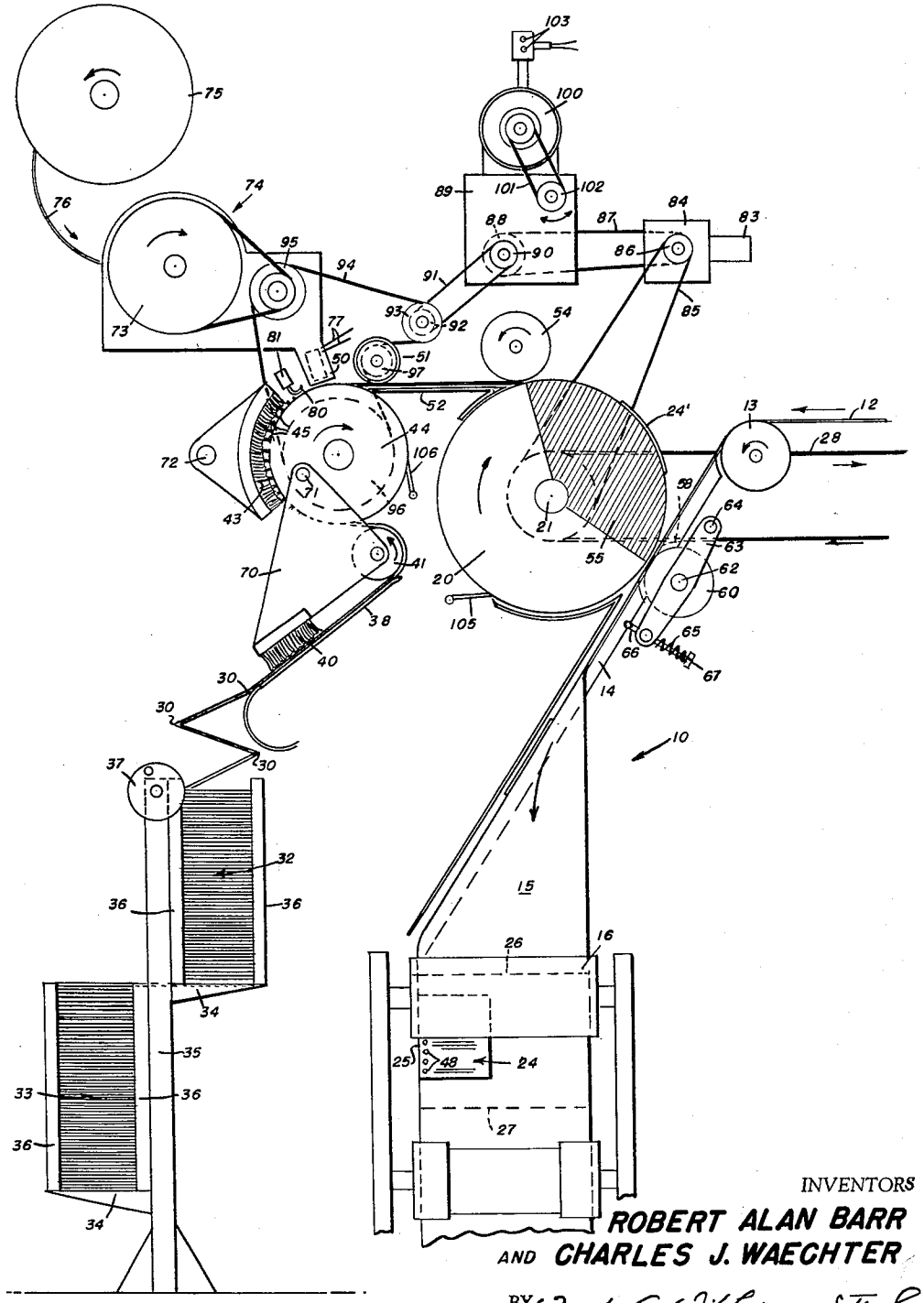
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OUTSERT APPLYING APPARATUS

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OUTSERT APPLYING APPARATUS

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This invention relates to apparatus for automatically applying outserts to a web running at high speed and correlating each outsert to one of a number of equal printed page areas on the web and more particularly to apparatus in which the outserts are preprinted on a strip having a transversely weakened line between each two outserts for easy severance before attachment.

It is a general object of the present invention to provide novel and improved apparatus for applying outserts at predetermined locations onto a web travelling at high speed.

