^{4'}$ are secured on the shafts h' and $h^{2'}$ respectively.

The supplement cutter and carrier cylinders F and G are secured on revoluble shafts f and g respectively. Intermeshing spur wheels K and K′ are secured on the shafts f and g respectively. The cylinder F has longitudinal knives f' and f^2 and two sets of retractile pins f^3 and f^4, each set comprising two or more pins arranged in a row lengthwise of the cylinder. The knives are situated in advance of the pins, viewed in the direction of the revolution of the cylinder, and the pins engage with the leading end of the web-member running on the cylinder. The sets of pins f^3 and f^4 may be actuated by any suitable means adapted to project and retract one set of pins once for each revolution of the cylinder and also adapted to project and retract both sets of pins once for each revolution of the cylinder. In the latter case said sets of pins will be alternately in operation, first one set and then the other. The preferable means effective to produce the above described operation of the sets of pins (shown in Figs. 1 and 4) will now be described.

Oscillative shafts f^6 and $f^{6'}$ extend lengthwise of the cylinder F and one end of each shaft projects beyond the end of the cylinder; pins f^3 are secured on the shaft f^6, and pins f^4 are secured on the shaft $f^{6'}$ and are adapted to be projected outward through corresponding holes (not shown), in the circumferential wall of the cylinder. Arms f^7 (Fig. 4) are connected with the projecting parts of the shafts f^6 and $f^{6'}$ in such manner that the arms may be slid on the shafts to

adjust the arms relative to the cam plate F^1, and when the arms are set in the desired position on the shafts the arms may be secured by set screws f^{10}, or equivalent securing devices. Revoluble little rollers f^{12} are mounted on the arms f^7 and are adapted to run on the perimeter of the plate F^1. A circular plate F^1, stationary on the main frame, has its center in line with the axis of the cylinder F, and has a ring-member f^{13}, and a cam-member f^{14}, each one-half the thickness of the plate. By loosening the set screws f^{10} the arms f^7 and $f^{7'}$ may be moved to the right or the left and set in such position that either or both of the rollers f^{12} will run around on the member f^{13}; or may be set in such position that one of the rollers f^{12} will run around on the member f^{13} and the other will run around on the member f^{14}. During the time that the rollers are running on the raised part of the member f^{14} the pins f^3 or f^4 as the case may be, will be projected through the corresponding holes in the wall of the cylinder F and will have hold on the leading end of the web-member running on the cylinder; and at all other times the pins will be retracted. The pins f^3 and f^4 may be retracted by any suitable means, such for example as a spring f^{15}, having one end connected with the arm f^7 and the other end connected with any suitable fixed support and acting on the arm f^7, as shown in Fig. 4 to hold the little roller f^{12} in contact with the surface f^{13}, or f^{14}, as the case may be.

A cylinder G is fixed on a revoluble shaft g. A stationary circular cam plate G^1 has its center in line with the axis of the cylinder G and has a ring-member g^3 and a cam-member g^4 similar to like parts of the cam-plate F^1. The cylinder G has longitudinal cutting-woods g^1 and g^2 of usual construction, and is equipped with retractive pins similar to the pins f^3 and f^4 already described. When the pins of the cylinder F are projected the pins of the cylinder G are retracted, and conversely when the pins of the cylinder G are projected the pins of the cylinder F are retracted; it is obvious therefore that the pins of both cylinders cannot operate upon the same sheet at the same time. Strippers f^{15} of the usual construction, strip the sheets from the cylinder F and similar strippers g^7 strip the sheets from the cylinder G. Suitable guides g^8, guide the sheets from the cylinder G to the rollers M and M'. Combined strippers and guides m^8 strip the sheets from the roller M and lead them to the cylinder B'. A spur wheel K secured on the shaft f meshes with and drives a similar spur wheel K' secured on the shaft g. Rollers M and M' are secured on revoluble shafts m and m'. A spur pinion M^2 is connected with the shaft m and meshes with the spur wheels B^2 and K'. The pinion M^2 is connected with a revoluble shaft m by a set screw or equivalent securing device (not shown), so that the pinion may be set in different positions on the shaft, to control the operations of the cylinders F and G. When the cylinders are in use the pinion M^2 will be driven by the wheel B^2 and will drive the pinion K'; and when it is desired to place the cylinders in disuse the pinion M^2 will be slid outward and secured on the shaft out of mesh with the wheels B^2 and K'.

The cylinders B and B' and their appurtenances are alike, so a description of one will suffice for both. The cylinder B Figs. 1 and 5 is fixed on a revoluble shaft b and has cutting woods b^2 and b^3; and projectile pins b^4 and b^5 constructed and arranged to operate the same as like parts of cylinder G. A stationary cam-plate B^4 similar to the cam-plate F^7 serves to cause timely operation of the pins b^4 and b^5. The cylinder B also has periodically revoluble folder blades b^6 and b^7, of any approved construction adapted to coöperate with the folder rollers H and H^2 in the usual well known manner. The pins b^4 and b^5 are arranged to engage the leading end of the cut sheets upon the cylinder and hold them in such position that the folder blades b^6 and b^7, acting on the sheets will project the central part of the sheets outward into position to be seized and folded by the folder rollers H and H^2.

Slotted cam-plates b^8 and b^9 are connected with one end of the cylinder B by bolts b^{10}, or equivalent connecting devices. The cam-plates b^8 and b^9 engage with the roller e^7 of the cylinder E to actuate the pins e^3 as hereinafter described. By loosening the nuts on the bolts b^{10} the cam-plates b^8 and b^9 may be adjusted radially on the end of the cylinder to cause the cam-plates to project beyond or to lie within the circumference of the cylinder, according as the cam-plates are to be active or inactive; and when the cam-plates are properly adjusted they may be secured by tightening the nuts on the bolts b^{10}. The cam-plates b^8 and b^9 will project beyond the cylinder and be effective only when the cylinder E is used as a collecting cylinder; at all other times they will lie within the circumference of the cylinder and will be ineffective.

