

March 5, 1968

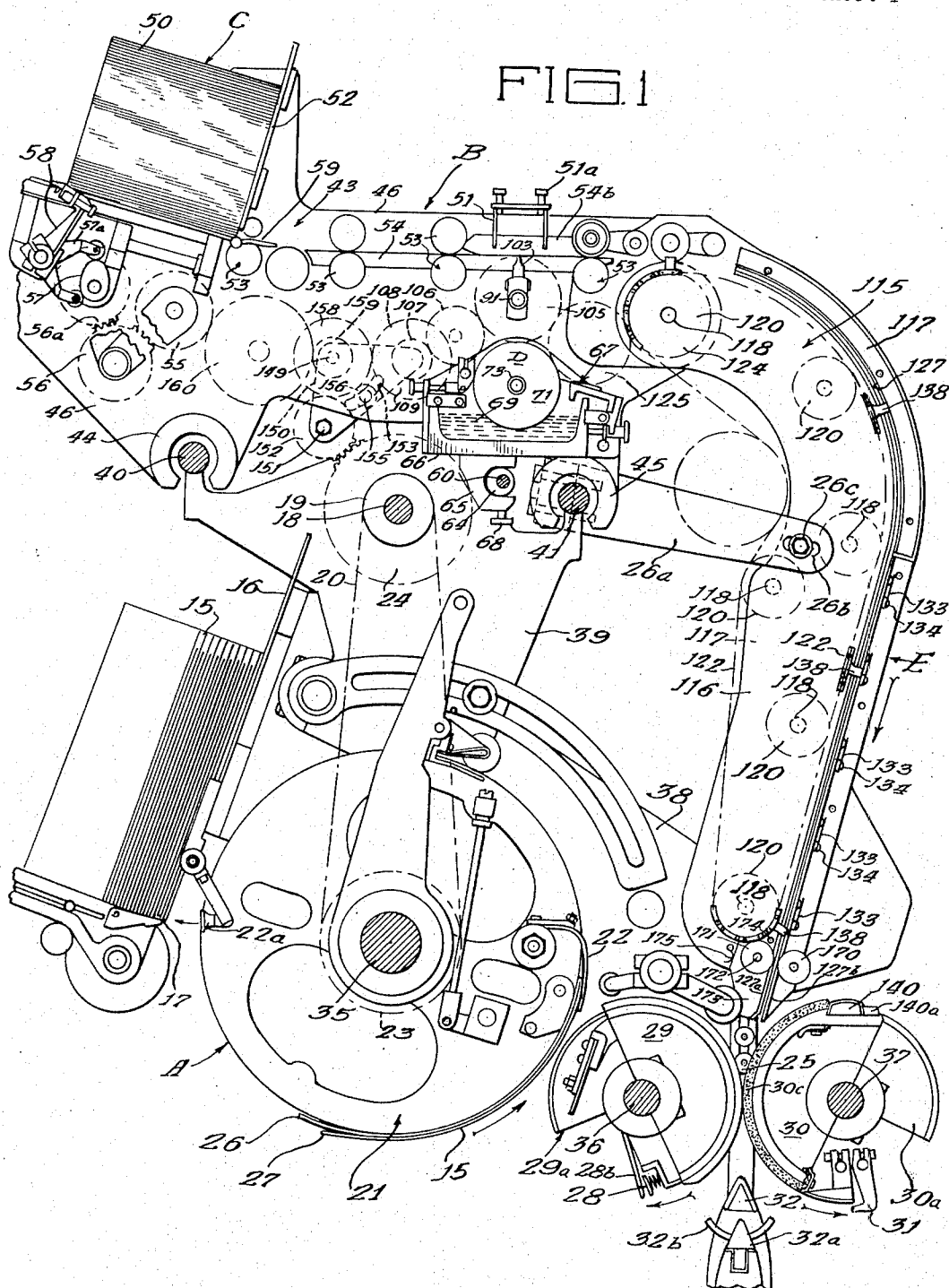
E. A. NELSON ET AL

3,371,924

APPARATUS FOR TIPPING INSERTS INTO A SADDLE STITCHED BOOK

Filed March 7, 1966

6 Sheets-Sheet 1



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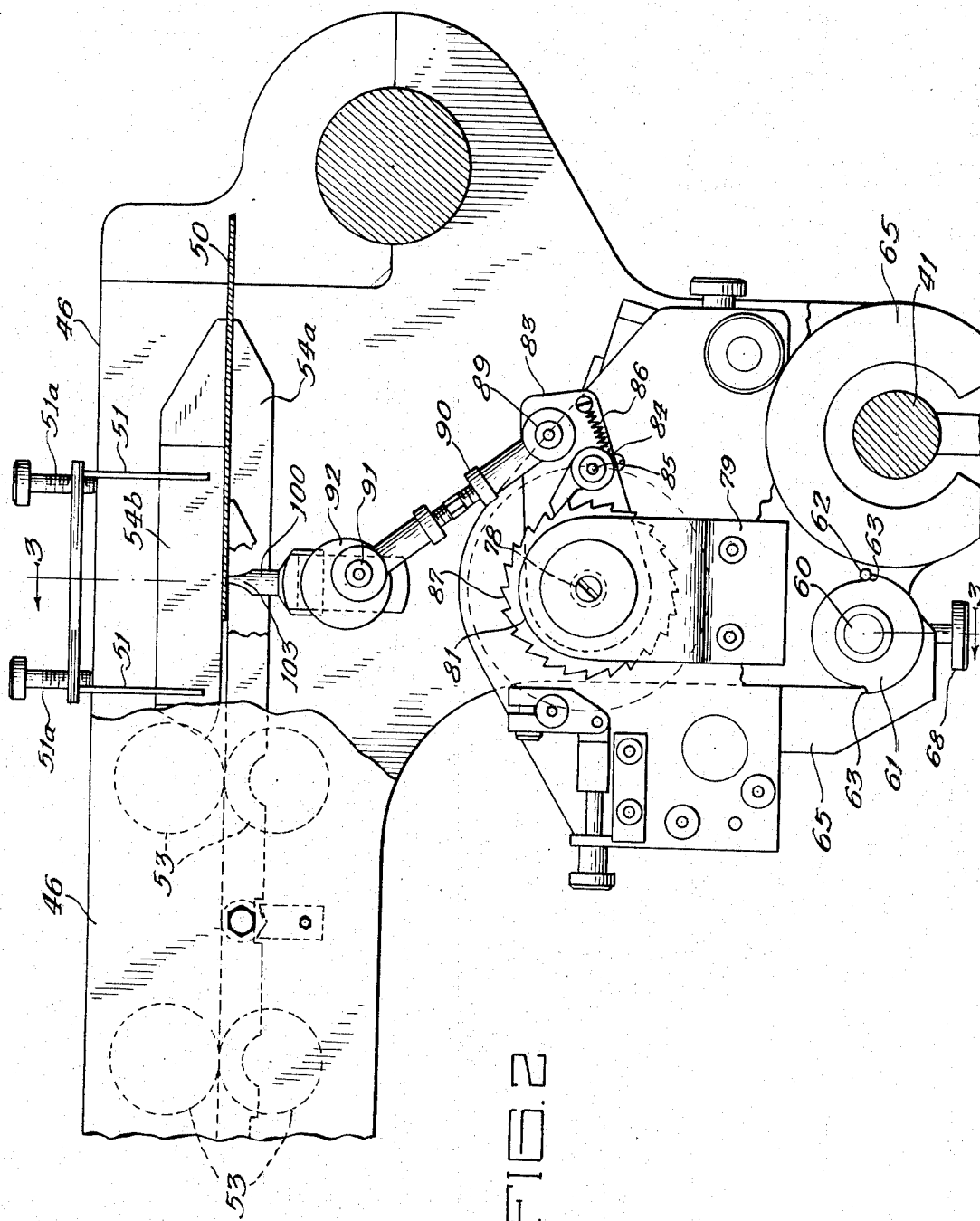
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6 Sheets-Sheet 3