More particularly it is an object of the present invention to provide apparatus for handling outserts printed on a continuous strip and connected by lines of weakness whereby they may be continuously fed at a slower linear speed than the web by interfitment with a driven roll, supplied with a stripe of adhesive while on the roll, and delivered over a guide path to the nip between a resilient and a suction roll which latter has the higher linear web speed to thereby sever the outserts successively along said lines and deliver them one to each desired position on the web for adhesion thereto.

Another important object of the invention comprises the provision of means interposed in the drive for said driven roll whereby its standard lower linear speed than the suction roll may be temporarily changed to adjust the position of each outsert longitudinally of the web for phase adjustment in respect to repetitive areas thereon.

Still another important object of the invention resides in the use of a crown roll so positioned in the guide path between the driven roll and the suction roll as to impart transverse curvature to the outsert strip near a line of weakness when the strip leading edge is engaged by the nip of the resilient and suction rolls to facilitate severance of the leading outsert for delivery by the suction roll to the web.

A further important object of the invention resides in the positive drive of the suction-roll from the press and the use of a clutch in the drive for a differential which provides for the phase adjustment, whereby when the clutch is released the outsert apparatus may be separately driven by the motor used to supply the phasing adjustment thus facilitating the threading of the outsert apparatus.

Other and further objects and specific features of the invention will be more apparent to those skilled in the art upon a consideration of the following specification and the accompanying drawing wherein is disclosed a single exemplary embodiment of the invention with the understanding that such changes and modifications may be made therein as fall within the scope of the appended claims without departing from the spirit of the invention.

In said drawing:

The single figure is a schematic and diagrammatic side elevational view of a portion of a newsprint or similar press and the outsert applying appratus of the present invention.

It is often desired by the publishers of newspapers, magazines, periodicals, catalogues, circulars, and the like to apply what may be termed an "outsert" to the outer sheet or cover of each publication for the purpose of directing the attention of the most apathetic reader to some particular advertising, special subscription offer, gift coupon, or the like, publicizing some product in a more attention-attracting manner, or to offer order blanks, samples of certain products, or provide other similar attachments which may be readily removed and used or sent in to the publisher or advertiser for premiums, special sale offers and other purposes. The web itself may be unprinted for subsequent use as a wrapper, insert, stuffer or the like.

Such outserts have heretofore been applied by hand or by semi-automatic machinery and usually after each copy of the newspaper, magazine or periodical has been completed. In accordance with the present invention the operation is wholly automatic and the outserts are applied at the proper position to successive or alternate printed areas of page designation on a continuous web running at high speed prior to cutting it into the final sheet sizes. The present device is capable of applying as many as 10 outserts per second and easily maintains a production rate of 6 per second which is from 2 to 2½ times faster than any machine available commercially.

For illustrative purposes only the invention is shown as applied to the folder section of a newsprint press designated generally by the reference character **10** and disclosing a printed web **12** approaching from the right passing over an idler roll **13** and then over a folder-former **14** which is generally triangular in shape tapering toward the bottom to fold the web into overlying half widths as indicated at **15** where it is delivered to folder rolls **16** appropriately driven, by means not shown, from the press and fed to cutting and assembling mechanism of conventional form.

The web indicated by the reference character **12** may be single or multiple, either of which arrangements is more or less conventional in newsprint presses.

Mounted for co-operation with the upper web surface as it runs over the folder **14** is the suction-roll or outsert applicator **20** supported on shaft **21** a suitable distance from the folder-former, or any other surface over which the web may be running, to accommodate the maximum number of plies which may be assembled at any one time. Actually no former, support or folder is necessary and the web may merely pass unsupported from idler **13** to another, not shown, and between them over the surface of the suction-roll where it may have a more substantial arc of contact, if desired, rather than the line contact resulting from the tangency indicated.

As shown at the lower portion of the folder mechanism, the outsert **24** is preferably a rectangle of any suitable paper or similar web material preprinted to contain the desired information and secured at any appropriate position on the travelling web **12**, preferably near its left or fold edge **25** and near the upper edge **26** of what will be the outer page or cover which is indicated between dotted lines **26** and **27**. Preferably the outsert is attached by a narrow stripe of adhesive along its left edge which is secured to the margin of the printed web so that detachment is facilitated without destroying any of the printing on the main page or the outsert. On the other hand, where the printing lines are arranged longitudinally of the web rather than across in the more conventional manner, as for instance in tabloid newspapers or magazines the outsert apparatus is adjusted to apply the adhesive to the appropriate area on the outsert to achieve proper mounting thereof.