The cylinder F is a combined cutter and carrier cylinder and the cylinder G is also a combined cutter and carrier cylinder. For convenience in description the male cylinder F is hereinafter designated as the first supplement cutter and carrier cylinder and the female cylinder G is designated as the second supplement cutter and carrier cylinder, but it is obvious that the terms "first" and "second" may be applied to said cylinders indiscriminately. The main carrier cylinder B is likewise designated as the first

main carrier cylinder, and the main carrier cylinder B′ is designated as the second main carrier cylinder, but the terms "first" and "second" are applicable to said main carrier cylinders indiscriminately.

The combined cutter and collecting cylinders E and E′ and their appurtenances are alike, so a description of one will suffice for both. The cylinder E (Figs. 1 and 5) is secured on a revoluble shaft e, and has longitudinal knives e^2 of the usual construction, coöperating with the cutting woods b^2 and b^3 of the cylinder B. Projectile pins e^3 are mounted on an oscillative shaft e^4. The lines along which the knives e^2 and $e^{2'}$ of the cylinders E and E′ cut on the cutting woods of the cylinders B and B′; the line along which the knives f' and f^2 of the cylinder F cut on the cutting woods of the cylinder G and the lines of contact of the folder rollers H and H^2 and the lines of contact of the folder rollers H′ and $H^{2'}$; will hereinafter be designated as the "contact lines" of the main cutter cylinders the supplement cutter cylinder and the folder rollers respectively. A stationary annular plate E^8 is adjacent to one end of the cylinder E and has its center in line with the axis of the cylinder. The ring e^5 of the plate E^8 has an opening e^6 adapted to permit the passage of the roller e^7 as hereinafter described. A shaft e^8 is mounted to oscillate within the cylinder and one end of said shaft projects beyond the end of the cylinder. An arm e^9, secured on the projecting part of the shaft e^8, carries a roller e^7 which, when the cylinder is turning, runs in contact with the ring e^5. A spring e^{10}, acts against the arm e^9 and normally holds the arm in such position that the roller e^7 will travel on the outer surface of the ring e^5 and the pins e^3 will be retracted. When the plate b^8 (or b^9, as the case may be) on the cylinder B engages with the roller e^7 and pushes it inward, the arm e^9 will move inward and will turn the shaft e^8 so as to cause the pins e^3 to project and the roller e^7 traveling on the inside of the ring will keep the pins projected during one revolution of the cylinder and when the roller again arrives at the opening e^6 it will pass outward through the opening and cause retraction of the pins, and thereafter the roller e^7 will continue to run on the outer surface of the ring e^5 and the pins will remain retracted until the roller e^7 is again pushed inward by the plate b^8 or b^9, as the case may be. The projecting pins e^3 will engage and hold the leading end of the sheet situated on the adjacent part of the cylinder B and carry the sheet once around with and upon the cylinder E; whereupon the pins e^3 will be retracted, the pins b^4 (or b^5, as the case may be) of the cylinder B will come into action and the sheet will be transferred to and collected with the sheets carried on the adjacent part of the cylinder B. The pins e^3 are active only when the cylinder E is used as a collecting cylinder and are retracted and ineffective when the cylinder is serving as a cutter cylinder only.

Rollers N and N′ at the lower ends of the formers A and A′ control the run of the webs, or web-members, as the case may be; and in case plate cylinders with circumferential columns are used the rollers N or N′, or N and N′ serve to make the first fold lengthwise of the web. Similar adjustable rollers N^2, N^3 and N^4 serve to control the run of and adjust the webs and web-members as hereinafter described.

A revoluble delivery wheel P of the usual construction, is centrally situated below and is adapted to receive papers folded by both pairs of folder rollers. Guides R, of any suitable construction, guide the papers running between the folder rollers downward onto the delivery wheel P. A carrier device S, of any suitable construction, carries away the papers delivered thereon by the delivery wheel P.

The operation of the mechanism is as follows: The shaft d actuated by any suitable means, causes the main drive wheel D to turn; the wheel D drives the pinion C and it in turn drives the pinion C′; the pinion C also drives the wheel B^2, and the connected cylinder B and the pinion H^3 and the connected roller H, and causes the pinion h^4 on the shaft of the roller H to drive the coöperating roller H^2; the wheel B^2 drives the pinion E^2 and the connected cylinder E, and also drives the pinion M^2 at one end of the shaft m and the connected roller M; and causes the pinion m^2 at the other end of the shaft m of the roller M (Fig. 3) to drive the pinion $m^{2'}$ and the connected roller M′; the pinion M^2 also drives the wheel K′ and the connected cylinder G; the wheel K′ drives the wheel K and the connected cylinder F; the pinion C′ drives the wheel B^3 and the connected cylinder B′ and also drives the pinion $h^{3'}$ and the connected roller H′ and causes the pinion $H^{4'}$ on the shaft h' to drive the pinion $h^{4'}$ and the connected roller $H^{2'}$ and the wheel B^3 drives the pinion $E^{2'}$ and the connected cylinder E′; or the main drive wheel D′ may be used to drive the pinion C′ and cause it to drive the pinion C so that the pinion C will cause the entire train to operate as already described. If it be desired to place the cylinders B′ and E′ in disuse and the folder rollers H′ and $H^{2'}$ in disuse, the pinion C′ may be pulled, as indicated by dotted lines in Fig. 3; and if it be desired to place the cylinders F and G in disuse the pinion M^2 may be pulled as already described.

The operation of the apparatus when used in connection with a rotary perfecting press equipped with plate cylinders having length-

wise columns will now be described; and afterward the operation of the apparatus when used in connection with a rotary perfecting press equipped with plate cylinders having circumferential columns will be described.