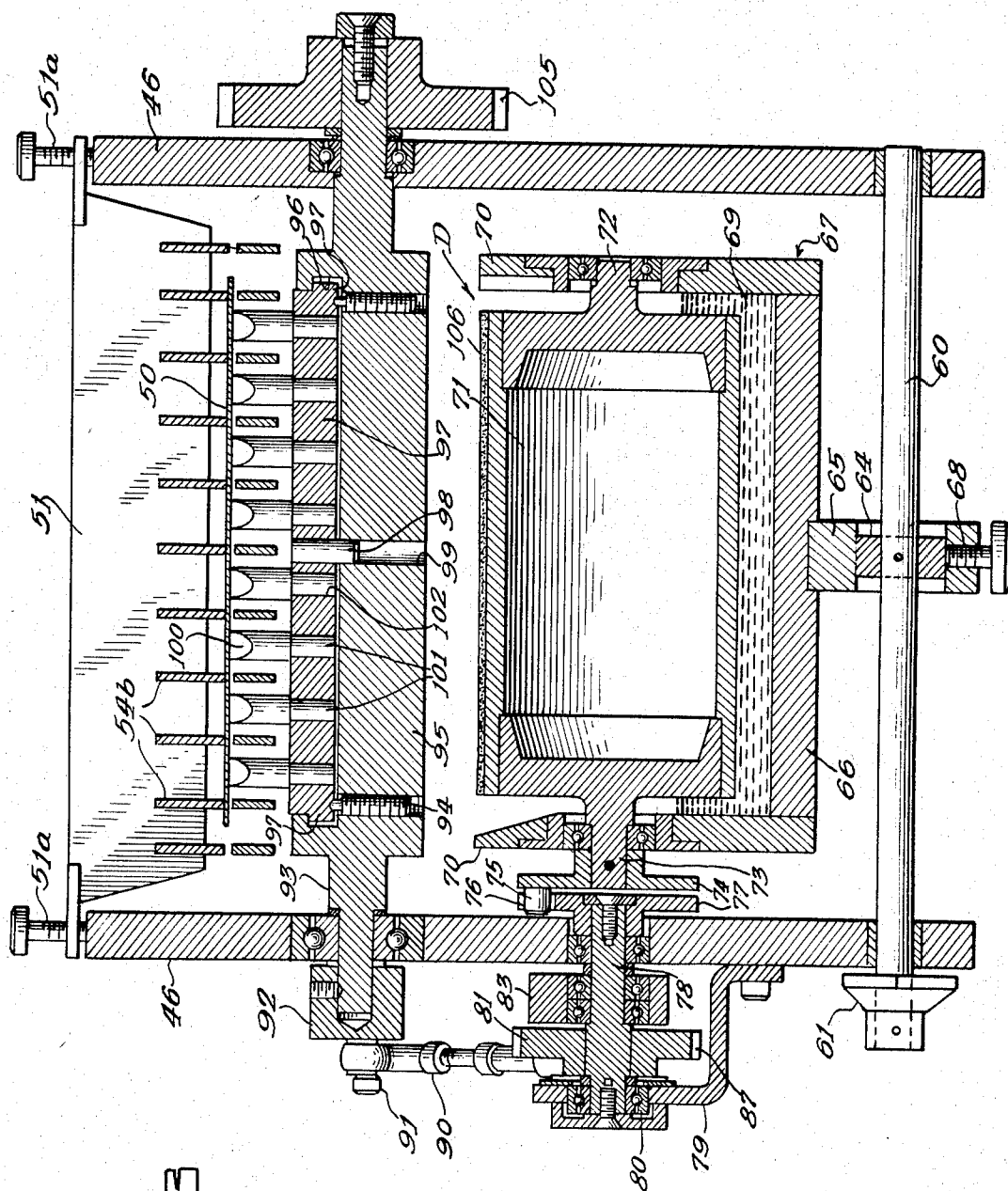


FIG. 3

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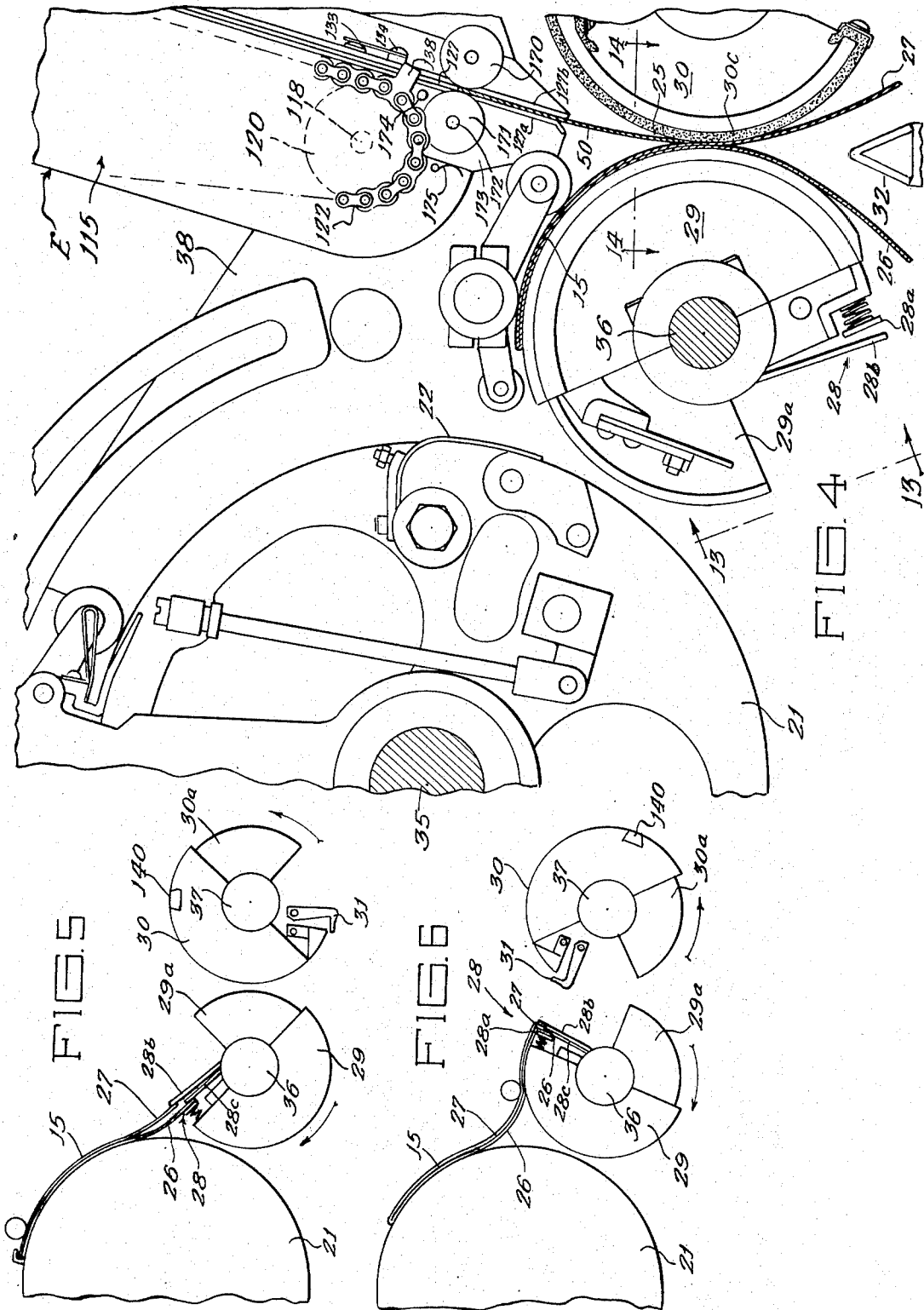