During the operation of the outsert applying apparatus it is desired to maintain phasing of the outsert and the page areas on the printed web **12** and for the purpose the outsert machine is driven by and at a particular speed in relationship to that of the press and indicated at **28** is a chain or other appropriate power driving means associated with a sprocket on suction-roll **20** for the purpose, the arrangement being such that the suction-roll is always driven at press speed and from the press as long as the

latter is in motion. "Press-speed" in this case means that the peripheral speed is that of the travelling web.

The outserts 24 are preprinted on a continuous strip or web of material which is perforated transversely to permit severance into desired outsert lengths and is then either folded back and forth on the perforation lines, as seen at 30, and formed into a stack of appropriate height for convenient handling, or formed into a suitable roll for use. Two such stacks are shown at 32 and 33 supported from platforms 34 vertically adjustable along or between a pair of spaced standards 35 supported from the floor as shown. The platforms 34 and their vertical corner extensions 36 are mounted on opposite sides of the guides 35 and simultaneously adjustable in opposite directions by mechanism 37 at the top of the guides so that either may be brought to the position of the uppermost one indicated.

In starting a day's run or an edition the lowermost platform 34 (here shown as the left one) is first loaded with a stack of printed alternately folded outserts in the web form, one is drawn between the standards 35 and positioned on the right-hand platform and there adhered to the lowest one in the stack which is now mounted or positioned on the upper platform so that continuous feeding may be had from both platforms successively. As soon as the upper one becomes empty it is lowered while the one still filled is lifted. The lowered one is then charged with a stack of folded outserts and the leading one secured to the lowest in the stack on the other side and this practice is continued alternately as the piles are depleted.

The outserts are withdrawn from the uppermost stack over the surface of guide plate 38 having the curved lower end to facilitate unfolding and passed beneath retarding brush 40, about idler roll 41 and then between curved retarding brush 43 and the surface of pin roll 44. This is a piece of standard equipment fitted with radially slidable pins 45 spaced circumferentially about one edge of the roll at appropriate intervals to be received in the perforations 48 shown adjacent the left edge of the outsert sheet 24 on the web in the folder-rolls.

Mechanism, of known form, projects the pins outwardly beyond the surface of pin roll 44 and retracts them beneath the surface in a continuous operation as the roll rotates as shown by the arrow. The extent of the arc through which the pins are started to protrude through the surface, advanced to their maximum protrusion, and are retracted until they disappear beneath the surface of the roll can be adjusted to suit conditions and here it is preferred that the arc be somewhat less than the surface contacted by the web of outserts travelling over it from the contact beyond the idler roll 41 to the separation point near the zenith of the roll as viewed in the figure.

When the outsert web is properly started so that the pins pass through the apertures 48 in the web edge, the web is thereafter continuously driven and withdrawn from its stack and passes over the pin roll 44 without any relative slippage so that it can be fed to the suction-roll in proper timed relationship as desired and as will be further discussed later. The brush 43 which is sufficiently narrow to avoid the openings 48, ensures holding the web down while the pins are moving in and out of the openings and prevents it from being lifted from the roll should there be any slight inaccuracies so that the pins rub on the edges of the apertures in the web.

Just before the web leaves the pin roll 44, against which it is positioned face or printed side down, a stripe of adhesive is applied between the line of pin holes and the adjacent edge by means of the stationary adhesive distributor nozzle 50. Almost immediately thereafter the web of outserts leaves the surface of pin roll 44, passes beneath crown roll 51 which is grooved to clear the adhesive, travels over bridge 52 extending between the pin roll and the suction-roll 20 and passes into the nip between suction-roll 20 and rubber roll 54 driven thereby. The latter is also grooved to clear the adhesive.

