March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 1

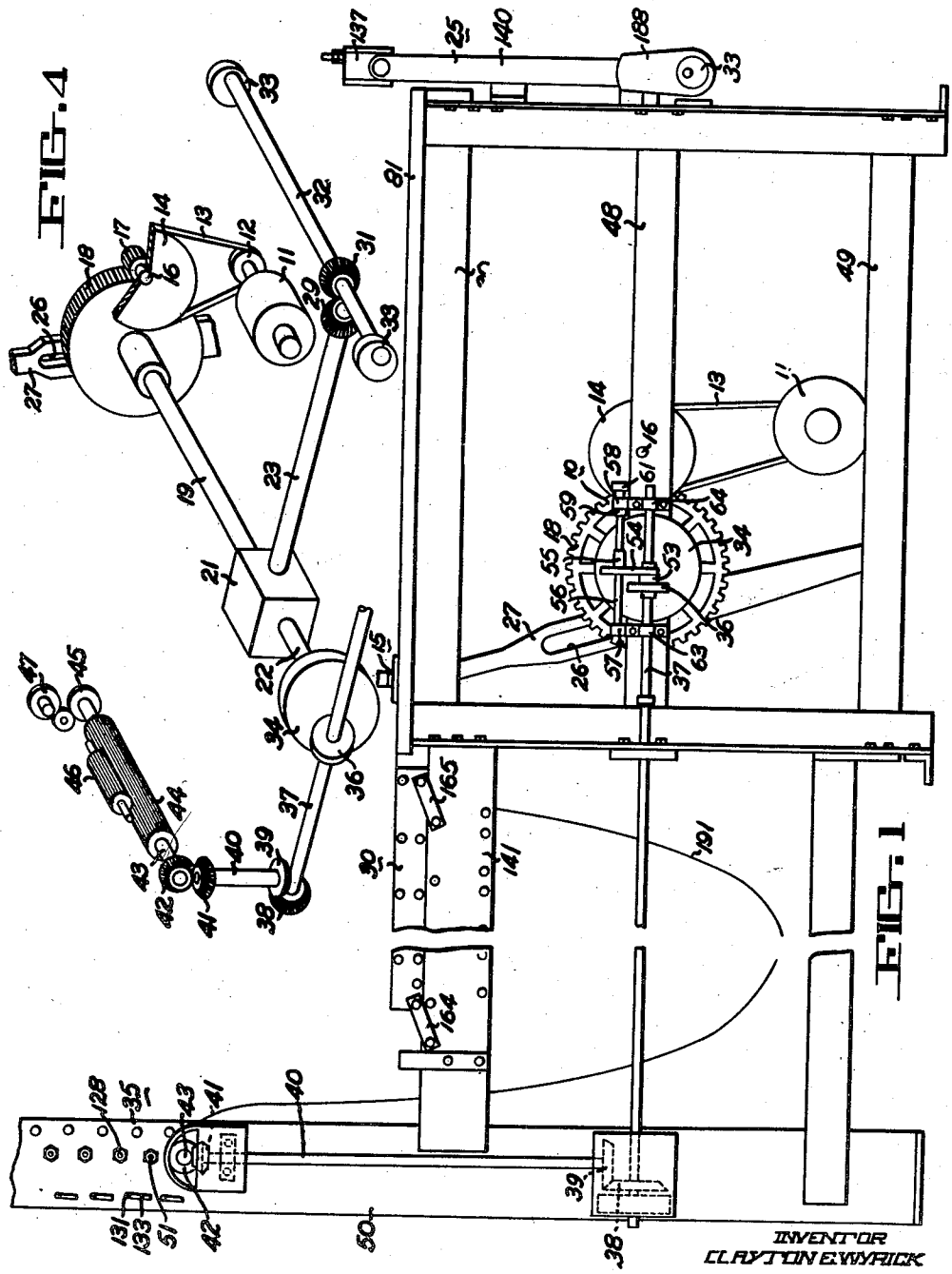


FIG. 1

FIG. 4

INVENTOR
CLAYTON E. WYRICK

BY
Toulmin & Toulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 2

FIG. 5

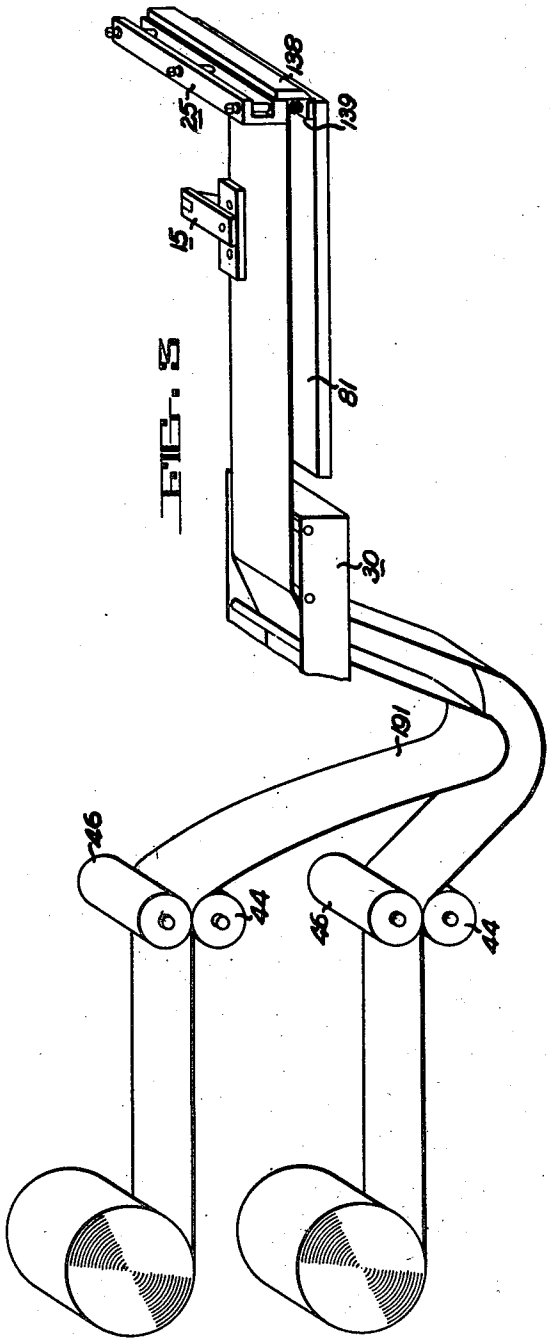
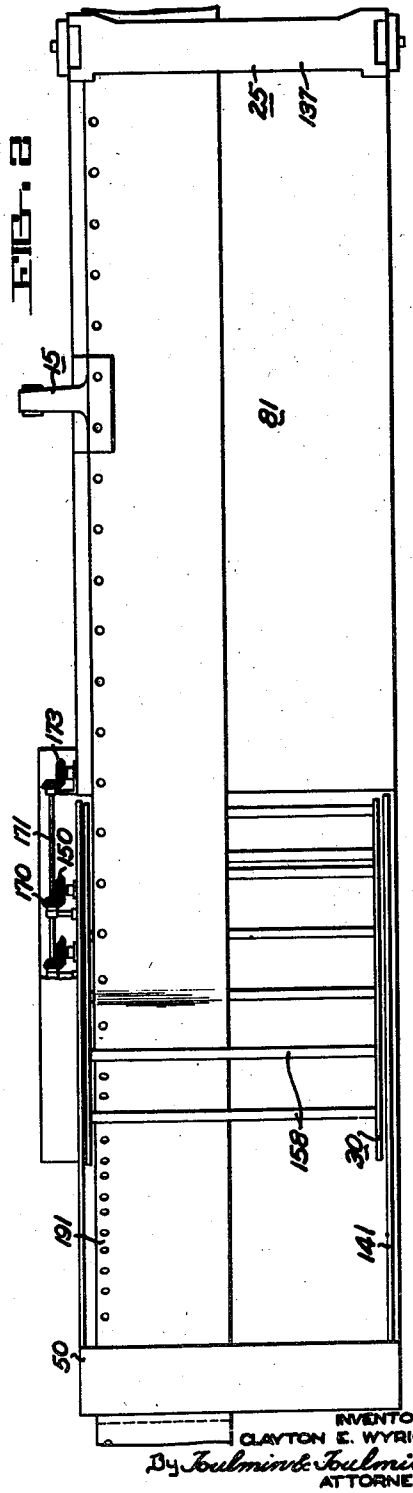


FIG. 2



INVENTOR
CLAYTON E. WYRICK
By Fulmin & Fulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 3