If book-form papers without supplements are to be produced from a plurality of one-plate wide webs printed by the printing couples of a multiple deck machine and only one set of folder rollers is to be used; all of the webs will be run over and downward along one side of one of the formers, (say the left-hand side of the former A) and will be associated on the former. The associated webs will travel downward around the roller N^4 onto the cylinder B, by which they will be carried into proper position to be cut into two-page-long sheets by the knives e^2 of the cylinder E and the cut sheets will be carried by the cylinder B into position to be acted upon by the folder blades b^6 and b^7 to project the central part of the sheets outward to be seized and folded by the folder rollers H and H^2, and the folded papers will be dropped onto the delivery wheel P. If both sets of folder rollers are to be used the web-members running between the rollers N will be separated and some of them will be run around the roller N^4 and those webs will be cut and the sheets will be folded by the rollers H and H^2 as already described, and the other web-members will travel over the rollers N^2 and N^3 to the cylinder B′ and will be cut into two-page long sheets by the knife of the cylinder E′ and the cut sheets will be folded by the rollers H′ and $H^{2\prime}$ and the papers folded by both sets of rollers will simultaneously drop onto the delivery wheel P. If two-plate-wide webs are used the webs will be slitted longitudinally by the slitter a, or a^8, as may be most convenient, and the web-members will travel downward along the former A and the associated web-members will run between the rollers N and thence to the cylinder B, (or to the cylinders B and B′ according as one or both main carrier cylinders and one or both sets of folder rollers are in use) and will then be cut into sheets, and the sheets will be folded and dropped as already described. If three-plate-wide webs are used the webs will be slitted by the slitters a and a', or a^3 and a', to divide each web into three equal web-members, two sets of web-members on the former A, one set on each side, and one set of web-members on one-half of the former A′ and the associated web-members of the two sets will run between the rollers N and the third set of web-members will travel downward along the left-hand side of the former A′ and between the rollers N′. If only one set of folder rollers is to be used the web-members running between the rollers N′ will be carried over the rollers N^3 and N^2 to the roller N^4 as indicated by arrows Y and will there be associated with the web-members running from the rollers N, and the associated web-members will all run to the cylinder B; will all be cut into sheets by the knife of the cylinder E and all of the sheets will run to the folder rollers H and H^2 which will fold them together, and the folded papers will drop onto the delivery wheel P. If three-plate-wide webs are used and both sets of folder rollers are in operation, all of the web-members from the former A may run to the cylinder B and all of the web-members from the former A′ may run to the cylinder B′; the web-members on the cylinder B may be cut into sheets and the sheets run to and folded by the rollers H, H^2; and the web-members running on the cylinder B′ may be cut into sheets and the sheets run to and be folded by the rollers H′ H^2, and in that case the papers folded by the folder rollers H, H^2 will have twice the number of pages that the papers folded by the rollers H′ and H^2 will have; the number of pages of the different products may however be varied at pleasure by taking some of the web-members from one former and associating them with the web-members from the other former as already described.

In operating with four-plate-wide webs the slitters a, a' and a^2 or a^5, a', and a^4 will divide the webs into four equal web-members and the entire surface of both formers will be utilized. Below the formers the operation will be the same as with three-plate-wide webs. If two-plate-wide webs or four-plate-wide webs, printed by plates having lengthwise columns are used, all of the web-members from one former, if the webs are two-plate-wide, or both formers if the webs are four-plate-wide, may be associated on one cylinder, B or B′ as the case may be, and after being cut into sheets, the sheets may be collected by the coöperating cylinders B and E, or B′ and E′ as the case may be and the collected sheets may be folded together by the folder rollers H, H^2 or H′ $H^{2\prime}$, as the case may be; or the sheets derived from all of the web-members from the former A may be collected by the cylinders B and E and folded by the rollers H, H^2 and the sheets derived from all of the web-members from the former A′ may be collected by the cylinders B′ and E′ and folded by the rollers H′, $H^{2\prime}$ and the papers from both sets of folder rollers may drop simultaneously onto the delivery wheel P.

To produce papers in book form with supplements and utilize both sets of folder rollers and drop papers from both sets simultaneously onto a single delivery device the cutter and carrier cylinders F and G will be brought into action. A plurality of webs, one, two, three, or four plates wide

may be used. The supplement web-member may be led from either one of the formers to and between the cylinders F and G by which it will be cut into one-leaf sheets. The first supplement sheet from the cylinder G will go to the cylinder B′ and be associated with the main web-members running on said cylinder, the next sheet carried by the cylinder F, will run to the cylinder B and be associated with the main web-members running thereon; and the supplement sheets will thus run alternately to the cylinders B′ and B so long as the apparatus continues to operate on papers with supplements. After the supplement sheets are associated with the main web-members, the run of the web-members, the cutting into sheets, the folding of the sheets and the dropping of all of the folded papers onto a single delivery wheel will be executed exactly the same as in producing papers without supplements. If webs printed by plates having circumferential columns are used, the webs may be either two, three, or four plates wide. If two-plate-wide webs are used all of the slitters will be in disuse, and if three-plate-wide, or four-plate-wide webs are used the central slitter a^1 alone will be in use. If two-plate-wide webs are used to produce book-form papers without supplements, the associated webs will travel downward along the former A (or A′ as the case may be) and the first fold will be made lengthwise of the webs by the rollers N at the lower end of the former; the longitudinally folded webs will travel to the cylinder B; will be cut into one-page-long sheets by the knives of the cylinder E; the sheets will be carried by the cylinder B into position to be folded by the folder rollers H, H^2; the rollers will fold the sheets; and the folded papers will drop onto the delivery wheel P.

When producing papers with supplements from webs printed by plates having circumferential columns, a single three-plate-wide web from which the supplement sheets are derived may be used in conjunction with one or more two-plate-wide webs. In that case the slitter a' will slit the three-plate-wide web longitudinally to divide it into two members, one of which will be two-plates wide and the other will be one-plate wide. The two-plate-wide member of said web will travel on the former A and will be associated with the two-plate-wide web or webs traveling on said former, and the one-page-wide supplement member of said three-page-wide web will travel downward along the left-hand part of the former A′; will run between the rollers N′ over the rollers N^3 and N^2 to the roller N^4 and will be associated on the cylinder B with the longitudinally folded webs from the former A running to and upon the cylinder B, as indicated by arrows Y and Y′ and the associated webs and supplement web-member carried on the cylinder B will be cut into one-page-long sheets by the knife of the cylinder E and the cylinder B will carry the cut sheets into position to be seized and folded together by the rollers H and H^2. If four-plate-wide web or webs are used both sets of folder rollers may be utilized to fold the papers and the papers from both sets will drop onto a single delivery device as already described. If four-plate-wide webs printed by plates having circumferential columns are used, all of the longitudinally folded webs from the former A may travel over the rollers N^2 and N^3 to the cylinder B′ as indicated by arrows Z, and may be associated on the cylinder with all of the webs from the former A′; the associated webs may be cut into one-page-long sections by the knife of the cylinder E′ and the sections may be folded together by the rollers H′ and H^2; or if a less number of papers with a greater number of pages, be desired, the cylinders B′ and E′ may be operated to collect the sections derived from the webs from both formers, the collected sections may be folded together by the rollers H′ and H^2, and the folded papers may be dropped onto the delivery wheel P.