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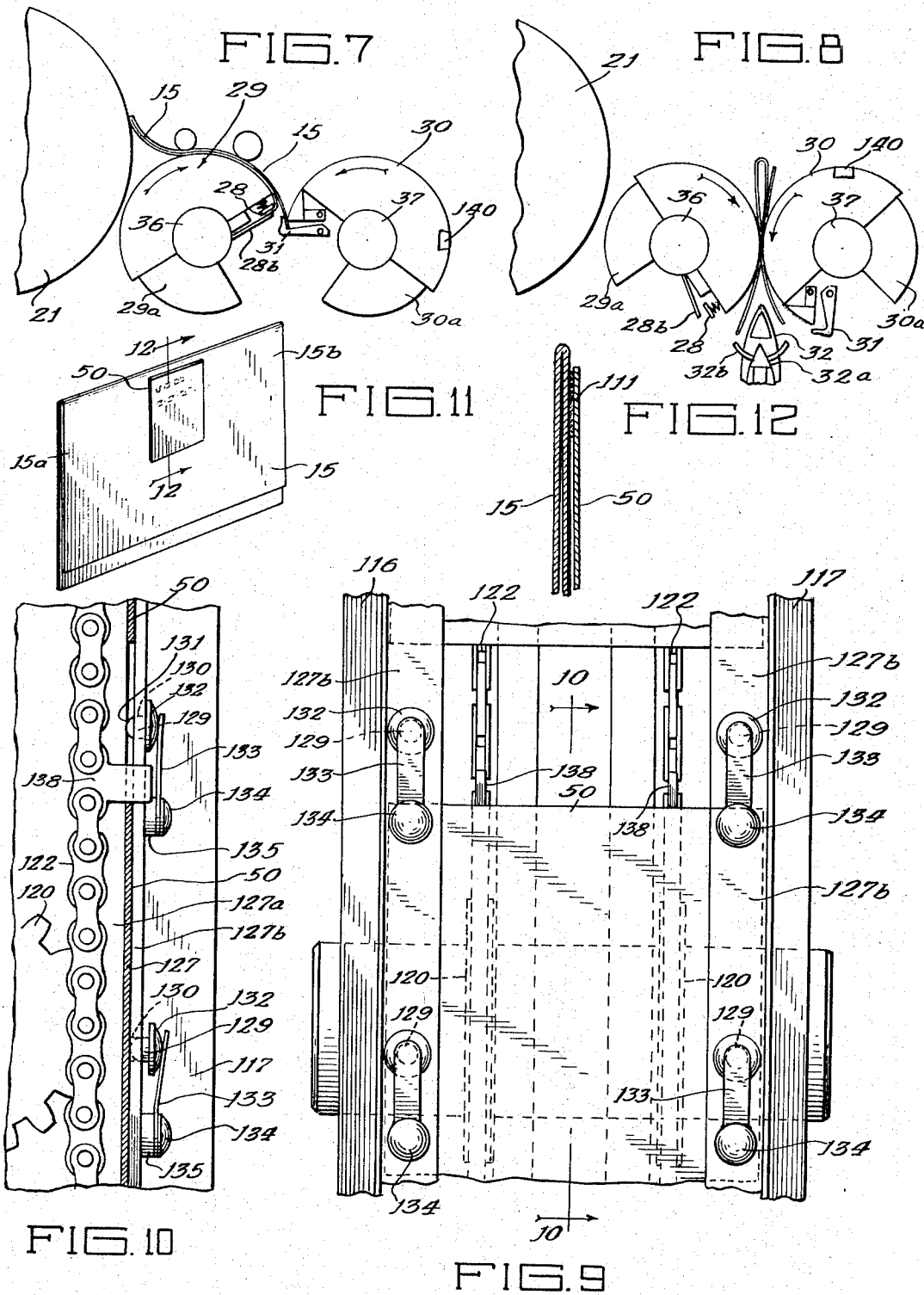
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FIG. 13