FIG. 5

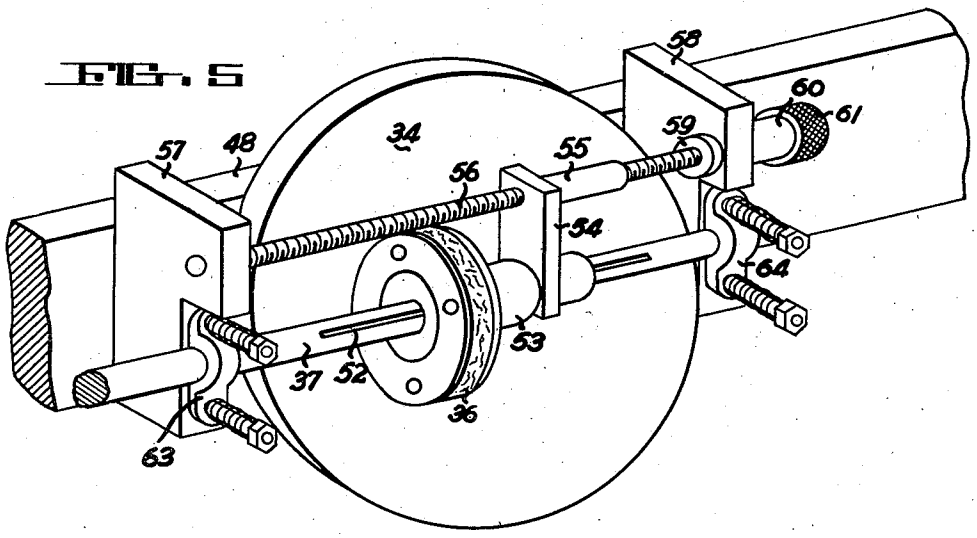
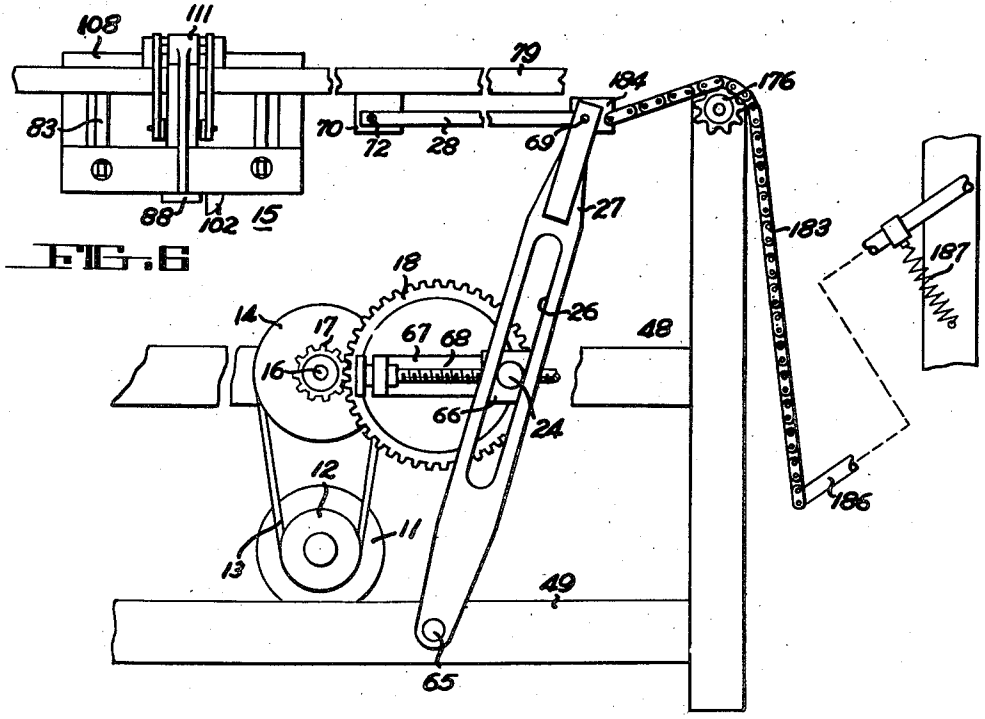


FIG. 6



INVENTOR
CLAYTON E. WYRICK

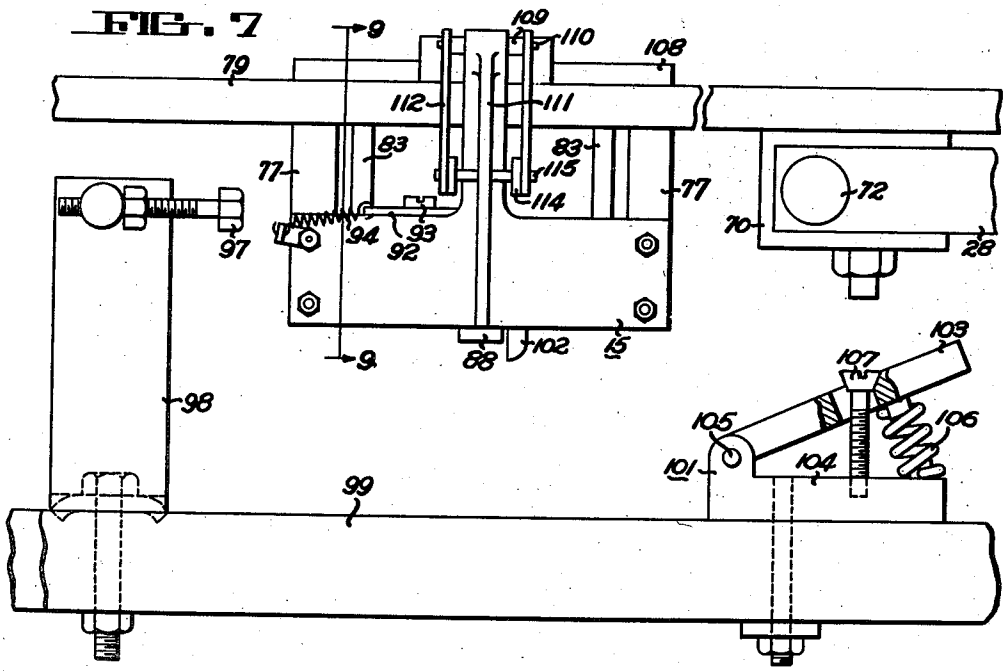
BY Toulmin & Toulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 4