If papers with supplements be desired, with one set of folder devices in operation, a one-plate-wide supplement web-member may be run from one side of either of the formers downward between the rollers M and M′ to the cylinder B′ and be thereon associated with the longitudinally folded web running on said cylinder; or the supplement web-member from one side of either former may run directly to the cylinder B or B′ as the case may be, as indicated by dotted lines Y and Z, without passing between the rollers M and M′, and may be associated with the longitudinally folded webs, and the associated webs and supplement web-member may be cut into sections and folded and delivered as already described. If two folder devices are in operation a two-plate-wide supplement web may be used and one web-member may run to one main carrier cylinder and the other may run to the other main carrier cylinder.

In case plate cylinders with circumferential columns are used and the supplement cutter and carrier cylinders F and G are operated to supply supplement sheets alternately on the cylinders B′ and B when both of said cylinders are in operation, the cylinders E′ and E will operate to cut and collect the sections running on said main carrier cylinders respectively, and if both sets of folder rollers are in operation a section without a supplement may be collected with a section with a supplement on the cylinder B′ and the two sections may be folded together

by the rollers H′ H² and a section without a supplement and a section with a supplement may in like manner be collected by the cooperating cylinders B and E and said sections may be folded together by the rollers H and H² and the papers from both sets of folder rollers will drop simultaneously onto the delivery wheel P.

The mechanisms are operative either with a single former or equivalent associating or longitudinal folding device, or with a plurality of formers or equivalent associating or longitudinal folding devices.

I have shown main carrier cylinders B and B′ each equipped with two sets of pins and two coöperating folder blades, but each cylinder obviously may be equipped with a greater number of pins substantially as shown in Fig. 38 of the drawing of my application No. 336856 filed Oct. 1, 1906, and hereinbefore referred to.

The apparatus herein set forth may be adapted for magazine work merely by reducing the diameters of the cylinders and correspondingly reducing the dimensions of the other parts; without any change in the relation of the mechanisms, and without departure from my invention.

The cylinders F, G, B, E, B′ and E′ are arranged in such relation to each other that the distance from the line of contact of the cylinders F and G to the line of contact of the cylinders B′ and E′, measured according to the run of the sheets, is the length of one supplement leaf greater than the distance from the line of contact of the cylinders F and G to the line of contact of the cylinders B and E, measured in the same way. This relation of the cylinders admits of the placing of supplement sheets alternately upon the cylinders B and B′ in the precise position necessary for associating the supplement sheets with the main sheets, so that the pages of the supplement sheets will register with the pages of the main sheets and this may be accomplished when plate cylinders with lengthwise columns or plate cylinders with circumferential columns are used.

Plate cylinders having lengthwise columns ordinarily differ in length and diameter from plate cylinders having circumferential columns, but this invention contemplates the use of plate cylinders having lengthwise columns or the use of plate cylinders having circumferential columns and in either case the formers A and A′ will be two plates wide and in either case the position of the cutter, carrier, and folder mechanisms, relative to the formers and relative to each other, will be the same.

The term, combined associating and longitudinal-web-folder device, hereinafter used, is hereby defined to mean, any means adapted to support a single web running thereon also adapted to associate a plurality of webs running thereon and also adapted for making a fold longitudinally of a single web, or making a fold longitudinally of a plurality of associated webs running thereon. An example of such means is the former A upon which a single web may be folded longitudinally, or a plurality of associated webs may be folded longitudinally.

Referring to Fig. 1 it will be seen that each of the formers A and A′ is adapted to receive webs from a plurality of decks of a multiple deck apparatus. The central splitters a' and a^2 are adapted to divide a plural-plate-wide web or webs, into a plurality to two-page-wide web-members running upon and longitudinally folded on the formers. The two-page-wide web-members longitudinally folded on the formers may run to a plurality of cutter devices E and E′, a plurality of carrier devices B and B′, and a plurality of folder devices H, H² and H′ H²′, and drop onto a single delivery device P, either separate papers in book form, or double papers collected on cutting and collecting cylinders E and E′; or a plurality of two-page-wide web-members folded longitudinally on all of the formers, may run to a single cutter device E or E′ as the case may be and to the coöperating carrier and folder devices B B′; H, H²; H, H²′; as the case may be, and in that case there will be a plurality of first-folded sections cut off together at the same time and said plurality of sections thus cut off will be led around the carrier cylinder B or B′ as the case may be, in position to be folded by the folder rollers coöperating with said cylinder, and the folded sections will drop onto the same delivery device P. If it be desired to have a plurality of sections, from both formers, folded together, say four sections in all, the cut sections derived from the webs running on both of the formers will all be cut by one cutter device, and the two sections first cut (one from each former) will be carried around on the collecting cylinder and collected with the next two sections running from the formers; and all of the collected sections will be carried by the carrier cylinder into position to be folded by the folder rollers, and all of the second-folded sections will drop onto the same single delivery device.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination of a web-turner device adapted to effect a quarter turn of a continuously moving web and cause it to ultimately run laterally relative to its initial line of travel, supplement cutter and carrier devices having their axes parallel to the initial line of travel of said web and cooperating with each other to cut the supple-

ment web into sheets running alternately to main carrier devices, main carrier devices parallel to and coöperating with said supplement cutter and carrier devices respectively, main cutter devices coöperating with said main carrier devices respectively and folder devices intermediate of and respectively coöperating with said main carrier devices and each making a fold parallel to the initial line of travel of said web.

2. The combination of a web-turner device effective to fold longitudinally and give a quarter turn to a continuously moving web and cause it to ultimately run laterally relative to its initial line of travel, supplement cutter and carrier devices adjacent to said web turner and having their axes parallel to the initial line of travel of said web and cutting crosswise of said web, main carrier devices parallel to and coöperating with said supplement cutter and carrier devices, main cutter and collecting devices coöperating with said main carrier devices respectively and folder devices intermediate of said main carrier devices and coöperating with said main carrier devices respectively.