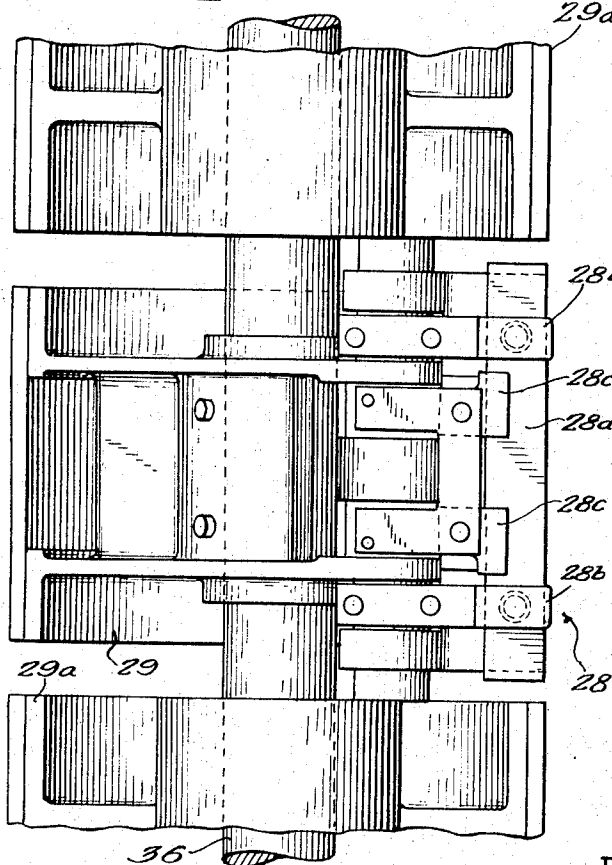


FIG. 14

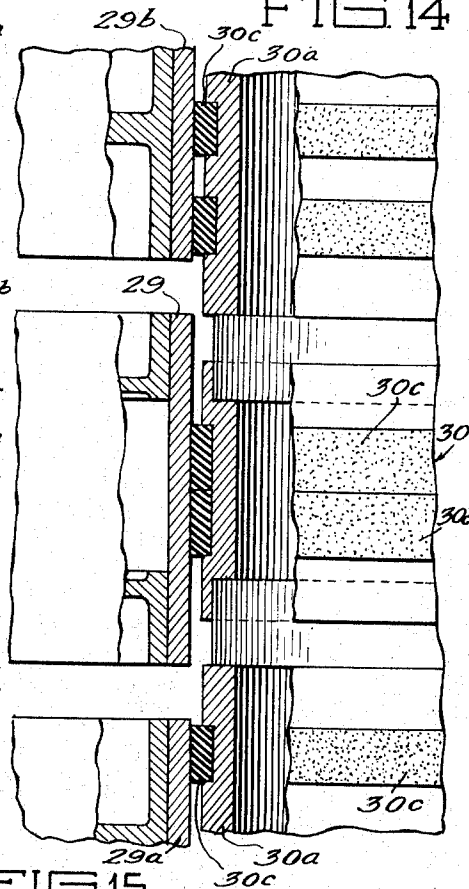
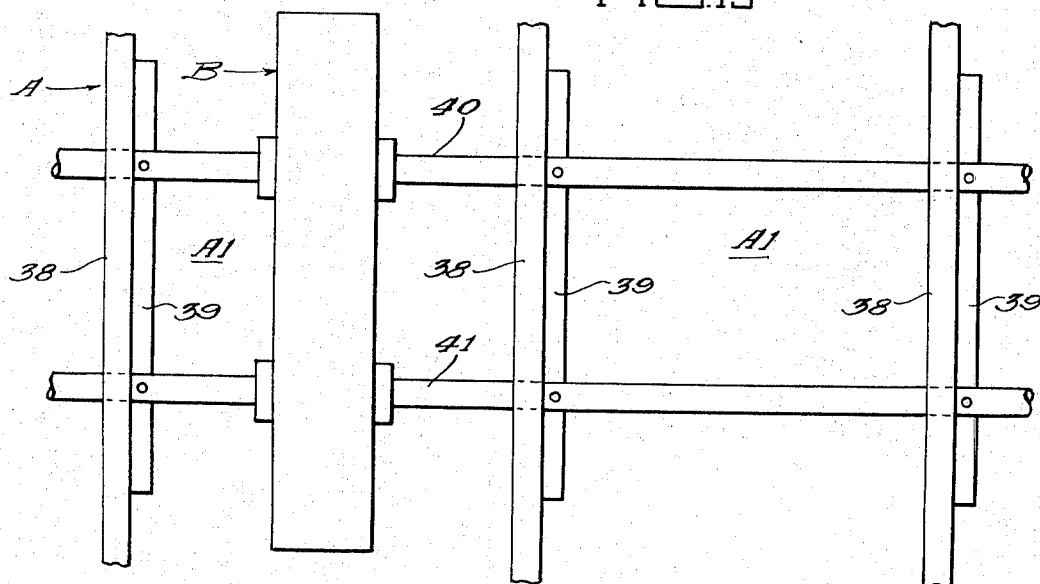


FIG. 15



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APPARATUS FOR TIPPING INSERTS INTO A SADDLE STITCHED BOOK

Earle A. Nelson, Park Forest, and Louis Kostal, Lombard, Ill., assignors to R. R. Donnelley & Sons Company, a corporation of Delaware
Filed Mar. 7, 1966, Ser. No. 532,334
10 Claims. (Cl. 270—53)

ABSTRACT OF THE DISCLOSURE

Insert tipping apparatus for a signature feeding station of the type wherein a signature is opened by cooperating feed rollers and dropped on the saddle. A glue carrying insert is timely fed into the rollers in association with the signature, whereby the rollers press the insert onto the signature.

This invention relates to an attachment for a signature gathering machine for a saddle stitcher, and more specifically it relates to an apparatus for tipping—i.e., attaching an insert onto a page of a signature in such a signature gathering machine.

Saddle stitchers are commonly used for binding relatively thin books and periodicals, all referred to herein after as books. A signature gathering machine for a saddle stitcher has a row of signature supply boxes positioned alongside a traveling saddle, and means which remove individual signatures from each box, spread them, and deposit them on the traveling saddle so that the superimposed signatures for a book arrive at the end of the traveling saddle ready for stitching by means of staples.

Inserts are commonly placed between successive signatures by providing the insert with an attaching flap which is folded over the fold in the signature so the insert is against the first page of the signature and the flap is against the last page of the signature. A saddle stitched book containing such an insert between two pages near the front of the book has the flap extending between successive pages in the other half of the book where it may interfere with the material on those pages. The attaching flap may cause the book to fall open to the pages into which it extends, it may overlap the printed material on those pages in such a way as to interfere with reading, and it may cause stitching problems where it folds around the signature. Further, such inserts often consist in part of a removable postcard or the like; and if the perforations for removal of the card are not well formed, the book may be torn by efforts to remove the card.