FIG. 7



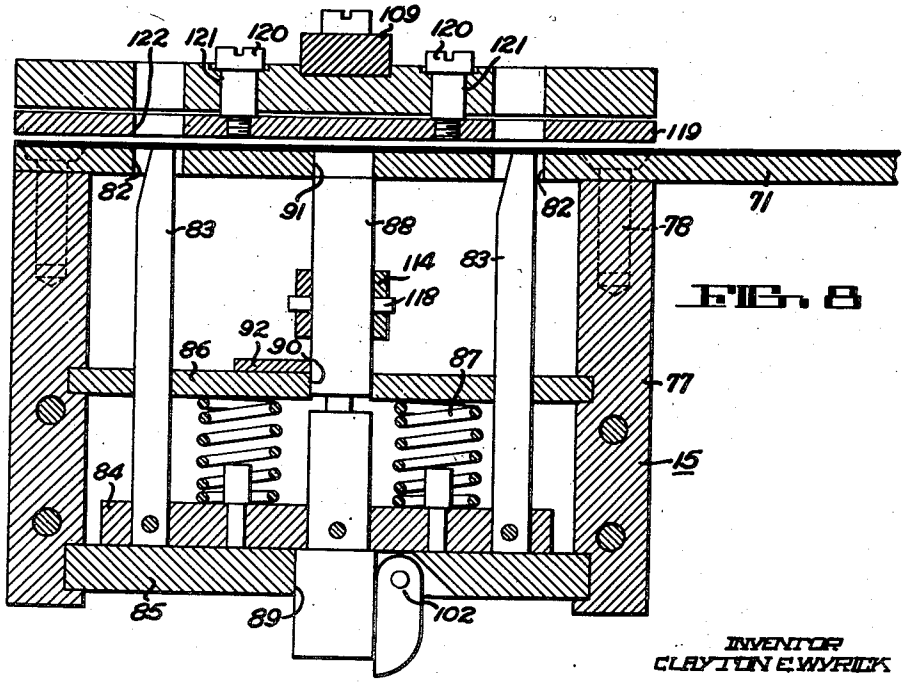


FIG. 8

INVENTOR
CLAYTON E. WYRICK

BY Toulmin & Toulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 5

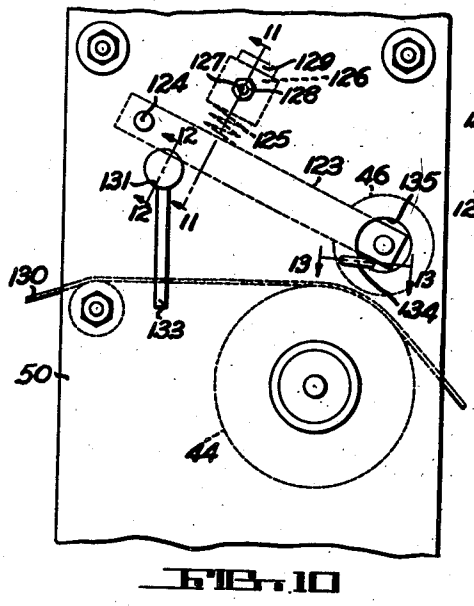


FIG. 10

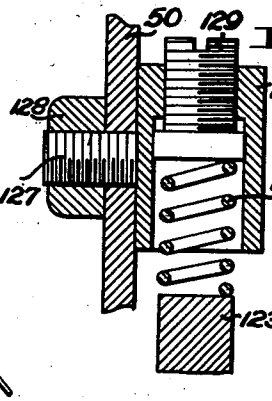


FIG. 11

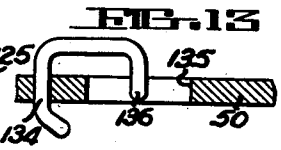


FIG. 13

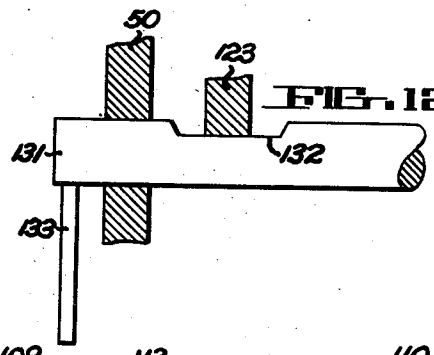


FIG. 12

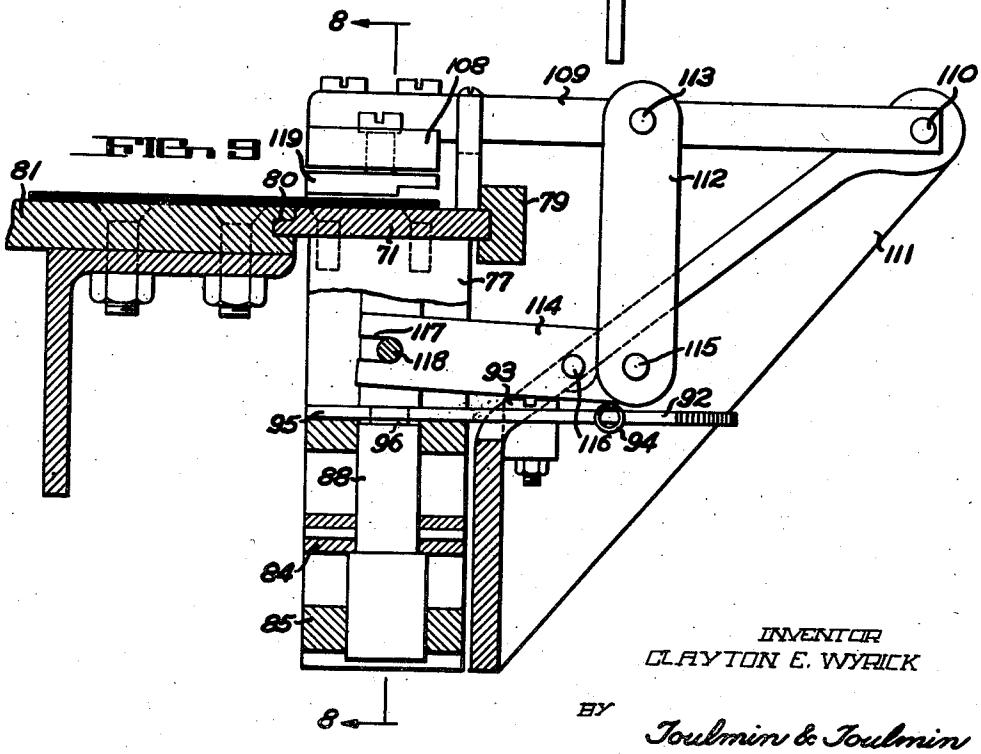


FIG. 9

INVENTOR
CLAYTON E. WYRICK

BY Toulmin & Toulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 6

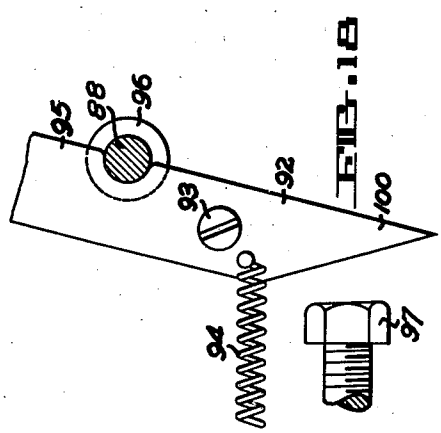


FIG. 18

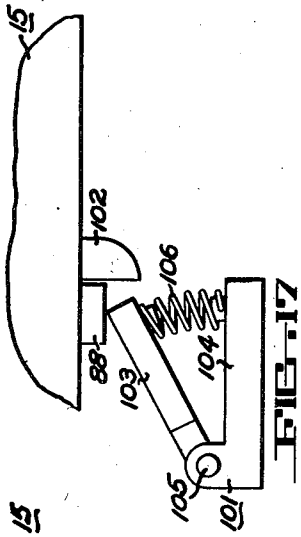


FIG. 17

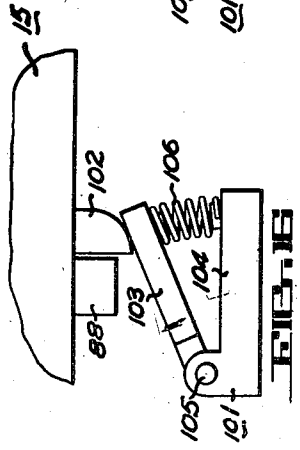


FIG. 16

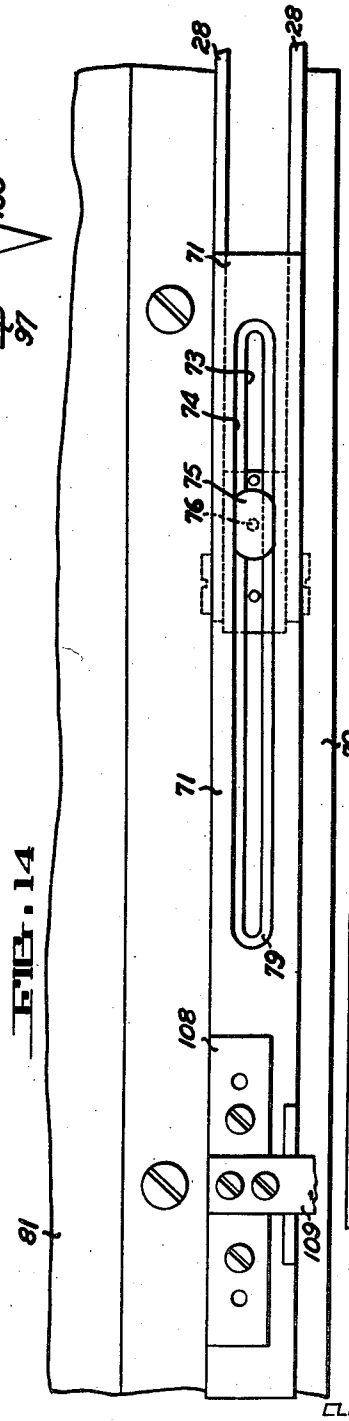


FIG. 14

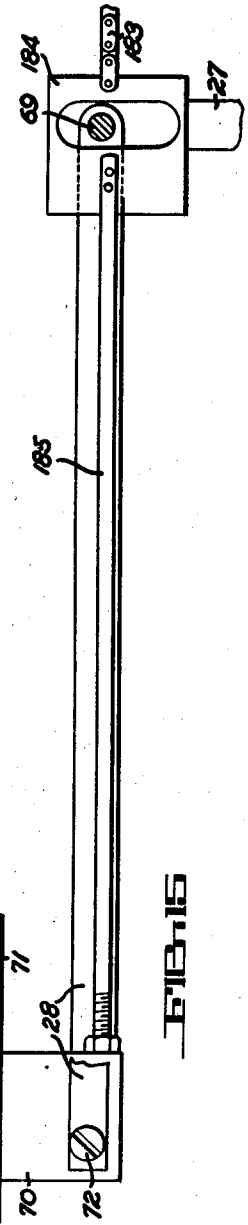


FIG. 15

INVENTOR
CLAYTON E. WYRICK

BY Toulmin & Toulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 7

FIG. 19

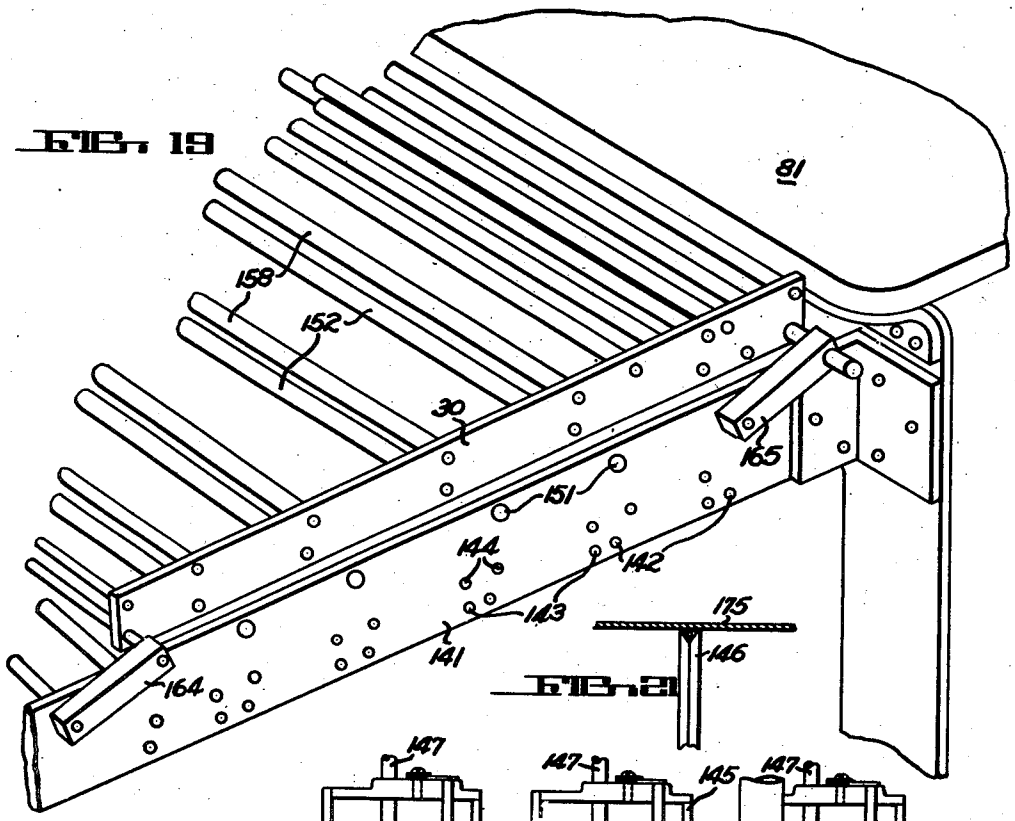


FIG. 21

FIG. 20

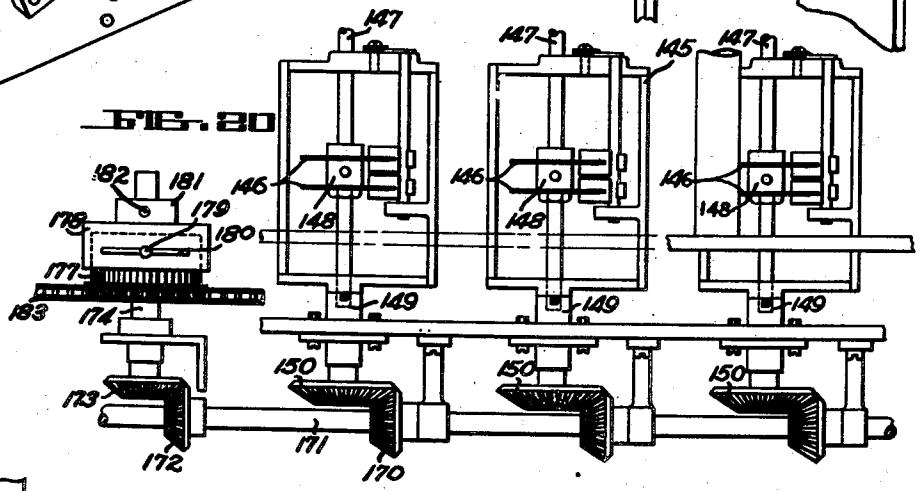


FIG. 22

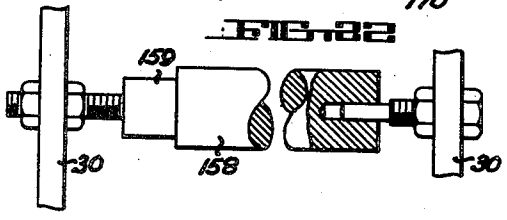
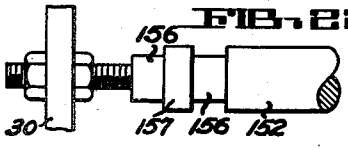