The linear speed of the web of outserts effective from its contact with the pin roll 44 is substantially less than the linear speed of the surface of suction-roll 20 since each outsert is shorter than the page to which it is applied. When the leading end of the outsert web comes under the control of faster running suction-roll 20 at its nip with rubber roll 54 the web above the bridge 52 is stretched in endeavoring to increase its speed to accommodate that of the suction-roll. The distance between lines of perforation which designate the individual outserts 24 is only slightly less than the distance between the nip of rolls 20 and 54 and the surface of crown roll 51. This latter roll is substantially crowned at its center and hence the tension due to the disparity in speeds of the two ends of the portion of the web passing over the bridge 52 increases first in the longitudinal center of the web thus causing the perforation to break in the vicinity of the crown roll. The break starts in the center and the tears extend rapidly laterally to the edges, severing the leading outsert which is already grasped by the stationary suction area of roll 20 as is indicated in cross-hatching and by the reference character 55. The succeeding outsert is still gripped by a few pins on roll 44 so as to prevent severance taking place at its trailing edge.

The severed outsert immediately draws away from the now leading end of the web by reason of the preponderance of speed of the suction-roll and the separated outsert is carried along at the speed of web 12 by the suction-roll, held closely against its surface by the action of the suction through its perforations. Such an outsert is shown at 24^1 being carried along by the suction-roll whose vacuum ensures against separation of the outsert until its leading edge engages the web 15, when it is progressively released as it leaves the stationary suction area of roll 20 which terminates substantially at the line of tangency of web and suction roll.

One longitudinal edge of the outsert is coated with a stripe of adhesive, which is preferably of the temperature-setting type, i.e. upon cooling it sets. However, the outsert moves so rapidly from the adhesive applicator until it is brought into contact with the travelling newsprint web 12 that setting does not take place until after contact is made. Being tacky on contact contributes to good adhesion.

The spacing between the surface of the suction-roll and the folder-former may not be sufficiently close to effect adequate pressure to ensure good adhesion between the outsert on the web 12 and, therefore, a slot 58 is provided in the former-folder (if one is used as a base) in line with the stripe of adhesive on the outsert and the pressure roll 60 forces the newsprint web, irrespective of the number of plies thereof, against the undersurface of the advancing outsert and rolls down the adhesive ensuring adequate contact and adherence. This roll is shown pivoted at 62 to one or two arms 63 fulcrumed at 64 to a portion of the frame of the machine and forced down by an adjustable helical spring 65. This spring surrounds rod 66 secured to the undersurface of the former plate, and extending through a perforated stud on the opposite end of arm 63, against which stud the end of spring 65 bears, a nut 67 being provided to adjust the spring compression.

The frame structure for the apparatus has not been illustrated except in isolated spots, but it may be pointed out that the brush 40 and idler roll 41, first contacting the outsert web as it is drawn from the stack, are carried on a plate 70 pivoted at 71 to a frame part, whereby they may be swung simultaneously to facilitate threading the machine. In a similar manner the brush 43 may be swung away from the pin roll to facilitate threading and is pivoted at 72 to a pivoted arm, not shown.

The adhesive applicator 74, may be of most any recognized type, such as one handling liquid adhesive including a solvent or any other of the suitable adhesives, but actually the apparatus shown makes use of a heat-softened

adhesive in rope or cord form 76. A reel 75 holds a supply of adhesive which is fed through the machine by suitable gripping rollers driven by pulley 73 and eventually passes adjacent heated surfaces which melt it so that it is ejected in liquid form from nozzle 50 onto the edge of the outsert strip in the desired quantity determined by rate of rope feed. It could with equal facility be applied by a wheel as a continuous stripe or even dotted if desired. At 77 are shown conductors leading from a solenoid valve capable of shutting off flow of the liquefied adhesive in case the outsert apparatus is stopped.

In order to prevent the application of adhesive to the pin roll in the event that no outsert strip is being fed, roll 44 is provided, at a position displaced laterally from the adhesive stripe, with a groove and a safety detecting arm 80 is pressed against the web covering the groove so that in the advent of a breakage of the web or a failure to feed it, the arm 80 will move down into the groove and close switch 81 which shuts the adhesive valve and at the same time energizes coil 83 which releases clutch 84 and stops the drive of the outsert apparatus.

Suction-roll 20 is driven by any suitable mechanical drive such as chains 28 from the printing press and a separate sprocket on the shaft of this roll drives chain 85 running over sprocket 86 on the input side of clutch 84. The output side of the clutch, by means of chain 87, drives pulley 88 on a shaft projecting from the rear face of differential housing 89. A separate shaft extending from the front face drives sprocket 90 which through chain 91 drives sprocket 92 and its companion sprocket 93 over which a chain 94 passes that drives sprocket 95 of the adhesive feeder and from thence passes around a large sprocket 96 on the pin roll, thence over small sprocket 97 on the crown roll and back to sprocket 93.