The present invention contemplates adhesively attaching, or tipping, an insert to an outside page of a signature, with one edge of the insert immediately adjacent the fold, while the signatures are gathered for saddle stitching. The insert requires no attaching flap, so there is nothing extending between other pages of the book, there are no uneven stitching problems created by the tab overlap, and the number of inserts possible in a single book is increased.

It is, therefore, a principal object of this invention to provide an improved card insert mechanism that overcomes the problems of the prior art.

It is another object of this invention to provide an improved card insert apparatus for tipping an insert card onto a signature without overlapping the insert card between the signature and another signature.

Another object of this invention is to provide an improved tipping apparatus for applying adhesive to each insert card while advancing said insert card to an appropriate station for attachment of the insert card to a signature.

Still another object of this invention is to provide an

improved apparatus for tipping an insert card at any pre-selected location on a signature.

A still further object of this invention is to provide an improved apparatus for tipping an insert card to a signature which apparatus can be easily moved from one station to another to tip an insert card to any signature in the group of signatures.

Still a further object of this invention is to provide an improved tipping apparatus having improved means for applying the adhesive to each insert card.

The invention is illustrated in a preferred embodiment in the accompanying drawings, in which:

FIG. 1 is a vertical sectional view of a signature gathering machine with the insert tipping apparatus of the present invention associated therewith, part of a side plate of the apparatus being broken away to illustrate the gear train;

FIG. 2 is an enlarged broken away elevational view of the mechanism for applying adhesive to the inserts;

FIG. 3 is a sectional view taken substantially on the line 3—3 of FIG. 2;

FIG. 4 is an enlarged broken away elevational view of part of FIG. 1 where an insert and a signature come together for attachment of the insert to the signature;

FIGS. 5, 6, 7 and 8 are schematic views of the successive steps of transferring a signature from a pickup drum to and through a pair of rollers for attaching an insert to the signature and depositing the opened signature upon a traveling saddle;

FIG. 9 is a fragmentary front elevational view of a transport means for advancing inserts from a storage means to the signature feeding rollers;

FIG. 10 is a sectional view taken substantially on the line 10—10 of FIG. 9;

FIG. 11 is a perspective view of a signature with an insert attached thereto;

FIG. 12 is a sectional view taken on the line 12—12 of FIG. 11;

FIG. 13 is an enlarged plan view of a signature and associated rollers taken substantially as indicated by the line 13—13 of FIG. 4;

FIG. 14 is an enlarged fragmentary section taken substantially on the line 14—14 of FIG. 4; and

FIG. 15 is a schematic fragmentary plan view of a gatherer and inserter.

In the embodiments of the invention as shown and described in the drawings, similar reference numerals will be used for similar parts throughout the several views. Referring now to the drawings in detail, FIG. 1 shows the invention in combination with one transfer box A1 of a gathering machine A for a saddle stitcher. As previously indicated, a gathering machine has a box A1 for each signature of a book; and the several boxes contain all the signatures for the book. Each box mechanism includes a hopper and the mechanism for depositing signatures from the hopper onto a traveling conveyor chain, so that at the end of the traveling conveyor all the signatures for a book will have been gathered ready for stitching with staples. An apparatus for tipping inserts or cards to a signature, indicated generally by the letter B, is positioned on rails above the line of signature transfer A. The tipping apparatus B includes a means C for storing inserts or cards, means D for applying adhesive or attaching means to the inserts or cards, and means E for transporting or conveying inserts or cards to a junction with the signature transfer mechanism whereby the inserts or cards are tipped to a page of a signature. The signature with the insert or card attached thereto is then positioned over the traveling conveyor which progressively picks up other signatures on the way to the stitcher.

In particular, the signature transfer mechanism A as shown in FIGS. 1 and 4 is generally shown and described

in U.S. Patent No. 2,413,358 in the name of P. E. Kleineberg. The transfer mechanism A has a plurality of gatherer boxes A1 each of which has a supply of folded signatures 15 stacked in a hopper 16 with the crease or fold 17 of each signature against the bottom surface of the hopper. A signature extractor means next to the hopper 16 comprises a continuously counterclockwise rotating transfer drum 21, having grippers 22 which receive signatures seriatim from cam operated pivoting vacuum cups 22a that are mounted on the hopper 16. Grippers 22 grip the signature by its folded edge portion 17 and pull it completely out of the box 16 for transfer by the drum 21 to a point where the open ends 26, 27 of the signature just clear the transfer area. The grippers 22 release the signature 15 at a position where the open ends 26, 27 of the signature are urged out and away from the drum 21 and into position to be gripped by gripper means, indicated generally at 28, of a feed roller set 29 which cooperates with a feed roller set 30 to feed the signatures onto a fixed gatherer saddle 32.

As seen in FIG. 13, gripper means 28 includes a spring loaded fixed gripper 28a, a pair of long gripper fingers 28b and a pair of short gripper fingers 28c, both of which pairs of fingers are cam operated. The short fingers 28c clamp only the long signature sheet 26 against the fixed gripper 28a while the long fingers 28b clamp both the sheets 26 and 27 against said gripper 28a. Clockwise rotation of the roller 29 pulls the signature 15 from the drum 21 and advances it toward a nip area 25 between the feed rollers 29 and 30.

As the signature approaches the nip area long gripper 28b releases the short sheet 27 which snaps open due to being curved around the roller 29. Grippers 31 on feed roller 30 grip the short signature sheet 27 to spread the signature so that it straddles the fixed gatherer saddle 32. Signatures are slid from the saddle 32 by fingers 32a on a gatherer chain 32b which thus receives a signature from each gatherer box as it moves along in front of said boxes.

The step of removing a signature 15 from the stack and advancing it around the drum 21 and into operative connection with the first roller 29 for pick-up by said roller 29 is shown in FIG. 5. FIG. 6 shows the sheets 26 and 27 of the signature 15 clamped firmly against the fixed gripper 28a. FIG. 7 shows the long sheet 26 of the signature 15 still gripped by the gripper means 28 and with the short sheet 27 extending tangentially and about to be gripped by the cam operated grippers or fingers 31 on the counterclockwise rotating roller 30. As the rollers 29 and 30 continue to revolve, the gripper on the roller 29 and the fingers 31 on the roller 30 spread the sheets 26, 27 of the signature 15 so as to cause the signature to straddle the saddle 32a from which it is picked up by fingers 32b on a moving conveyor saddle 32.