FIG. 23



INVENTOR
CLAYTON E. WYRICK
By Joulmin & Joulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 8

FIG. 24

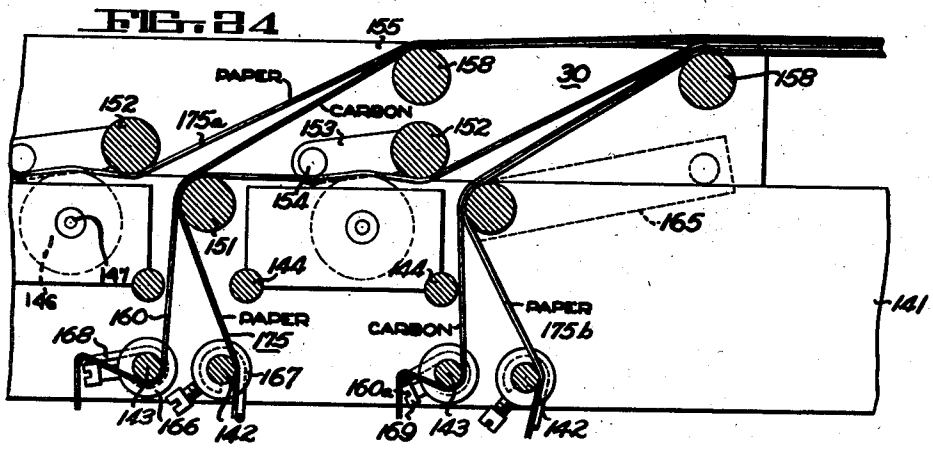


FIG. 25

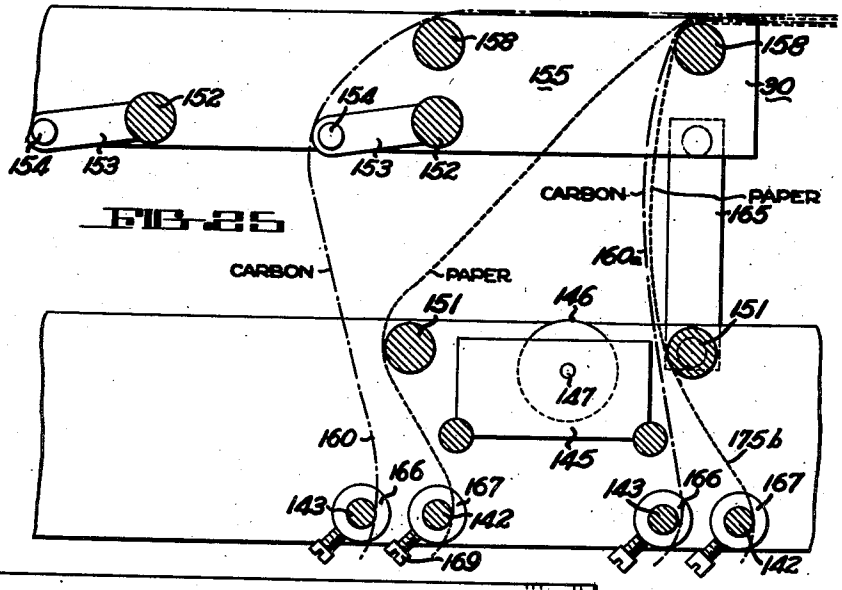
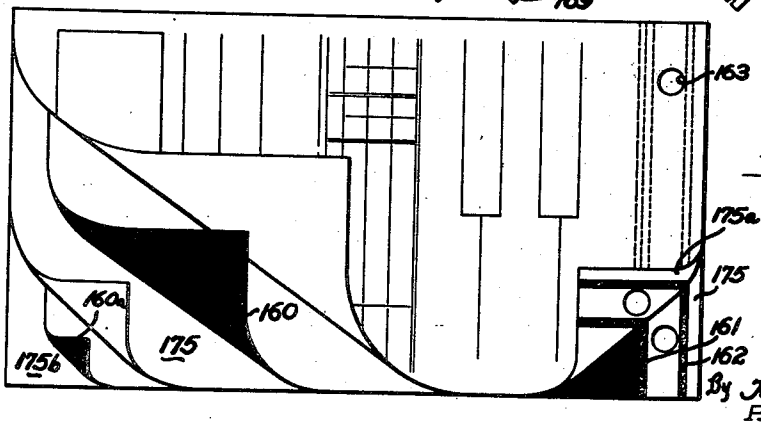


FIG. 26



INVENTOR
CLAYTON E. WYRICK
By Toulmin & Toulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 9

FIG. 27

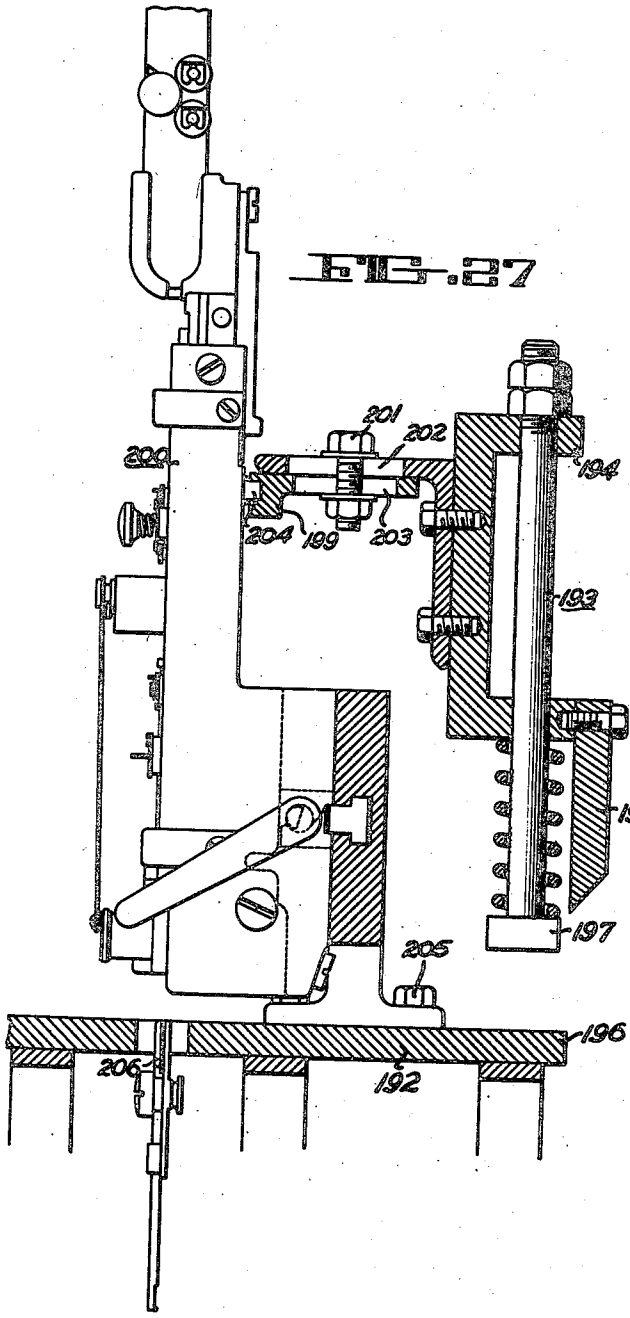
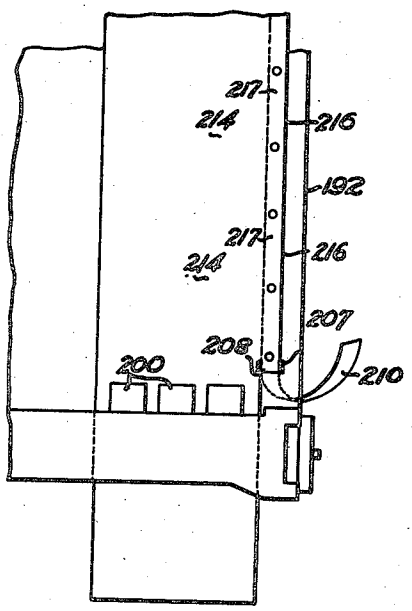