By appropriately sizing the sprockets the surface speed of the pin roll and the crown roll can be adjusted to be such as to supply one outsert for each page on web 12 and hence lower than the surface speed of the suction-roll to effect the breakage of the outserts from their strip in a manner explained previously because of speed disparity.

The clutch 84 serves the purpose of permitting the outsert applying apparatus, except for the suction-roll to be disconnected from the power if for any reason it is not required or needs attention. It also permits the outsert feed apparatus to be stopped or started regardless of press speed, thus permitting the placing or elimination of outserts from any given number of printed page areas or even editions. By waiting for the press to attain running register and stability before starting the outsert machine no waste of high revenue producing outserts occurs.

If when starting up afresh an outsert strip is manually positioned onto the pin roll and if outserts are found to be presented to the printed pages on web 12 in wrong positions, the phasing may be corrected by momentarily driving electric motor 100 either forwardly or backwardly by pushing one of buttons 103 as required, and this through chain 101 drives sprocket 102 so associated with the differential mechanism as to add to or subtract from the speed of the differential output shaft sprocket 90 during the time that motor 100 is being driven. Thus by judicious use of the switch buttons the operator can properly phase the outserts on the printed sheets, for instance of the newsprint web, and after they are once properly positioned the phasing will remain constant until the outsert web is broken and/or re-started.

With clutch 84 disengaged the nature of the differential drive 89 is such that the motor 100 may be used to drive the outsert apparatus to facilitate threading the outsert web, testing the adhesive applicator, etc.

The arrangement for driving the outsert apparatus must be adjusted to operate at such a speed that one outsert is fed each time a web sheet area which requires the outsert attachment passes the application position, and by appropriate adjustment of sprocket diameters arrangement can be made to adhere an outsert to every sheet on the printed web, to every sheet or in any specific arrangement desired.

The suction-roll is shown as provided with an appropriate doctor blade 105 positioned to remove from the surface thereof any outsert which has failed to become adherent to the travelling newsprint web and also to remove any adhesive material which may have accidentally coated its surface.

In a similar manner a doctor blade 106 co-operates with an inactive area of pin roll 44 to remove any adhesive which is inadvertently applied thereto in the absence of a web on the roll.

It has already been pointed out how the outserts are phased or adjusted to the desired positions longitudinally of the running web. If lateral adjustment is desired to achieve specific placement of the outserts and/or side shift is required to compensate for "wander" of the web on the press rolls then the mountings for the pin-wheel and feed sections of the outsert machine may be provided with manual or automatic lateral shifting mechanism to maintain correct side register on the web, and/or to achieve outsert mounting intermediate the edges of the web or substrate.

We claim:

1. Apparatus for applying outserts at uniformly spaced-apart locations to a web of paper travelling at a high uniform speed from a web treating machine, comprising in combination, an applicator roll mounted for rotation and driven at the speed of and in constant angular contact with said web, a resilient roll rotating and providing a nip with said applicator roll angularly spaced ahead of said web contact, means for supporting a supply of a continuous strip of lightly connected printed outsert areas of uniform length having a line of equally spaced perforations along one edge of the strip, a wheel having pins projecting from its periphery to engage in said perforations to advance said strip, means to drive said wheel from said machine at a fixed lesser peripheral speed than said web, means to apply a continuous narrow stripe of tacky adhesive to said strip as it moves over said wheel, means to guide said strip from said wheel to said nip on said applicator roll and of a length greater than the length of an outsert, a breaker roll engaging said strip at a distance not substantially greater than an outsert length from said nip and less than that length from pin engagement with the next outsert on said strip, said breaker roll being of circular cross-section but having portions of different diameters to stress the strip non-uniformly of its width to thereby start a tear at the weakened area nearest to said breaker roll at the beginning of leading outsert speed increase under the action of said nip, said applicator roll being perforated throughout its circumference, and means to apply a suction to said applicator roll in only the partial circumferential area extending substantially between said nip and the beginning of said web contact to thereby carry severed outserts into engagement with said web for adhesion thereto.