3. In an apparatus of the class described, means effective to fold and deliver onto a single delivery device papers comprising collected sections in case one main carrier device is in use, and effective to fold and deliver onto the same delivery device papers comprising collected sections, in case a plurality of main carrier devices are in use; comprising a plurality of associating and longitudinal web-folder devices, opposite main carrier devices coöperating with said associating and longitudinal web-folder devices, combined main cutter and collecting devices coöperating with said main carrier devices respectively, folder devices intermediate of said main carrier devices, and a delivery device between said folder devices.

4. The combination of a web-turner device adapted to effect a quarter turn of and fold longitudinally a continuously moving web, a pair of parallel coöperating supplement cutter and carrier devices having their axes parallel to the initial line of travel of the web as it runs from the last impression cylinder, a first main carrier device receiving a web, or webs, or web-members, from said web-turner device and coöperating with one of said supplement cutter and carrier devices, a second main carrier device receiving a web, or webs, or web-members, from said web-turner device and coöperating with the other supplement cutter and carrier device, and main cutter devices coöperating with said main carrier devices respectively.

5. Means effective to collect two sections, one with a supplement and the other without a supplement, comprising a plurality of web-turner devices each adapted to give a quarter turn to continuously moving webs, a pair of coöperating supplement cutter and carrier devices arranged to cut across a web-member running from one of said web-turner devices, a first main carrier device receiving main webs from one of said web-turner devices and receiving supplement sheets from one of said supplement cutter and carrier devices, a second main carrier device receiving main webs from the other web-turner device and receiving supplement sheets from the other supplement cutter and carrier device, and main cutter and collecting devices coöperating with said main carrier devices respectively.

6. The combination of a supplement cutter device, main carrier devices, collecting devices coöperating with said main carrier devices respectively, folder devices coöperating with said main carrier devices respectively, and a delivery device intermediate of said folder devices in such relation to each other that said delivery device is intermediate of the folder devices, the contact lines of said folder devices are equidistant from the contact lines of said collecting devices respectively, and the distance from the contact line of one of said collecting devices to the contact line of said supplement cutter device is equal to the distance from the contact line of the other collecting device to the contact line of said supplement cutter device plus the length of one supplement leaf.

7. The combination of supplement cutter and carrier devices, main carrier devices, main cutter devices, folder devices and a delivery device; in such relation to each other that the delivery device is intermediate to the folder devices, the contact lines of the folder devices are equidistant from the contact lines of the main cutter devices respectively and the distance from the contact line of one main cutter device to the contact line of said supplement cutter device is equal to the distance from the contact line of the other main cutter device to the contact line of said supplement cutter device, plus the length of one supplement leaf.

8. Means effective to cut and insert supplement sheets in two papers and simultaneously fold said papers; comprising web-turner devices adapted to fold the web longitudinally and adapted to effect a quarter turn of a continuously moving web and cause it to ultimately run laterally relative to its initial line of travel, supplement cutter and carrier devices having their axes parallel to the initial line of travel of said web, two main carrier devices parallel to and receiving supplement sheets alternately from said supplement cutter and carrier devices, main cutter devices coöperating with said main carrier devices respectively and folder devices intermediate of said main carrier devices.

9. The combination of oppositely turning main carrier devices, combined cutter and

collecting devices on opposite sides and co-operating with said main carrier devices respectively, and folder mechanisms intermediate of and coöperating with said main carrier devices respectively and equidistant from said combined cutter and collecting devices respectively, one of said folder mechanisms acting to fold together the collected sections running on one of said main carrier devices and the other folder mechanism acting to fold together the collected sections running on the other main carrier device.

10. The combination of formers, a supplement cutter device and a supplement carrier device between said formers, a main carrier device coöperating with said supplement cutter and carrier devices; a cutter and collecting device coöperating with said main carrier device and a folder device coöperating with said main carrier device.

11. The combination of formers, a supplement cutter device between said formers, a main carrier device adapted to receive main webs from said formers and supplement sheets from said supplement cutter device, a main cutter device coöperating with said main carrier device, and a folder device co-operating with said main carrier device.

12. The combination of a plurality of formers, a supplement cutter device adapted to cut supplement sheets from a web-member running from any one of said formers, two main carrier devices adapted to receive webs from any and all of said formers, means for leading supplement sheets from said supplement cutter device alternately to said main carrier devices, and cutter devices coöperating with said main carrier devices.

13. The combination of a plurality of formers, a supplement cutter device adapted to cut sheets from a web-member running from any one of said formers, two main carrier devices adapted to receive webs from any and all of said formers, means for leading supplement sheets from said supplement cutter device alternately to said main carrier devices, main cutter devices coöperating with said main carrier devices respectively, and folder devices coöperating with said main carrier devices respectively.

14. The combination of a plurality of formers, a supplement cutter device adapted to cut supplement sheets from a web-member running from any one of said formers, main carrier devices adapted to carry webs running from any and all of said formers, means for leading supplement sheets from said supplement cutter device alternately to said main carrier devices, main cutter devices coöperating with said main carrier devices respectively, folder devices coöperating with said main carrier devices respectively and a delivery device coöperating with both of said folder devices.

15. The combination of revoluble main carrier cylinders, spur wheels connected with said carrier cylinders respectively, revoluble and slidable spur pinions meshing with each other and with the spur wheels connected with said main carrier cylinders respectively, folder rollers in pairs, one pair co-operating with each of said main carrier cylinders, intermeshing pinions connecting the folder rollers of each pair, pinions connected with one roller of each pair of folder rollers and meshing with said revoluble and slidable spur pinions respectively, revoluble main cutter cylinders, pinions connected with said main cutter cylinders and meshing with the wheels connected with said main carrier cylinders respectively, a revoluble supplement cutter cylinder, a revoluble supplement carrier cylinder, intermeshing spur wheels connected with said supplement cutter cylinder and said supplement carrier cylinder respectively, and a spur pinion intermeshing with a spur wheel connected with one of said main carrier cylinders and the spur wheel connected with said supplement carrier cylinder.