FIG. 28



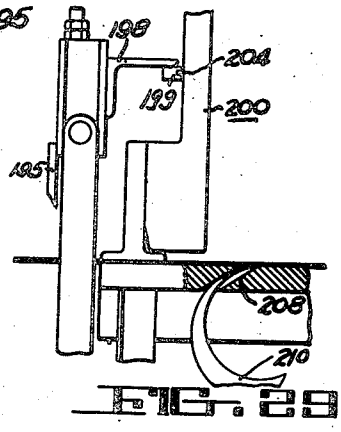


FIG. 29

INVENTOR
CLAYTON E. WYRICK
By Toulmin & Toulmin
ATTORNEYS

March 22, 1949. C. E. WYRICK 2,465,304

COLLATING MACHINE

Filed July 20, 1942 10 Sheets-Sheet 10

FIG. 30

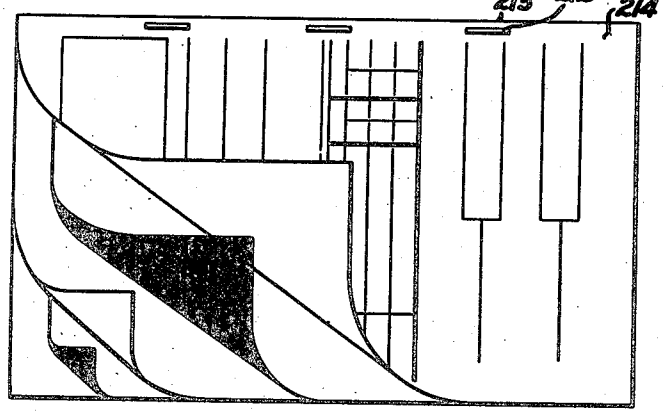


FIG. 31

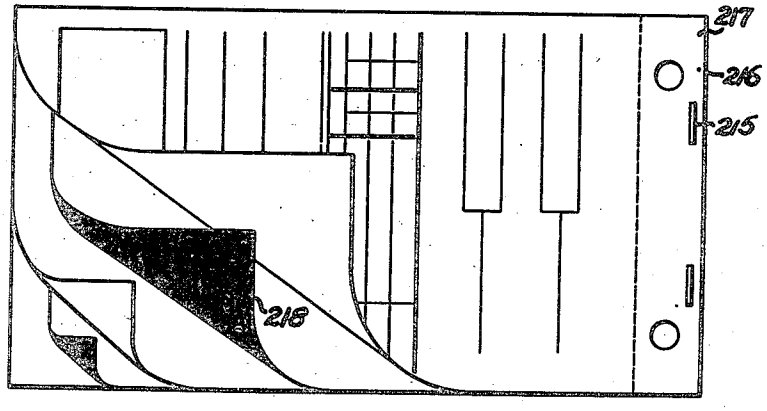
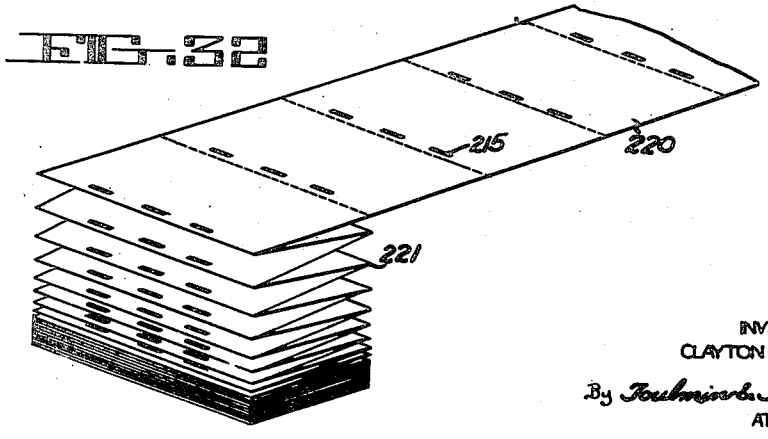


FIG. 32



INVENTOR
CLAYTON E. WYRICK
By Toulmin & Toulmin
ATTORNEYS

Patented Mar. 22, 1949

2,465,304

UNITED STATES PATENT OFFICE

2,465,304

COLLATING MACHINE

Clayton E. Wyrick, Miami, Fla., assignor to The Egry Register Company, Dayton, Ohio, a corporation of Ohio

Application July 20, 1942, Serial No. 451,648

14 Claims. (Cl. 164—48)

1

This invention relates to an apparatus for aligning, gluing and interleaving a plurality of paper and carbon sheet webs for producing a multiple copy "all set" form.

In this invention the apparatus is adapted to feed the paper and carbon sheet webs in increments equal to the length or width of a form printed upon the face of the paper webs. The feeding mechanism draws the paper and carbon sheet webs over suitable gluing rolls for causing adherence between the paper and carbon sheet webs in proper spaced and aligned relationship, and feeds the assembled paper and carbon webs to a suitable cut-off knife operated in synchronism with the feeding mechanism for severing the assembled webs at proper intervals, whereby a plural copy all set form is produced.

An object of the invention is to provide a collating machine of a simplified form which can collate a plurality of webs and be adjusted to feed the webs in increments equal to the length or width of a form printed upon the face of the webs.

Another object of the invention is to provide a collating machine for interleaving a carbon web between adjacent paper webs and for causing adherence between the paper webs and the carbon webs in properly aligned relationship.

Another object of the invention is to provide a collating machine having a reciprocating feeding mechanism.

It is another object of the invention to provide a collating machine having a reciprocating feeding mechanism which is adjustable to feed paper webs in increments of any desired length.

Another object of the invention is to provide a collating machine having an improved feeding mechanism for engaging paper webs arranged in stacked relationship for feeding the webs in increments of predetermined length.

Another object of the invention is to provide an apparatus for interleaving carbon webs between paper webs, whereby they can be secured in adjacent relationship by means of a gluing apparatus which spreads adhesive upon the paper webs only during the period of operation of the machine wherein the paper webs are moving forward through the machine.

Another object of the invention is to provide a collating machine having a reciprocating feeding apparatus for moving paper webs through the machine, and having an adhesive applying apparatus associated with the feeding mechanism in a manner that the adhesive applying mechanism is operated only when the feeding

2

mechanism is moving through a forward stroke and advancing the paper webs through the collating machine.

Another object of the invention is to provide an apparatus constructed and arranged in accordance with the foregoing object wherein the adhesive applying apparatus consists of a disk rotated by the reciprocatory movement of the feeding mechanism at the peripheral speed of the feeding mechanism.

Another object of the invention is to provide a reciprocating feeding mechanism for a collating machine which has an adjustable stroke and which is adjustable for speed of actuation of the stroke.

Another object of the invention is to provide a collating machine constructed and arranged wherein the stacked paper and carbon webs can be severed in lengths of predetermined increment, or the web can be fed through the machine in a continuous length.

Another object of the invention is to provide a collating machine for interleaving carbon webs between paper webs and for causing adherence between the respective webs which is constructed and arranged in a manner that threading of the machine is considerably simplified.

Another object of the invention is to provide a simplified form of collating machine wherein an interleaved carbon and paper stack can be stitched together at predetermined intervals.

Another object of the invention is to provide an apparatus for stitching interleaved carbon and paper webs, either transversely of the web or longitudinally thereof.

Another object of the invention is to provide an apparatus for stitching an interleaved web stack of paper and carbon webs simultaneously with severing a length of the web, and for providing adjustment between the stitching means and the severing means for changing the space therebetween according to the length of the form passing through the machine.

Another object of the invention is to provide a collating machine wherein a plurality of paper webs is fed through the machine and aligned with respect to one another by means of holes provided in one edge of the webs, the strip containing the holes being removable if desired.

Another object of the invention is to provide an improved adhesive applying apparatus for a collating machine.

Another object of the invention is to provide a feeding mechanism for a collating machine wherein the feeding stroke of the mechanism

is started slowly and ended slowly but the intermediate portion of the feeding stroke is rapid and wherein the return or non-feeding stroke is accomplished in much less time than the feeding stroke to thereby increase the capacity of the machine.

Another object of the invention is to provide an apparatus for feeding a plurality of webs in adjacent relationship that is constructed and arranged to prevent interfernce between the webs.

Further objects and advantages will become apparent from the drawings and the following description.

In the drawings:

Figure 1 is a side elevational view of a machine built in accordance with the teachings of this invention.

Figure 2 is a top plan view of the apparatus of Figure 1.

Figure 3 is a diagrammatic perspective view showing the general plan of threading and feeding paper and carbon webs through the machine of this invention.

Figure 4 is a diagrammatic perspective elevational view of the driving mechanism of this invention.

Figure 5 is a perspective elevational view of the driving apparatus for feeding the paper and carbon webs through the machine.

Figure 6 is an elevational view of the reciprocating feeding mechanism showing the interconnection between the feeding mechanism, the adhesive applying apparatus and the stroke control mechanism for the feeding apparatus.

Figure 7 is a side elevational view of the mechanism which engages the stacked paper and carbon webs for moving the same through the machine.

Figure 8 is a longitudinal cross-sectional view of the mechanism for engaging the stacked paper webs and is taken along line 8—8 of Figure 9.

Figure 9 is a transverse cross-sectional view of the mechanism for engaging the stacked paper webs and is taken along line 9—9 of Figure 7.

Figure 10 is an end elevational view of the feeding rolls for a carbon or paper web.

Figure 11 is a cross sectional view of the spring pressure means for the feeding rolls shown in Figure 10 taken along the line 11—11 of Figure 10.

Figure 12 is a cross-sectional view of the mechanism for locking the feeding rolls out of engagement with a paper or carbon web taken along line 12—12 of Figure 10.

Figure 13 is a cross-sectional view of a second mechanism for locking a feeding roll out of engagement with a paper or carbon web, taken along line 13—13 of Figure 10.

Figure 14 is a top plan view of a portion of the feeding mechanism, showing the slide for guiding the feeding mechanism and the apparatus interconnecting the same with the driving mechanism therefore.

Figure 15 is an elevational view of the apparatus interconnecting the feeding mechanism with the adhesive applying mechanism for obtaining identical linear travel of the feeding mechanism and the adhesive applying mechanism.

Figure 16 is an elevational view of a portion of the feeding mechanism shown in Figure 8 in a position with a spring pressed latch depressed for causing engagement of the feeding apparatus with the paper webs upon release of the latch.

Figure 17 is an elevational view, similar to Figure 16, showing the latch in released position.

Figure 18 is an elevational view of a portion of the mechanism of the feeding apparatus showing the device for locking the feeding pins in engagement with the paper webs.

Figure 19 is a perspective elevational view of the adhesive applying rack.

Figure 20 is an elevational view of the adhesive applying devices and the driving mechanism for the same.

Figure 21 is a cross-sectional detailed view of one of the adhesive applying devices, and more particularly the adhesive applying wheel.

Figure 22 is an elevational view, partially in cross section, of one of the rolls over which an adjacent carbon and paper web passes immediately after the adhesive has been applied upon the paper web to cause adherence between the carbon and paper webs, and to prevent contact of the roll with an exposed line of adhesive which subsequently engages another paper web.

Figure 23 is an elevational view of a roll disposed adjacent an adhesive applying device and having a contour to insure engagement of the paper web with the adhesive applying device.

Figure 24 is a longitudinal cross-sectional view of a portion of the adhesive applying rack, shown in Figure 19, with the paper and carbon webs threaded therethrough.

Figure 25 is a longitudinal cross-sectional view of the adhesive applying rack shown in open position for threading of the paper and carbon webs.

Figure 26 is an elevational view of a plural copy all set form produced upon the machine of this invention.

Figure 27 is a longitudinal cross-sectional view of the shearing mechanism of this invention showing a wire stitching apparatus associated therewith for securing stacked paper and carbon webs in adjacent relationship.

Figure 28 is a top plan view, somewhat diagrammatic in form, of the apparatus for removing a strip of the stacked paper and carbon webs which has holes therein for feeding and aligning the webs.