2. The apparatus defined in claim 1 in which the said web contains successively defined areas of sheet size larger than an outsert, and means interposed in said means driving said pin wheel from said machine for temporarily superimposing an incremental speed change on the pin wheel driving means to change the phasing of the outserts on the sheet areas.

3. The apparatus as defined in claim 2 in which said interposed means is arranged to drive the pin wheel independently of the web treating machine for initial set-up purposes.

4. The apparatus of claim 1 in which a spring pressed wheel engages the rear face of said web directly beneath the said adhesive stripe on the outsert being applied thereto and forces the web and outsert against the applicator roll to squeeze the web and outsert together

along said adhesive stripe independently of any other support for the web.

5. The apparatus of claim 4 in which a doctor blade engages said applicator roll as it leaves said spring pressed wheel to separate any outsert therefrom resulting from a faulty lack of web moving over said applicator roll.

6. The apparatus of claim 1 in which said pin roll is grooved circumferentially in an area engaged by said strip but out of the path of the adhesive, detector means riding the strip above said groove to determine strip absence, and means actuated by movement of the detector means into the groove to stop the delivery of adhesive.

7. The apparatus of claim 3 in which the applicator roll is always driven from and at the linear speed of the web treating machine, said interposed means comprising a differential gearing driven by said press and having an output and a secondary input, connecting said output to said means pin wheel to drive the strip at said less speed than the web, and a motor connected to said secondary input to temporarily increase or decrease the relative speed of the strip in relation to the speed of the web for phasing purposes.

8. The apparatus of claim 7 in which a clutch is interposed between said press and said differential gearing whereby the outsert strip may be threaded and advanced to the applicator roll by driving the differential by said motor without driving the web treating machine.

9. The apparatus of claim 1 in which said breaker roll for the adhesived strip is positioned for the strip to pass under it and a crown roller spaced a distance not substantially greater than an outsert length from the position where the strip engages the applicator roll whereby the strip is transversely bowed adjacent its weakened location not more than one outsert length prior to nip engagement by the leading edge of the strip to facilitate severance.

10. Apparatus for applying outserts at uniformly spaced locations to a web of paper having successive equal printed page areas spaced therealong and travelling at a high uniform speed through a web treating press, comprising in combination, a suction roll mounted for rotation at the speed of and in small constant angular contact with said web, a resilient roll rotating and providing a nip with the suction roll remote from said web contact, a continuous strip of material having uniformly spaced transversely weakened lines defining lightly connected printed outsert areas of less length than said page areas, said strip having a line of perforations along one edge thereof, a conventional driving pin wheel for said strip, storage means for said strip, means guiding said strip from said storage means to said pin wheel including braking means, means to eject a stripe of adhesive onto one edge of said strip as it moves over said pin wheel, guide means for said strip between the pin wheel and suction roll and including a crown roller engaging the strip at a distance not substantially greater than an outsert length from said nip and less than that length from pin engagement with the next outsert on said strip, differential means driving said pin wheel and crown roller at the same peripheral speeds but less than the peripheral speed of said suction roll, a driving connection between said differential and said press and including a clutch, and a motor arranged to drive said differential to increase or decrease the difference in linear speeds between the suction roll and pin wheel to change the position of the application of each outsert to a page area on the web under the delivery action of said suction roll.

11. The apparatus of claim 10 in which the difference in peripheral speeds of the suction roll and pin wheel effects tearing of the strip at the weakened area near contact with the crown roller, a resilient pressure roll not substantially wider than said adhesive stripe, and means mounting said roll for resilient contact with the undersurface of the web where it engages the suction roll and along the line of said stripe to cause adhesion of the outsert to the web.

References Cited in the file of this patent

UNITED STATES PATENTS

1,431,456	Cox	Oct. 10, 1922
1,856,659	Sanfanander	May 3, 1932
2,062,280	Aanesen et al.	Dec. 1, 1936
2,209,765	Cormack	July 30, 1940
2,363,417	Heywood	Nov. 21, 1944
2,678,748	McCain et al.	May 18, 1954
2,723,604	Fischer	Nov. 15, 1955

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,083,009 March 26, 1963

Robert A. Barr et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 64, for "appratus" read -- apparatus --; column 6, line 2, after "every" insert -- other --; column 7, line 17, before "connecting" insert -- means --; line 18, strike out "means".

Signed and sealed this 3rd day of December 1963.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWIN L. REYNOLDS
Acting Commissioner of Patents