16. Means effective to cut supplement sheets and associate said sheets with longitudinally folded webs and afterward cut said webs into sections and fold together said sections and said supplement sheets; comprising a plurality of longitudinal folder devices such as formers, a supplement cutter device intermediate of said longitudinal folder devices, means for leading a web-member to said supplement cutter device, a main carrier device receiving longitudinally folded webs from all of said longitudinal folder devices, a main cutter device coöperating with said main carrier device to cut said longitudinally folded webs into sections, and a folder device coöperating with said main carrier device to successively fold together said sections and the supplement sheets interposed between said sections.

17. The combination of a plurality of longitudinal folder devices such as formers, adapted to fold webs in the first instance length-wise of the webs, a first supplement cutter and carrier device equipped with retractile pins, a coöperating supplement cutter and carrier device equipped with retractile pins, the pins of said first supplement cutter and carrier device and said second supplement cutter and carrier device respectively being alternately effective and ineffective and said cutter and carrier devices being intermediate of and in operative relation to two of said longitudinal-folder-devices, a first main carrier device adjacent to said first supplement cutter and carrier device a second main carrier device adjacent to said second supplement cutter and carrier device, means for leading cut sheets from said supplement cutter and carrier devices

to said main carrier devices alternately, main cutter devices coöperating with said main carrier devices respectively and folder devices intermediate of and coöperating with said main carrier devices respectively.

18. The combination of a plurality of longitudinal folder devices such as formers, a supplement cutter device equipped with retractile pins, a coöperating supplement carrier device equipped with retractile pins, the pins of said supplement cutter device and said supplement carrier device respectively being alternately effective and ineffective, a main carrier device adjacent to said supplement cutter device, a second main carrier device adjacent to said supplement carrier device, means for leading cut sheets from said supplement cutter and carrier devices to said main carrier devices alternately, main cutter and collecting devices coöperating with said main carrier devices respectively and intermediate folder devices equi-distant from the lines of cutting of said main cutter and collecting devices.

19. In an apparatus adapted to perfect and fold a continuously moving web the combination of main carrier devices having their axes in line with the initial line of travel of the web operated upon, opposite folder mechanisms having their axes parallel to the initial line of travel of said web and a delivery device intermediate of and simultaneously receiving papers folded separately by said folder mechanisms.

20. The combination of opposite folder devices, carrier devices in operative relation to said folder devices respectively, collecting devices coöperating with said carrier devices respectively and a delivery device intermediate of said folder devices and receiving collected and folded papers from both of said folder devices.

21. The combination of a former adapted to accommodate a web or webs, means for slitting centrally the web or webs which run on said former, two main carriers in operative relation to said former, means for leading to one main carrier a web-member or web-members running from said former, means for leading to the other main carrier a web-member or web-members running from said former, means for alternately inserting supplement sheets with the web-member or web-members running on said main carriers respectively, combined cutters and collectors coöperating with said main carriers respectively to cut into sheets the web-member or web-members running on said main carriers and collect said sheets, and folder mechanisms coöperating with said main carriers respectively to fold together the collected sheets running on said main carriers.

22. The combination of a plurality of combined associating and longitudinal web-folder devices, a plurality of main carrier devices in operative relation to said combined associating and web-folder devices, supplement cutter and carrier devices adapted to cut and carry supplement sheets alternately to said main carrier devices, main cutter devices coöperating with said main carrier devices, folder devices coöperating with said main carrier devices respectively, and a delivery device receiving papers from all of said folder devices.

23. The combination of a plurality of combined associating and longitudinal web-folder devices, main carrier devices in operative relation to said combined associating and web-folder devices, supplement cutter and carrier devices in operative relation to said combined associating and folder devices, combined main cutter and collecting devices coöperating with said main carrier devices respectively, and folder rollers co-operating with said main carrier devices respectively.

24. The combination of combined associating and longitudinal web-folder devices, main carrier devices in operative relation to said combined associating and web-folder devices, supplement cutter and carrier devices in operative relation to said combined associating and web-folder devices, and adapted to cut and carry supplement sheets alternately to said main carrier devices, combined main cutter and collecting devices co-operating with said main carrier devices respectively, folder devices coöperating with said main carrier devices respectively and a delivery device receiving folded papers in sections from all of said folder devices.

25. The combination of combined associating and longitudinal-web-folder devices, main carrier devices in operative relation to said combined associating and web-folder devices, supplement cutter and carrier devices in operative relation to said web-folder and associating devices and adapted to cut and carry sheets alternately to said main carrier devices, main cutter devices coöperating with said main carrier devices respectively and main folder devices coöperating with said main carrier devices respectively.

26. The combination of combined associating and longitudinal web-folder devices, main carrier devices in operative relation to said combined associating and web-folder devices, supplement cutter and carrier devices in operative relation to said combined associating and web-folder devices and adapted to cut and carry supplement sheets alternately to said main carrier devices, main cutter devices coöperating with said main carrier devices respectively, main folder devices coöperating with said main carrier devices, and a central delivery device receiving papers from said main folder devices.

27. The combination of a plurality of associating and longitudinal web folder devices, a plurality of opposite main carrier devices in operative relation to said associating and longitudinal web folder devices, main cutter devices coöperating with said main carrier devices, folder mechanisms cooperating with said main carrier devices respectively, and a single delivery device adapted to receive papers simultaneously from a plurality of folder mechanisms; said associating and longitudinal folder devices and said single delivery device being in such relation to each other that folded papers will drop onto the same delivery device in case one of said associating and longitudinal folder devices is in coöperation with one of said main carrier devices and the folder mechanisms co-acting therewith, or in case a plurality of said associating and longitudinal folder devices are in coöperation with a single main carrier device and the folder mechanisms co-acting therewith, or in case a plurality of associating and longitudinal folder devices are in coöperation with a plurality of main carrier devices and the folder mechanisms co-acting therewith.

28. In an apparatus of the class described, the combination of a plurality of formers, associating and carrier mechanisms and cutter and folder mechanisms coöperating to associate webs from all of said formers and carry cut and fold papers derived from webs running from all of said formers; and a single delivery device located to receive, two at a time, folded papers derived from webs running from said formers separately, or to receive, one at a time, on the same delivery device, papers derived from webs running from all of said formers collectively and associated after leaving said formers.