Figure 29 is a side elevational view, partially in cross section, of the strip removing device shown in Figure 28.

Figure 30 is an elevational view of a plural copy all set form shown with the adjacent sheets stitched together with wire stitching.

Figure 31 is an elevational view of an all set form similar to Figure 30 but with the wire stitching upon an end thereof in place of at the side, as shown in Figure 30.

Figure 32 is a perspective elevational view of a continuous web of plural copy all set forms arranged in fan folded condition.

In this invention the apparatus consists of a driving mechanism 10 which reciprocates a web feeding and aligning device 15 longitudinally of a table 20 toward a cut-off mechanism 25 for shearing the web in increments of predetermined length as fed by the feeding and aligning device 15. The feeding and aligning device 15 draws a plurality of paper and carbon webs through an adhesive applying device 30. The adhesive applying device 30 places two parallel lines of adhesive material adjacent one edge of the paper webs so that a carbon web interleaved between adjacent paper webs will be secured to one of the paper webs and the paper webs will be secured to each other. The carbon and paper webs are fed

to the adhesive applying device 30 by means of a feeding apparatus 35 which draws the webs from the suitable supply rolls and advances the webs toward the adhesive applying device 30. The supply rolls of paper and carbon webs are arranged in alternate adjacent relationship so that the paper and carbon webs will be directed through the feeding device 35 in an interleaved arrangement with a carbon web between two paper webs, whereby a plural copy form can be produced.

The paper webs are printed with a suitable form upon the face thereof so that any desired record can be maintained upon the paper webs. The plurality of paper webs fed through the feeding device 35 is adapted to be arranged so that the forms printed on the face of the webs are arranged in proper relationship wherey a plurality of copies of an original document can be produced at the same writing.

Referring more particularly to Figure 4, showing a diagrammatic arrangement of the driving mechanism, the driving apparatus consists of an electric motor 11 having a pulley 12 mounted upon the shaft thereof for driving a belt 13 which engages a pulley 14. The pulley 14 is secured to a shaft 16 which carries a pinion 17 driving a gear wheel 18. The gear wheel 18 is secured to a shaft 19 extending from one side of the wheel 18. The shaft 19 enters a gear box 21 from which there extends a shaft 22 and a shaft 23 suitably geared to the shaft 19, whereby shafts 22 and 23 are driven by the shaft 19.

The gear wheel 18 carries a crank pin 24 (see Figure 6) which rides in a slot 26 provided in an oscillating arm 27 connected to the feeding and aligning device 15 by means of a pair of arms 28 (see Figure 14), whereby the feeding and aligning mechanism 15 is oscillated for moving paper webs across the table 20 in lengths of predetermined increment.

The shaft 23 (see Figure 4) carries a beveled gear 31 secured to a shaft 32 which carries eccentrics 33. The eccentrics 33 rotate within a connecting rod 140 for reciprocating the shearing mechanism 25 with respect to the paper webs passing thereunder for cutting the webs in lengths of predetermined increment.

The shaft 22 carries a friction disk 34 which drives a friction wheel 36 carried upon a shaft 37. The shaft 37 carries a beveled gear 38 which engages a beveled gear 39 secured to the shaft 40. The shaft 40 carries a beveled gear 41 driving a beveled gear 42 carried upon the drive shaft 43 of a feed roll 44. The opposite end of the drive shaft 43 carries a spur gear 45 adapted to engage a train of gears driving other feed rolls through suitable gears 47 for moving paper or carbon webs through the machine of this invention. A friction or pressure roll 46 is pressed against the feed roll for frictionally retaining the paper or carbon webs between rolls 44 and 46 for feeding the same through the machine. There is provided a plurality of feed rolls 44 for simultaneously advancing carbon and paper webs through the machine in interleaved relationship.

As will be noted from Figure 4, the drive for the feeding and aligning device 15, the shearing mechanism 25 and the feed rolls 44 originates from a common apparatus whereby the various functions of the collating machine are synchronized. Suitable adjustments are provided for changing the stroke of oscillation of the arm 26 to regulate the length of the web feed, and for changing the speed of rotation of the feed rolls 44 to compensate for the change in length

of web fed by the feeding and aligning device 15. These adjustments will be hereinafter more fully disclosed.

The apparatus of this invention consists of the table 20 upon one end of which there is mounted the shearing mechanism 25. The driving apparatus 10 is mounted within the frame of the table 20 upon suitable longitudinally extending frame members 48 and 49. The adhesive applying device 30 is secured to the table 20 upon the end thereof opposite to the shearing device 25, the adhesive applying apparatus 30 being disposed between the end of the table 20 and a frame 50 which carries the feed rolls 44 disposed at a level above the adhesive applying device 30. The drive shaft 43 of the feed roll 44 is viewed in Figure 1 as well as the supporting shafts 51 of other feed rolls disposed in vertical alignment with the feed roll 44.

As previously described the driving apparatus for the feed rolls 44 consists of a friction disk 34 and a friction wheel 36 driving the shaft 37. A more detailed view of this driving mechanism is shown in Figure 5 wherein the friction disk 34 secured to the shaft 22 is suitably bearinged in the frame member 48. The friction wheel 36 secured to the shaft 37 is adapted to be moved parallel to the face of the friction disk 34 and radially toward and away from the center of the disk 34 to change the speed of rotation of the shaft 37 and thus change the speed of feeding the paper and carbon webs through the machine.

The friction wheel 36 is drivingly secured to the shaft 37 by means of a suitable key riding in a key slot 52. The wheel 36 is provided with a hub 53 having an annular recess therein. A plate member 54 has a yoke disposed within the recess of the hub 53 and has a hub 55 secured thereto which is in threaded engagement with a threaded rod 56. The threaded rod 56 is carried between bearing plates 57 and 58 secured to the frame member 48. One end of the threaded rod 56 carries a collar 59 which engages one face of the bearing plate 58, the end of the rod 56 extending through the plate 58 receiving a collar 60 having a knurled face 61 whereby the threaded rod 56 can be rotated without longitudinal movement with respect to the friction disk 34. Rotation of the rod 56 moves the friction wheel longitudinally along the shaft 37 to change its radial location with respect to the disk 34 for changing the speed of rotation of the shaft 37 while the machine is running, the threaded member 56 preventing movement of the disc 36 after adjustment has been made thereon.

The shaft 37 is bearinged upon opposite sides of the friction wheel 36 upon the bearing blocks 57 and 58 by means of suitable spring pressed bearing plates 63 and 64.

The oscillating arm 27 for drivingly reciprocating the feeding and aligning device 15, and the adjusting mechanism for the same is more specifically shown in Figures 6, 14 and 15.

The oscillating arm 27 is pivotally mounted upon the frame member 49 of the table 20 by means of a pivot pin 65. The crank pin 24 is carried upon a slide 66 which is slidably mounted upon a guide member 67 secured to the gear wheel 18. The slide 66 may be reciprocated upon the guide member 67 by means of a screw 68 in threaded engagement with the slide 66, whereby the location of the crank pin 24 with respect to the axis of the gear 18 is changed for changing the stroke of oscillation of the arm 27.

The oscillating arm 27 has the free end thereof

connected to the pair of arms 28 by means of a pivot pin 69. The arms 28 are in turn connected to a block 70 disposed beneath a slide 71 forming a part of the feeding and aligning mechanism 15 by means of suitable pivot connections 72.

The driving mechanism for the feeding and aligning device 15 is constructed and arranged so that the return stroke of the oscillating arm 27 is of much shorter duration than the feed or forward stroke. As viewed in Figure 6 the pin 24 is rotating in a counter-clockwise direction so that the upper portion of the rotation is for a feed stroke and the lower portion of the rotation is for a return stroke. The return portion of the stroke being that portion of the circle of rotation that falls within lines that are tangent to the circle of rotation and pass through the pivot pin 65 for the arm 27. Therefore the beginning of the forward stroke and the end thereof are accomplished slowly because the pin 24 is passing through a substantially vertically disposed arc. The feeding and aligning device 15 can thus pick up the paper slowly and stop the same slowly to prevent damage to perforation holes therein that are engaged by the feeding and aligning device 15.

The slide 71 has a slot 73 therein which has a recessed face 74 around the periphery thereof to receive a holding block 70 by means of a suitable bolt 76 for clamping the slide 71 between the block 70 and the holding block 75. This means of connecting the arms 28 to the slide 75 provides means for changing the location of the feeding and aligning mechanism 15 with respect to the forward end of the table 20 when changing from one length form to another which is to be sheared from the continuous web passing through the machine.

The feeding and aligning mechanism 15 consists of a frame 77 secured to the slide 71 by means of bolts 78. The slide 71 is carried between a guide rail 79 secured to the top of the table 20 and a guide track 80 provided in the edge of the top 81 of the table 20 (see Figure 9). The slide 71 is provided with openings 82 through which pins 83 are adapted to reciprocate for engaging holes in a paper web passing over the slide 71. The pins 83 extend upwardly through a stationary plate 86 disposed in the frame 77, which plate provides a guide for the pins 83. Springs 87 are disposed between the stationary plate 86 and the plate 84 carrying the pins 83 to normally maintain the plate 84 against the plate 85 and thus withdraw the pins 83 from holes in the paper web passing over the slide 71.

The plate 84 carries a central guide rod 88 which extends through an opening 89 in the plate 85 and an opening 90 in the plate 86. The upper end of the guide rod 88 extends into an opening 91 provided in the slide 71 for properly locating the upper end of the guide rod 88.

In order to lock the pins 83 in position to engage holes in a paper web adjacent the slide 71 when the feeding and aligning device 15 advances the web through the machine, a lever 92 is pivotally mounted upon the plate 86 by means of a pivot screw 93 (see Figures 7 and 18). A tension spring 94 urges one end 95 of the lever 92 into engagement with the guide rod 88. The guide rod 88 is provided with an annular recess 96 which is adapted to receive the end 95 of the lever 92 when the guide pin 88 is moved in an upwardly direction, the locking position being shown in Figure 18.

As previously described the feeding and aligning device 15 is adapted to move a paper web

through the machine in increments of predetermined length due to its reciprocating movement adjacent the edge of the top 81 of the table 20. On the web advancing stroke of the feeding and aligning device 15 the pins 83 must be released at the extreme forward position of the stroke, and when the feeding and aligning device 15 is retracted to position for reengaging the paper web it is then necessary that the pins 83 shall be forced into engagement with suitable holes provided in the edge of the web.