A gathering machine of the type illustrated in Patent 2,413,358 has the feed rollers 29 and 30 only in the central area of the signatures, and since it may be desirable to locate an insert near the top or bottom of a page, supplemental rollers 29a and 30a (FIGS. 13 and 14) are mounted, respectively, on the shafts which carry the rollers 29 and 30 so that inserts fed by the mechanism B may be fully controlled as they are applied to the signatures. The rollers 29a, like the rollers 29, have rigid surfaces against which the signatures are supported; while the rollers 30 and 30a have circumferential sponge rubber strips 30c into which the surfaces of the rollers 29 and 29a press as seen in FIGS. 1 and 14, so that the signatures and the inserts are fully controlled as they pass between the rollers. Gatherers of the Kleineberg type commonly have a space between the rollers immediately above the fixed saddle so as to accommodate signatures of different thicknesses; but the present device requires such close control over the position of the signatures and the inserts that the space is eliminated in this machine.

The several transfer mechanisms of a gathering machine

A are driven from a common power source which rotates a shaft 35 upon which the transfer drum 21 is mounted, and which also rotates the shafts 36, 37 carrying the feed rollers 29 and 30.

Each signature transfer box A1 has a frame that includes a pair of upwardly extending side plates 38, and to mount the insert B each plate 38 is provided with an upwardly projecting bracket 39 on which two longitudinally extending parallel rails 40 and 41 are supported. The rails 40 and 41 may extend the full length of the gathering machine, bridging continuously from one box A1 to another; or alternatively, the rods 40 and 41 may be positioned over a few of the boxes A1.

A drive shaft 18 extends between the brackets 39 co-extensive with and parallel to the rails 40, 41 and has a sprocket 19 which is driven by a chain 20 connected to a sprocket 23 on the main drive shaft 35 so that the shaft 18 is continuously driven by the same source of power as drives the signature gathering mechanism. The shaft 18 has a large timing gear 24 mounted thereon between each pair of support members 39 so that all of said timing gears 24 are driven by said shaft 18.

The insert tipping apparatus B which forms the principal part of this invention is slidably supported on the rails 40 and 41 so as to be longitudinally adjustable relative to a signature in a gatherer box A1 and so as to be movable from box to box. As shown in FIG. 1, the insert tipping apparatus B includes a frame 43 which has a pair of side plates 46 connected by cross frame members. Each side plate 46 has a pair of spaced apart open roller bearing members 44 and 45 which partially encircle and ride upon the rails 40 and 41, respectively.

The insert storage means C includes a storage box 52 containing a stack of inserts 50 and is positioned between upstanding portions of the side plates 46 of the frame 43. Any one of several well known mechanisms for removing one card at a time from the bottom of a stack of cards in a storage box 52 may be employed to remove one insert 50 at a time in timed sequence from the storage box 52 and to advance said insert 50 toward driven rollers 53 of a conveyor 54. One such mechanism C is made by International Business Machines, Inc. and is sold as a Feed and Hopper mechanism. In brief, a gear and shaft 55 is geared to be driven by a power train connected to one of said timing gears 24 in a manner to be described hereinafter. The gear 55 drives gear 56 which in turn drives gear 56a for rotating the cam 57 on cam follower 57a which reciprocates an arm 58 for selecting and removing the bottom insert 50 from the stack of inserts in the box 52. The arm 58 that removes an insert from the box is timed through the gear train with the power source for the whole system so that as each insert 50 is removed from the box 52, the driven rollers 53 along the conveyor 54 will grip the insert 50 as it emerges along the guide 59 from the box 52 and is advanced in a spaced relation to the preceding and to the following inserts 50. Each time a signature 15 is removed from the storage box 16 of the signature transfer mechanism A, an insert 50 is removed from the bottom of the stack in the box 52.

The power train will now be described. A pair of generally triangular plates 150 are pivoted on a shaft 149 between the side plates 46 and support a shaft 151 upon which is mounted a gear 152. An arcuate slot 153 is formed through at least one plate 150 to receive a bolt 155 carried by one side plate 46 of the frame 43, and a nut 156 on the bolt clamps the plate 150 to the side plate 46. When the nut 156 is loosened the plates 150 can be pivoted about the shaft 149 so as to engage the gear 152 with the timing gear 24 carried by the shaft 18 of the signature transfer mechanism A. The nut 156 is tightened to hold the gear 152 in driving engagement with the timing gear. To move the insert apparatus to another signature transfer mechanism, triangular plate 150 is unclamped and pivoted to disconnect the gear 152 from the timing gear 24 so that the apparatus B may be moved to the new

location and the power train reconnected. To permit adjustment of the position of the insert 50 on the signature 15 between the left edge 15a in FIG. 11 and the right edge 15b, the timing gear 24 on the shaft 18 can be loosened and slid along the shaft 18 with the insert mechanism B until the proper location is selected for the insert, whereupon the gear 24 is locked to the shaft 18 and the apparatus can be operated.

The gear 152 is in driving engagement with a gear 158 which is keyed on the shaft 149, which shaft also has a smaller gear 159 keyed thereto. A gear 160 carried by one of the shafts 47 is adapted to mesh with said smaller gear 159 and with the gear 55 which drives the power train for selecting and removing one insert 50 from the box 52. Therefore, with the shaft 35 driving the timing gear 24, the gear train 152, 158, 159, 160 transmits power to the insert selecting mechanism C.

The means or apparatus D for applying an adhesive to each insert 50 is best shown in FIGS. 1, 2 and 3, and is supported between the side plates 46 of the frame 43. A shaft 60 extends between said side plates 46 and has a knob 61 on one end portion thereof for manually rotating the shaft through an arc of 180° about its longitudinal axis. A stop 62 on the side 46 of the frame 43 (FIG. 2) is adapted to be engaged with one of the abutments 63 on the knob 61 which will limit the rotation of the knob and shaft. The shaft 60 has an eccentric cam 64 keyed thereto midway between the side plates 46. The surface of the cam slidably engages in a cam follower 65 rigidly secured to a base 66 of an open top container 67. A lock screw 68 is threaded through one wall of the cam follower 65 into engagement with the cam 64 so that loosening the screw 68 makes it possible to rotate the shaft 60 to raise or lower the container 67 relative to the frame 43.

The container 67 is filled with a liquid adhesive material 69 and has aligned bearings in its opposite end walls 70 for rotatably receiving stub shafts 72, 73 of a roller 71 which is supported within said container. The stub shaft 73 on the roller 71 projects through the end wall 70 of the container and a disc 74 is keyed to the projecting end portion. A pin 75 having its axis lying parallel to the axis of the shaft 73 projects from an outer portion of the radial face of said disc 74 into engagement with the walls of a radially disposed slot 76 formed in a mating disc 77 keyed to a shaft 78 rotatably supported in one side plate 46 of the frame 43. The shafts 72, 73 and 78 all lie along a common axis. An offset bracket 79 is fastened to the outer wall of the side plate 46 and supports a bearing 80 for rotatably supporting the outer end portion of the shaft 78.