29. In an apparatus of the class described the combination of instrumentalities effective to fold and deliver one at a time onto a single delivery device papers produced from associated webs running upon a plurality of associating devices and again associated after leaving said associating devices, or to fold and deliver two at a time onto the same delivery device, papers produced from associated webs running on all of said associating devices; comprising a plurality of formers, means for slitting webs running on said formers, main carrier devices, intermediate of said formers, means for leading webs from any of said formers to and associating them on any of said main carrier devices, cutter mechanisms and folder mechanisms coöperating with said main carrier devices respectively, and a delivery device located to receive papers from all of said folder mechanisms.

30. The combination of a former adapted to accommodate a web or webs, means for slitting centrally the web or webs which run on said former, two main carriers in operative relation to said former, means for leading to one main carrier a web-member or web-members running from said former, means for leading to the other main carrier a web-member or web-members running from said former, means for alternately inserting supplement sheets with the web-member or web-members running in said main carriers respectively, combined cutters and collectors coöperating with said main carriers respectively to cut into sheets the web-member or web-members running on said main carriers and collect said sheets, folder mechanisms coöperating with said main carriers respectively to fold together the collected sheets running from said main carriers, and a single delivery device adapted to receive two at a time, folded papers each comprising collected sheets.

31. The combination of a former adapted to accommodate a web or webs, means for slitting centrally the web or webs which run on said former, two main carriers in operative relation to said former, means for leading to one main carrier a web-member or web-members running from said former, means for leading to the other main carrier a web-members running from said former, means for alternately inserting supplement sheets with the web-member or web-members running on said main carriers, combined cutters and collectors co-acting with said main carriers respectively to cut into sheets the web-member or web-members running on said main carriers and collect said sheets, and folder mechanisms adjacent to said main carriers respectively and adapted to fold together the sheets cut and collected by said combined cutters and collectors respectively.

32. The combination of a former adapted to accommodate a web or webs, means for slitting centrally the web or webs which run on said former, two main carriers in operative relation to said former, means for leading to one main carrier a web-member or web-members running from said former, means for leading to the other main carrier a web-member or web-members running from said former, means for alternately inserting supplement sheets with the web-member or web-members running on said main carriers respectively, main cutters respectively co-acting with said main carriers to cut into sheets the associated webs running on said main carriers, folder mechanisms coöperating with said main carriers respectively and a single delivery device adapted to receive, two at a time, papers folded by said folder mechanisms.

33. The combination of two formers side by side, a slitter between said formers, slitters central to said formers respectively, opposite right and left main carrier devices

each in operative relation to either or both of said formers, cutter mechanisms coöperative with said carrier devices respectively, a pair of folder mechanisms respectively cooperative with said carrier devices, and a single delivery device adapted to receive from one folder mechanism of the pair papers derived from webs running from one or both of said formers onto one carrier device, or to receive from both folder mechanisms of the pair, papers derived from webs running from either or both of said formers onto both of said carrier devices.

34. The combination of two plural-plate-wide formers side by side and adapted to effect a quarter turn of the side by side members of webs slitted on said formers to bring all of said quarter-turned web-members oppositely into line with each other, a slitter device between said formers, slitter devices central to said formers respectively, supplement cutter and carrier mechanism located between the web-members turned by said formers respectively and adapted to cut and carry sheets alternately in opposite directions, opposite right and left main carrier devices in operative relation to said formers respectively and adapted to receive supplement sheets running alternately from said supplement cutter and carrier mechanism, main cutter mechanisms coöperating with said main carrier devices respectively, and folder mechanisms coöperating with said main carrier devices respectively.

35. The combination of two plural-plate-wide formers side by side and adapted to effect a quarter turn of the side by side members of webs slitted on said formers to bring all of said quarter turned web-members oppositely into line with each other, a slitter between said formers, slitters central to said formers respectively, opposite right and left main carrier devices, means for leading web-members from said right and left formers to said right-hand carrier device, means for leading web-members from said right and left formers to said left-hand carrier device, cutter mechanisms coöperating with said carrier devices respectively, a pair of folder mechanisms coöperating with said carrier devices respectively and a single delivery device adapted to receive from one folder mechanism of the pair papers derived from web-members running from both formers and associated on one carrier device, also adapted to receive from both folder mechanisms papers derived from web-members running from both of said formers to both of said carrier devices.

36. The combination of two plural-plate-wide formers side by side and adapted to effect a quarter turn of the members of webs slitted on said formers to bring all of said web-members into line with each other, a slitter device between said formers, slitter devices central to said formers respectively, supplement cutter and carrier mechanism located between the web-members turned by said formers respectively and in operative relation to both of said formers, opposite right and left main carrier devices in operative relation to said formers respectively and in operative relation to said supplement cutter and carrier mechanism, main cutter mechanisms coöperating with said main carrier devices respectively, main folder mechanisms coöperating with said main carrier devices respectively, and a single delivery device adapted to receive folded papers running from either or both of said folder mechanisms.

37. The combination of two plural-plate-wide formers side by side, a slitter device between said formers, slitter devices central to said formers respectively, opposite right and left main carrier devices in operative relation to said formers respectively, main cutter and collecting devices coöperating with said main carrier devices respectively to cut and collect sheets derived from webs running on said main carrier devices, main folder mechanisms coöperating with said main carrier devices respectively to fold in book form collected sheets running from said main carrier devices and a delivery device adapted to receive simultaneously collected and folded sheets running from both of said folder mechanisms.

38. Means for slitting a plural-plate-wide web lengthwise to divide it into companion web-members, means for slitting said companion web-members to divide them into sub-members, means for effecting a quarter turn of and associating in parallel all of the sub-members derived from one of said companion web-members, means for effecting a quarter turn of and associating in parallel the sub-members derived from the other companion web-member, supplement cutter and carrier mechanism between said web-turner and associating devices, opposite right and left main carrier devices in operative relation to said supplement cutter and carrier mechanism, main cutter and collecting devices coöperating with said main carrier devices respectively, to collect sheets in book form, main folder mechanisms coöperating with said main carrier devices respectively, and a single delivery device adapted to receive collected and folded sheets running from either or both of said folder mechanisms.