The releasing mechanism for the feeding and aligning device 15 consists of a stop pin 97 which is suitably mounted upon a bracket 98 carried upon a frame member 99. The position of the bracket 98 is adjustable upon the frame member 99 and the stop pin 97 is adjustable upon the bracket 98 whereby minute changes of adjustment can be made for changing the location of the stop pin 97 for releasing the pins 83 when in the extreme forward position of its reciprocating stroke. The stop pin 97 is adapted to engage the end 100 of the lever 92 to force the end 95 of the lever 92 out of engagement with the recess 96 provided in the guide rod 88, whereby the springs 87 will force the pins 83 downwardly and out of engagement with a paper web disposed upon the surface of the top 81 of the table 20.

When the feeding and aligning device 15 is retracted to a position for again engaging a paper web, a spring pressed actuating device 101 is adapted to strike the guide rod 88 to force the pins 83 upwardly into engagement with the paper web. The feeding and aligning device 15 carries a latch finger 102 which engages an arm 103 of the spring pressed actuating device. The arm 103 is pivoted upon a base member 104 by means of a pivot pin 105. A compression spring 106 is disposed between the base 104 of the arm 103 to urge the same upwardly against a stop screw 107 which is threaded into the base 104.

When the latch finger 102 of the feeding and aligning device 15 engages the arm 103 of the spring pressed actuating device 101 the arm 103 is pressed downwardly against the spring 106 (as shown in Figure 16). As the feeding and aligning device continues to move rearwardly the latch finger 102 passes over the arm 103 thereby permitting the spring 106 to force the arm 103 upwardly and strike the guide rod 88 (as shown in Figure 17), whereby the rod 88 and the pins 83 are moved upwardly to force the pins into engagement with holes provided in the paper web disposed upon the top of the table 20.

To insure that the pins 83 will penetrate the holes provided in a paper web disposed upon the top of the table 20, and to insure proper alignment of the holes with respect to one another as provided in adjacent webs whereby the form faces thereon are aligned, a mechanism is provided for positioning a plate adjacent the paper webs and spaced therefrom slightly to permit shifting of the webs with respect to one another.

This mechanism consists of a plate 108 carried upon an arm 109 fulcrumed upon a pivot point 110 secured to a bracket 111 extending from the frame 77 of the feeding and aligning device 15. A link 112 carried upon the arm 109 by means of a pin 113 is pivotally secured to an arm 114 by means of a pin 115. The arm 114 is fulcrumed upon the bracket 111 by means of a pin 116. The free end of the arm 114 is provided with a slot 117 which extends over a pin 118 provided in the guide rod 88.

A plate 119 is loosely carried upon the plate

108 by means of guide pins 120 slidably disposed within openings 121 provided in the plate 108. The guide pins 120 are threaded into engagement with the plate 119, the plate 119 being suspended from the plate 108 at all times by the guide pins 120. As shown in Figure 8, the plate 108 is in raised position with the platen 119 suspended therefrom with the pins 120 and out of engagement with the paper webs passing over the slide 71.

When the guide rod 88 of the feeding and aligning device is forced upwardly by the spring pressed actuating device 101 the arm 114 fulcrums about the pin 116 to move the arm 109 downwardly through the link 112. The loosely suspended plate 119 will thus be moved closely adjacent the upper surface of the paper webs disposed upon the slide 71 so that the paper webs are prevented from upward movement when the pins 83 of the feeding and aligning device 15 enter the aligning holes in the webs, the webs being shifted with respect to one another to align adjacent form faces by the holes in the webs. Suitable holes 122 are provided in the plate 119 to permit the pins 83 to penetrate the paper webs and enter the plate 119.

The apparatus for drawing the carbon or paper webs from a supply roll consists of the rolls 44 supported in the frame 50 as heretofore described. Each roll 44 has a pressure roll 46 associated therewith which is carried upon an arm 123 pivoted to the frame 50 by means of the pin 124 (see Figure 10). The arm 123 is spring-pressed downwardly by means of a spring 125 having one end thereof in a cage 126 so that the roll 46 engages the roll 44. The opposite end of the spring 125 engages the arm 123. The cage 126 is secured to the frame 50 by means of a threaded shank 127 extending through the frame 50 and having a belt 128 threaded thereon. An adjusting screw 129 is provided for changing the compression of the spring 125 to change the frictional contact between the roll 46 and the roll 44.

A paper web 130 is positioned between the roll 44 and the roll 45 so that rotation of the roll 44 will draw the web 130 from a supply roll (not shown). The roll 44, the roll 46, or both may have the surface roughened to more satisfactorily frictionally engage the web 130 to draw the same from a supply roll.

The rolls 44 are of decreasing diameter from the bottom to the top of the series in steps of about .002 inch, so that the lowermost roll will feed the greatest length of web and each successive roll thereabove will feed a lesser amount and thereby eliminate interference between adjacent web loops 191.

If it should be desired to cause the web 130 to slip with respect to the rolls 44 and 46 for any reason, such as adjusting the length of the web loop 191, the arm 123 can be lifted upwardly against the pressure of the spring 125 and thus relieve frictional engagement of the web 130 with the roll 44, since the roll 46 will be lifted from the surface of the web 130. A rod 131 extends through the frame 50 and has a cam face 132 thereon adapted to engage the arm 123 when in frictional contact with the web 130. Rotation of the rod 131 by means of a handle 133 removes the cam surface 132 from engagement with the arm 123 and causes the arm to ride upon the cylindrical surface of the rod 131 and thus raise the roll 46. This apparatus is more particularly shown in Figure 12.

If it is desired to permanently lock out one of the feeding rolls 44 a U-shaped clip 134 may be inserted within an opening 135 provided in the frame 50 and having the end 136 thereof disposed between the arm 123 and the edge of the opening 135. This latter arrangement is provided when less than the total number of rolls 44 is used for interleaving and collating a plurality of paper webs or a plurality of paper webs and carbon webs. This device is shown in Figure 13.

The apparatus 25 for shearing the web in lengths of predetermined increment consists of a head 137 carrying a suitable knife blade 138 adapted to cooperate with a stationary blade 139 carried adjacent the top of the table 20. The head 137 is supported by connecting rods 140 for reciprocating the head 137 with respect to the stationary knife blade 139 whereby the knife blade 138 shears a web passing therethrough. The rotation of the eccentric 33 for reciprocating the head 137 is synchronized with the feeding of the web by means of the feeding and aligning mechanism 15 for shearing the web when the same is stationary upon the table top 81. The connecting rod 140 has a bearing block 188 secured upon the end thereof in which the eccentric 33 rotates. If it is desired to pass a continuous web through the machine the shearing blade can be removed from the head 137 or adjusted so as to prevent shearing cooperation with the stationary blade.

The apparatus thus far described relates to the collating, interleaving, feeding and shearing of a plurality of webs arranged in adjacent relationship. After the webs have been collated and interleaved they are directed through an adhesive applying apparatus which places one or more lines of adhesive adjacent the edge of the webs for causing adherence between the webs before the same engage the feeding and aligning device 15. The adhesive applying apparatus consists of a frame having a guide rod 142 extending between opposite sides of the frame 141 for each paper web which may be passed through the machine. When carbon webs are to be interleaved between adjacent paper webs a guide rod 143 is provided for each of the carbon webs, and is arranged in parallel spaced relationship with respect to the guide rod 142. A plurality of rods 144 extend between opposite sides of the frame 141 and are arranged in parallel alignment with the rods 142 and 143. The rods 144 are adapted to be paired to support an adhesive supply container 145. The adhesive supply container 145 is secured to the rods 144 in any suitable fashion to retain the container in a proper position for applying one or more lines of adhesive to a paper web.

The adhesive supplying container 145 is provided with one or more adhesive applying disks 146 which are secured upon a shaft 147 extending through the side walls of the adhesive supplying container 145. When a plurality of disks 146 is used in each supplying container then a suitable spacing collar 148 is used to retain the disks in proper spaced relationship with respect to one another. The shaft 147 extends from the adhesive supplying container 145 into engagement with the hub 149 of a driving gear 150 for the adhesive applying disk 146. The shaft 147 is suitably clutched into the hub 149 so that the shaft 147 and the adhesive supplying container 145 can be removed from the frame 141. The adhesive supplying container 145 extends beyond the frame 155 as shown in Figure 20, so that the interior of the container can be viewed through

the space between the frames 155 and 141 to determine the quantity of adhesive in the container and to supply adhesive to the container when necessary without occasioning stopping of the machine to replenish the adhesive supply in the supply container 145.

An adhesive supplying container 145 is provided in the frame 141 for each paper web passing through the adhesive applying device 30, with the exception of the lowermost paper web.

A roll 151 receives the paper and carbon webs from the guide rods 142 and 143, the paper web 175 being directed from the roll 151 over an adhesive applying disk or disks 146 in an adhesive supplying container 145. A roll 152 is carried upon an arm 153 pivoted to an auxiliary frame 155 by means of a rod 154. The roll 152 is shown in more detail in Figure 23 wherein the surface of the roll 152 is provided with an annular recess 156 for each of the adhesive applying disks 146 disposed within the adhesive supply container 145. In this instance there are two adhesive applying disks 146 and therefore two annular recesses 156 provided in the roll 152. The annular ring 157 disposed between the annular recesses 156 is adapted to be positioned between the adhesive applying disks 146 to insure engagement of the paper web 175 with the periphery of the adhesive applying disks 146, the roll 152 resting upon the paper web 175 at a point adjacent the adhesive applying disks 146 and being retained adjacent the periphery of the adhesive applying disks 146 by means of the rod 154 and the roll 152.

The carbon web 160 passes over the roll 151 into engagement with a roll 158. The roll 158 is shown in more detail in Figure 22. This roll 158 has an annular recess 159 on one end thereof which is disposed adjacent the line of adhesive applied upon the paper web 175a passing over the roll 158 and on top of the carbon web 160. The recess 159 is provided to clear the wet adhesive line on the paper web 175 to permit the adhesive line to engage the next successive paper web 175 below the paper web 175a to retain the webs in secured adjacent relationship.