As seen in FIG. 2, a ratchet mechanism is provided on the shaft 78 for producing step by step rotation of the shafts 78, 73 and roller 71. That is, a ratchet wheel 81 is keyed to the shaft 78 in juxtaposed relation to a link 83 which is rotatably supported on said shaft. A pawl 84 is pivoted on a pin 85 on said link 83 with a spring 86 anchored at one end on said link and at its other end to the pawl for urging the pawl 84 into engagement with the ratchet teeth 87 on the ratchet wheel 81. A second pin 89 on said link 83 pivotally supports one end of an adjustable turnbuckle link 90 which has its other end connected eccentrically by a pin 91 to an enlarged sleeve 92 on the end of a pivotally mounted shaft 93. The pin 91 on the sleeve 92 is offset from the center of the shaft 93 such that rotation of the shaft 93 will reciprocate the link 90, which in turn will oscillate the link 83 about the shaft 73 engaging and disengaging the pawl 84 with the teeth 87 in the wheel 81 to rotate the wheel 81, shaft 73 and roller 71 step-by-step in a counterclockwise direction. In this way the adhesive material 69 in the container 67 is deposited in a thin layer on the outer surface of said roller 71. Due to the nature of the turnbuckle link 90 it is possible to lengthen or shorten the link 90 which in turn lengthens or shortens

the number of degrees the ratchet will rotate the roller 71 with each rotation of the shaft 93.

Referring now to FIG. 3, the shaft 93 is rotatably supported on the frame 43 by means of bearings in the sides 46 of said frame. The shaft 93 has an enlarged central portion which forms an applicator bar 95 for the adhesive applying means D. The bar 95 has a radially directed longitudinally extending undercut slot 96 formed therein in which is seated a support member 97 having a guide pin 98 projecting into a guide opening 99 formed in the bar 95 so as to center the member 97 relative to said bar. Bolts 94 are threaded into the bar 95 and into engagement with the support member 97 for urging the member 97 radially outward as far as the undercut slot 96 will allow. A plurality of applicator pins 100 which project radially from the bar have anchor portions 101 seated in openings 102 formed in the support member 97, and said pins 100 have applicator tips or end portions 103 extending radially outward from said applicator bar 95. The ends 103 of the pins 100 have relatively narrow axially extending face portions, all of which are aligned longitudinally with each other a predetermined distance from the applicator bar. The shaft 93 has an end portion on the opposite end from the sleeve 92 which extends outward from the frame 43 to receive a pinion gear 105 keyed thereon. The gear 105 meshes with an idler gear 106 which meshes with a pinion 107 that is pinned to a larger gear 109 which is in driving engagement with the gear 158 previously described.

Still referring to FIG. 3, the conveyor 54 in the vicinity of the adhesive applicator D comprises a plurality of parallel support bars 54a forming the bed of the conveyor upon which the inserts 50 slide. Each support bar 54a has a mating backing bar 54b held in spaced relationship by means of a pair of support plates 51 which are vertically adjustable by means of members 51' threaded into the top surfaces of the frame side plates 46. The applicator tips 103 are adapted to extend slightly above the plane of the top surface of the support bars 54a so that as an insert 50 is moved past the adhesive applying station, the applicator tips 103 will raise the insert off the bars 51a and against the backing bars 54b as the adhesive 69 is applied to the insert. The backing bars 54b can be adjusted to allow for different thicknesses of inserts and the like.

In operation, with the gear 105 continuously driven, the applicator bar 95 rotates about the axis of the shaft 93 so that the applicator tips or points 103 sweep past the surface of the roller 71 which carries the film of adhesive 69, which adhesive was picked up as the roller passed through the adhesive supply in the container 67. A film of adhesive will be deposited on the ends of the applicator tips as they sweep past said roller. Continued rotation of the shaft 93 will sweep the tips 103 into contact with and past a card or insert 50 which is being moved from the insert storage box 52 along the conveyor 54. The shaft 93 which rotates the applicator bar from its adhesive pick-up point to its adhesive applying point also rotates the eccentric pin 91 on the sleeve 92 so as to reciprocate the link 90 for step-by-step advancing of the ratchet wheel 81 and the roller 71. The roller 71 is continuously picking up a film of adhesive 69 on its outer surface so that each pass of the pins or tips 103 on the applicator bar 95 will pick up adhesive from a fresh coating or film of adhesive on said roller 71.

The insert 50 with the adhesive 69 applied thereto in a plurality of small spots 111 is next advanced to the insert conveying means E. Referring especially to FIGS. 1, 4, 9 and 10, the conveying means E is composed of a downwardly extending frame portion 115 which is attached to the frame 43 and has a pair of side walls 116, 117 connected by a plurality of rods 118. Each rod 118 supports a pair of spaced sprockets 120 about which a pair of continuous chains 122 is wrapped. The topmost rod 118 also has keyed thereon a gear 124 which is

meshed with a gear 125 driven by the pinion gear 105 described above, so that rotation of the gear 124 drives the chains 122. The side wall 116 has a pair of spaced flanges 126a, 126b forming a guide channel 126 projecting inwardly toward a similar pair of spaced flanges 127a, 127b forming a guide channel 127 on the wall 117, so that there is a pair of guide channels extending from the top of said frame portion 115 around the knee of the frame portion and vertically downward to a point spaced slightly above the nip 25 of the rollers 29, 30 of the signature transfer means.

A plurality of drag pins 129 are positioned in apertures 130 in the flanges 126b, 127b of the channels 126, 127, with their ends 131 bearing against the flanges 126a, 127a. The pins 129 have large heads 132 against each of which one end of a spring member 133 bears for urging said ends 131 against the portions 126a, 127a. The other end of each spring member 133 is staked by rivets 134 and spacers 135 to the portions 126b, 127b, of the channels 126, 127, respectively. The spring urged pins 129 bear against the inserts 50 to restrain the latter against any movement except that given them by the chains. Attached at appropriate points along the chains 122 are pairs of aligned lugs 138 which pick up the adhesive spotted inserts 50 at the top portion of the conveying means and advance them between the guide channels 126, 127.

As each insert 50 is moved around the curved portion of the guide channels, the leading edge of the insert engages with and raises a pair of drag pins 129 which bear against the insert so that it will not fall out of place. The lugs 138 on the chains 122 advance each insert 50 downwardly until the leading edge of the insert is pushed beyond the last pair of arresting pins 129 and between a driven roller 170 and an idler roller 171 which control movement of the insert into the nip of the rollers 29 and 30 and against a signature 15 which is already partway through the nip of the rollers 29 and 30 so the insert 50 is advanced with the signature 15 until the adhesive spots 111 on the insert 50 are brought into contact with and secured to the facing page of the signature. The idler roller 171 is carried on a spindle 172 which, in turn, is supported in plates 173 that are pivoted on aligned studs 174; and springs 175 bias the plates to the right as seen in FIGS. 1 and 4 to urge the roller 171 lightly against the roller 170 and form a "floating" nip which prevents jamming of cards.