39. The combination of a plurality of formers; supplement cutter and carrier mechanism adapted to cut into sheets a web running from any of said formers and insert said sheets with main webs running from one or more of said formers; a pair of main carrier devices in operative relation to said formers and said supplement cutter and car-

rier mechanism and each adapted to carry sheets cut from a web or webs running from any of said formers and inserted with a web, or associated webs running from any of said formers onto either of said main carrier devices and associated before cutting, or to carry cut sheets derived from a web running from any of said formers and inserted with a plurality of associated webs running from one or more of said formers onto said main carrier device and associated thereon before cutting; cutter devices adjacent to said main carrier devices respectively and adapted to cut into sheets webs running from one or more of said formers to said main carrier devices respectively, or to cut into sheets associated webs running from a plurality of said formers to and associated on one main carrier device; folder mechanisms coöperating with said main carrier devices respectively and a single delivery device adapted to receive folded papers with supplements, derived from webs running from any of said formers, or papers with supplements derived from associated webs running from a plurality of said formers and associated before cutting.

40. The combination of a plurality of formers, a pair of opposite main carriers each adapted to carry a web or a plurality of associated webs running from any or all of said formers, main cutter and collecting devices coöperating with said main carriers respectively, folder mechanisms respectively coöperating with said main carriers and main cutter and collecting devices, and a delivery device adapted to receive papers in sections derived from webs running from one or more of said formers and running on one or both of said main carriers; or to receive in succession papers in sections derived from webs running from one of said formers and carried on one of said main carriers and folded by one of said folder mechanisms; or to receive in succession papers in sections derived from a plurality of webs running from a plurality of formers and associated on one of said main carriers and folded by one of said folder mechanisms.

41. The combination of a plurality of formers, a pair of opposite main carriers each adapted to carry a web, or a plurality of associated webs, running from any or all of said formers, main cutters coöperating with said main carriers respectively, folder mechanisms coöperating with said main carriers respectively, and a delivery device located to receive papers in pairs derived from webs running on said plurality of formers and carried on both of said main carriers and folded by both of said folder mechanisms; or to receive in succession papers derived from webs running on one of said formers and one of said carriers and folded by one of said folder mechanisms; or to receive in succession papers derived from a plurality of webs running from said plurality of formers and associated on one of said main carriers and folded by one of said folder mechanisms.

In witness whereof I have hereunto subscribed my name at Springfield, Illinois, this 27th day of September, 1907.

JOHN A. BOYCE.

Witnesses:
EDWIN A. WILSON,
JESSIE J. NETTLETON.

Corrections in Letters Patent No. 950,014.

It is hereby certified that in Letters Patent No. 950,014, granted February 22, 1910, upon the application of John A. Boyce, of Springfield, Illinois, for an improvement in "Apparatus for Associating, Cutting, Collecting, Folding, and Delivering Newspapers," errors appear in the printed specification requiring correction as follows: Page 1, line 72, after the word "reference" the words *letters and* should be inserted; page 7, lines 78–79, the word "splitters" should read *slitters*, and same page, line 81, the word "to" should read *of*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of July, A. D., 1910.

[SEAL.]

F. A. TENNANT,
Acting Commissioner of Patents.

rier mechanism and each adapted to carry sheets cut from a web or webs running from any of said formers and inserted with a web, or associated webs running from any of said formers onto either of said main carrier devices and associated before cutting, or to carry cut sheets derived from a web running from any of said formers and inserted with a plurality of associated webs running from one or more of said formers onto said main carrier device and associated thereon before cutting; cutter devices adjacent to said main carrier devices respectively and adapted to cut into sheets webs running from one or more of said formers to said main carrier devices respectively, or to cut into sheets associated webs running from a plurality of said formers to and associated on one main carrier device; folder mechanisms coöperating with said main carrier devices respectively and a single delivery device adapted to receive folded papers with supplements, derived from webs running from any of said formers, or papers with supplements derived from associated webs running from a plurality of said formers and associated before cutting.

40. The combination of a plurality of formers, a pair of opposite main carriers each adapted to carry a web or a plurality of associated webs running from any or all of said formers, main cutter and collecting devices coöperating with said main carriers respectively, folder mechanisms respectively coöperating with said main carriers and main cutter and collecting devices, and a delivery device adapted to receive papers in sections derived from webs running from one or more of said formers and running on one or both of said main carriers; or to receive in succession papers in sections derived from webs running from one of said formers and carried on one of said main carriers and folded by one of said folder mechanisms; or to receive in succession papers in sections derived from a plurality of webs running from a plurality of formers and associated on one of said main carriers and folded by one of said folder mechanisms.

41. The combination of a plurality of formers, a pair of opposite main carriers each adapted to carry a web, or a plurality of associated webs, running from any or all of said formers, main cutters coöperating with said main carriers respectively, folder mechanisms coöperating with said main carriers respectively, and a delivery device located to receive papers in pairs derived from webs running on said plurality of formers and carried on both of said main carriers and folded by both of said folder mechanisms; or to receive in succession papers derived from webs running on one of said formers and one of said carriers and folded by one of said folder mechanisms; or to receive in succession papers derived from a plurality of webs running from said plurality of formers and associated on one of said main carriers and folded by one of said folder mechanisms.

In witness whereof I have hereunto subscribed my name at Springfield, Illinois, this 27th day of September, 1907.

JOHN A. BOYCE.

Witnesses:
EDWIN A. WILSON,
JESSIE J. NETTLETON.

Corrections in Letters Patent No. 950,014.

It is hereby certified that in Letters Patent No. 950,014, granted February 22, 1910, upon the application of John A. Boyce, of Springfield, Illinois, for an improvement in "Apparatus for Associating, Cutting, Collecting, Folding, and Delivering Newspapers," errors appear in the printed specification requiring correction as follows: Page 1, line 72, after the word "reference" the words *letters and* should be inserted; page 7, lines 78–79, the word "splitters" should read *slitters*, and same page, line 81, the word "to" should read *of*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of July, A. D., 1910.

[SEAL.]

F. A. TENNANT,
Acting Commissioner of Patents.

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[SEAL.]

F. A. TENNANT,

Acting Commissioner of Patents.