A pressure bar 140 and aligned bars 140a extend longitudinally of the rollers 30 and 30a, respectively, to bear against each insert 50 in the area of the adhesive spots 111 so as to press the adhesive on the insert against the signature for attachment of said insert to said signature. The pressure bars 140 and 140a are radially adjustable so as to allow for different thicknesses of insert and/or signature. Continued rotation of the rollers 29 and 30 forces the signature with the insert 50 attached through the nip of the rollers where it is dropped onto the fixed saddle 32.

By advancing the timing on the insert apparatus B relative to the signature transfer mechanism, it is possible to adjust the location of the insert on the page of a signature. That is, varying the time when an insert 50 reaches the rollers 29 and 30 relative to the time that the signature reaches said rollers determines whether the insert is attached closer to the open edge of the signature or closer to the fold 17. This adjustment, together with the adjustment to vary the insert position up or down on a page, makes it possible to tip an insert onto a page at any desired location—i.e., top, bottom, right or left of the open edge of the page. It is to be understood that the positions of the pressure bars 140, 140a on the rollers 30 and 30a must be adjusted so that the bars always press the adhesive spots 111 on the insert against the signature.

The lower end of the insert conveyor E must be precisely aligned with the nip of the rollers 29 and 30, and to assure such alignment a locking strut 26a (FIG. 1) is releasably clamped on the support rail 41 and has a slot 26b to receive a bolt 46c that extends through one of the side plates 46, so the conveyor may be firmly clamped in the desired position by tightening a nut on the bolt.

In the event the frame members of the gatherer boxes in a particular gatherer would interfere with movement of the insert mechanism from box to box, the insert conveyor mechanism C may be readily disconnected from the rest of the inserter when the inserter is to be moved.

The foregoing detailed description is given for clearness of understanding only, and no unnecessary limitations are to be understood therefrom, for some modifications will be obvious to those skilled in the art.

We claim:

1. Insert tipping apparatus for a signature gathering machine having means for transferring signatures seriatim from a supply stack into the nip of a pair of rollers with their folded edges trailing and substantially parallel to the roller axes, said rollers being adapted to spread each signature open and deposit it on a conveyor saddle, said tipping apparatus comprising, in combination: storage means for a stack of inserts; means for transporting inserts seriatim from said storage means into the tip of said pair of rollers with a margin of each insert substantially parallel to the roller axes, said insert transporting means being coordinated with said signature transferring means so that an insert is fed into said rollers with one face of the insert abutting a page of said signature and the trailing edge of the insert spaced slightly inward from the folded edge of said signature; and means associated with said insert transporting means for applying adhesive to each insert immediately adjacent said trailing edge of said one face thereof, whereby said rollers press said insert onto said page and adhesively secure it to said signature.

2. The apparatus of claim 1 which includes supporting frame means on which the insert storage means, the transporting means and the adhesive applying means are mounted, and means for moving said frame means parallel to the roller axis so as to adjust the positions of inserts along the folded edges of signatures.

3. The apparatus of claim 2 in which the transporting means includes chain conveyor means for positively moving inserts into the nip of the rollers at precisely spaced intervals, and means for adjusting said conveyor means endwise with respect to the nip of the rollers so as to adjust the inserts circumferentially of the rollers and thereby coordinate the trailing edges of the inserts with the trailing edges of signatures of different widths.

4. The apparatus of claim 1 in which the transporting means includes chain conveyor means for positively moving inserts into the nip of the rollers at precisely spaced intervals, and means for adjusting said conveyor means endwise with respect to the nip of the rollers so as to adjust the inserts circumferentially of the rollers and thereby coordinate the trailing edges of the inserts with the trailing edges of signatures of different widths.

5. The apparatus of claim 1 having means carried by one of said rollers for pressing the adhesive bearing end of said insert against said signature for securing said insert to said signature.

6. The apparatus of claim 5 wherein said last named means is radially adjustable so as to be adaptable for use with signatures and inserts of different thickness.

7. Insert tipping apparatus for a signature gathering machine having means for transferring signatures seriatim from a supply stack to a pair of rollers with their folded edges trailing and substantially parallel to the roller axes, said rollers being adapted to spread each signature open and deposit it on a conveyor saddle, said tipping apparatus comprising, in combination: means for trans-

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porting inserts seriatim from a stack of inserts to said pair of rollers with a margin of each insert substantially parallel to the roller axes, said insert transporting means being coordinated with said signature transferring means so that an insert is fed into said rollers with one face of the insert abutting a page of said signature and the trailing edge of the insert spaced inward from the folded edge of said signature; means associated with said insert transporting means for applying adhesive to each insert immediately adjacent said trailing edge of said one face thereof; and means associated with said rollers for pressing the adhesive bearing trailing edge of the insert against said signature.

8. An apparatus as claimed in claim 7 wherein said adhesive applying means comprises tip means coordinated with said insert transporting means for applying a fresh batch of adhesive to said insert as said insert moves past said tip means, and means for presenting a constant source of fresh adhesive to said tip means after each application of adhesive to an insert.

9. An apparatus as claimed in claim 7 which includes means on said insert transporting means for restraining the movement of inserts and chain means on said transporting means for moving said inserts against said restraining means whereby said inserts are positively moved to said rollers in timed relation therewith.

10. In a signature gathering machine having a plurality of signature transfer means arranged side by side with each transfer means including a pair of rollers on parallel axes and means for transferring signatures seriatim from

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a supply stack into the nip of said pair of rollers, insert tipping apparatus, comprising: support rail means parallel to the roller axes and extending across at least one transfer means; a tipping frame supported on said rails for movement therealong to change the position of said frame relative to the center line of the transfer means; storage means on said frame for a stack of inserts; means for transporting inserts seriatim from said storage means into the nip of said pair of rollers with a margin of each insert substantially parallel to the roller axes, said insert transporting means being coordinated with said signature transferring means so that an insert is fed into said rollers with one face of the insert abutting a page of said signature and the trailing edge of the insert spaced slightly inward from the folded edge of said signature; and means associated with said insert transporting means for applying adhesive to each insert immediately adjacent said trailing edge of said one face thereof, whereby said rollers press said insert onto said page and adhesively secure it to said signature.

References Cited

UNITED STATES PATENTS

2,143,715	1/1939	Rosebush	270—51
2,268,600	1/1942	Kleineberg	270—51
3,162,434	12/1964	Hepp	270—45

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