The carbon webs 160 and 160a are somewhat narrower than the paper webs 175, 175a and 175b so that when the carbon web is disposed in proper relationship with respect to the paper webs there will be a portion of the paper web exposed on either side of the carbon web.

As shown in Figure 26, the carbon web forms a carbon sheet between adjacent paper sheets in an all set multiple copy form. To produce the all set form two lines of adhesive 161 and 162 are applied adjacent one edge of the continuous paper web passing through the collating machine. The inner adhesive line 161 engages the edge of the carbon web 160, while the outer adhesive line 162 engages the paper web 175 disposed below the top paper web 175a, whereby the carbon and paper sheets are retained in secured relationship. Holes 163 are provided in the edge of the paper webs upon which the adhesive is applied and are located between the lines of adhesive 161 and 162. These holes may be used for filing holes for the form.

When the paper and carbon webs are threaded through the adhesive applying apparatus 30 the auxiliary frame 155 is pivoted upon the parallel arms 164 and 165 so that the auxiliary frame 155 is moved upwardly and away from the main frame 141 whereby the threading of the paper and carbon webs through the adhesive applying apparatus 30 is greatly facilitated and the paper and carbon webs are retained out of engagement with the adhesive applying disks 146 until all of the webs have been threaded and brought into proper aligned relationship upon the table top 81.

In order to transversely align the carbon webs 160 and 160a with respect to the paper webs 175, 175a and 175b, while in the adhesive applying apparatus 30, collars 166 and 167 are provided on the guide rods 143 and 142 respectively. These collars are disposed adjacent the edges of the respective webs and maintain the webs in proper transverse position with respect to one another. A wire loop 168 is provided upon each of the rods 142 and 143 for applying a slight frictional resistance to the movement of a carbon web over the guide rod. In the disclosure of Figure 24 the guide rods 143 carry the carbon webs and therefore the wire loops 168 have been positioned adjacent the set screws 169 in a position so that the carbon webs 160 and 160a are caused to travel around the loops 168 and increase the arc of contact upon the guide rods 143, whereby the carbon web between the guide rod 143 and the roll 158 is retained in somewhat of a taut condition.

When applying liquid adhesive, such as glue, upon the paper webs it is desirable that the glue shall be applied in a smooth even line and that the quantity of glue shall be distributed evenly throughout the entire line of adhesive. To prevent accumulation of liquid adhesive in spots upon the paper web it is necessary that the peripheral speed of the adhesive applying disks 146 shall be the same as the peripheral speed of the paper webs passing over the disks 146, thereby eliminating any rubbing action between the disks and the paper web. Also, since this apparatus is a type wherein the paper web is fed in increments or predetermined length by a reciprocating feeding mechanism the webs will start and stop intermittently. Therefore, the adhesive applying disks 146 must not be rotated continuously but only when the webs are moved with respect to the disks 146 during the feeding motion of the feeding mechanism 10. To accomplish this purpose the adhesive applying disks 146 are rotated by apparatus interconnecting the driving gears 150 for the adhesive applying disks with the oscillating arm 27 of the driving mechanism 10.

As shown in Figure 20, the gear 150 for the adhesive applying device engages a gear 170 secured upon a shaft 171. The shaft 171 carries a gear 172 engaging a gear 173 carried upon a shaft 174. The shaft 174 carries a sprocket wheel 176 (also shown in Figure 6). The sprocket wheel 176 has a ratchet wheel 177 associated therewith and secured thereto, the sprocket wheel and the ratchet wheel being freely rotatable upon the shaft 174. The ratchet wheel extends within a casing 178 which carries a ratchet pawl 179 spring pressed into engagement with the ratchet wheel 177 by means of a light spring 180. The casing 178 has a hub 181 thereon for supporting the casing upon the shaft 174, and has a set screw 182 for securing the hub 181 to the shaft 174.

A sprocket chain 183 engages the sprocket wheel 176 and has one end thereof secured to a block 184 carried upon the end of a rod 185 which extends from the block 70 secured to the slide 71 of the feeding and aligning mechanism 15 (as shown in Figures 6 and 15). The block 184 has a slot therein to receive the pivot pin 69 which connects the oscillating arm 27 to the arm 28 for reciprocating the feeding and aligning mechanism 15.

The opposite end of the sprocket chain 183 is

secured to a lever arm 186 suitably pivoted upon the frame of the table 20. A spring 187 is secured between the frame of the table 20 and the arm 186 tending to retain the sprocket chain 183 under tension (shown in Figure 6).

When the oscillating arm 27 is driven by the drive mechanism 10 the sprocket chain 183 will be moved in a leftward direction, as viewed in Figure 6, to rotate the sprocket wheel 176 and thereby rotate the ratchet wheel 177 (shown in Figure 20). The shaft 174 is driven through the ratchet wheel 177 and the pawl 179 to rotate the gear 173 and thus through the train of gears heretofore described and rotate the adhesive applying disks 146. The gear arrangement between the shaft 174 and the shaft 147 is such that the adhesive applying disks are rotated at the peripheral speed of the paper web passing over the adhesive applying disks 146. Of course when the oscillating arm 27 moves in a rightward direction (as seen in Figure 6) the pawl 179 will ride over the ratchet wheel 177 without causing any rotation of the shaft 174, thereby the adhesive applying disks will remain stationary during the return stroke of the oscillating arm 27.

To produce a plural copy all set form upon the collating, interleaving and form aligning apparatus of this invention, the paper webs are printed with repeated form faces and are provided with holes along one edge thereof at regular spaced intervals. The web is then wound into a suitable roll which forms the supply roll for the collating machine. A plurality of prepared supply rolls is disposed upon a suitable rack adjacent the collating machine of this invention. Supply rolls of carbon web are also disposed upon a rack adjacent the collating machine and are arranged with respect to the paper web supply rolls so that a carbon web may be disposed between two paper webs.

The paper webs and carbon webs are threaded over the feed rolls 44, with a carbon web disposed between adjacent paper webs. The plurality of webs is suspended between the feed rolls 44 and the adhesive applying apparatus 30 so that a web loop 191 is provided in each of the paper and carbon webs and disposed below the adhesive applying apparatus 30 (as shown in Figure 1). The carbon and paper webs are then threaded through the adhesive applying apparatus 30 (as shown in Figure 24). The plurality of webs is then drawn across the table top 81 into engagement with the feeding and aligning device 15.

The paper webs 175, 175*a* and 175*b* are located in their proper position with respect to the adhesive applying disks 146 by means of the collars 167 disposed upon the rods 142 so that the adhesive applying disks 146 will apply parallel lines of adhesive adjacent one edge of the paper webs. The carbon webs 160 and 160*a* are aligned transversely of the paper webs by means of the collars 166 upon the rods 143 so that a portion of the paper web extends beyond opposite sides of the carbon web, and one edge of the carbon webs is in alignment with the inner line of adhesive 161 on the paper webs.

The carbon and paper webs are brought into adjacent relationship (as shown in Figure 24) so that the carbon webs will adhere to the inner line of adhesive 161 and the paper webs will be secured together by means of the outer line of adhesive 162.

Before the paper webs are disposed in engagement with the adhesive applying disks the plurality of paper webs is brought into engagement with the feeding and aligning device 15 so that the holes 163 in the edge of the paper webs engage the pins 83 of the feeding and aligning device 15. The auxiliary frame 155 of the adhesive applying apparatus 30 can then be lowered to cause engagement of the paper webs with the adhesive applying disks 146. The machine can then be put into operation so that the feeding and aligning device 15 will reciprocate adjacent the edge of the table top 81 for feeding the plurality of paper and carbon webs in increments of predetermined length.

When the feeding and aligning device 15 moves to its rearward position (as shown in Figure 1) the pins 83 are forced upwardly by means of the spring pressed actuating device 101 to penetrate the holes 163 in the edge of the paper webs. The crank pin 24 is rotated by the gear 18 and reciprocates in the slot 26 of the oscillating arm 27 to advance the paper webs 175, 175*a* and 175*b*, as well as the carbon webs 160 and 160*a*, a predetermined increment of length which is equal to the stroke of the oscillating arm 27.

As the arm 27 reaches the forward end of its stroke the pins 83 of the feeding and aligning device 15 will be released from engagement with the holes 163 in the paper webs. This is accomplished by means of the stop pin 97 and the lever 92 (see Figure 7), the springs 87 causing instantaneous removal of the pins 83 from the holes 163. The feeding and aligning device 15 can then be retracted into the position shown in Figure 1 for again engaging the holes in the paper web.

During the period of the retraction movement of the arm 27 the eccentric 33 of the shearing mechanism 25 actuates the head 137 to shear the plurality of webs at the dividing line between subsequent forms printed upon the face of the webs.

To change the operation of the machine to accommodate different size all set forms the stroke of the oscillating arm 27 is changed by means of the adjusting rod 68, whereby a longer or shorter form can be fed by the feeding device 15. To change the location of the feeding and aligning device with respect to the shearing mechanism 25 when the feeding and aligning device 15 is at the forward end of its stroke, the block 70 can be adjusted upon the slide 71. This adjustment permits the feeding and aligning device to approach the shearing device as closely as possible to prevent buckling of the paper web between the feeding device and the shearing device.

When the length of the form fed by the feeding and aligning device 15 is changed there must be a change in the quantity of web fed to the adhesive applying device. This change is accomplished by moving the friction disk 34 to change the speed of rotation of the feed rolls 44. If the loop 191 in the webs should become too short or too long during passage of the webs through the machine they can be altered manually by releasing the pressure roll 46 from the feed roll 44 to temperatrily stop feeding of the web or to pull the web across the feed roll by hand.

If it is desired the paper webs passing through the collating and interleaving machine of this invention can be transversely perforated to form a continuous web of all set forms which can be subsequently fan-folded into a suitable pack. Such an arrangement is shown in Figure 2. The apparatus of the machine does not require any

alteration to interleave, align and secure webs which are to be transversely perforated. The only alteration from the normal cycle of operation of the machine is that the shearing blade 138 is removed and a perforating blade substituted therefore. After the paper and carbon webs have been collated, interleaved, aligned and secured in the machine of this invention they will pass under the perforating blade which will perforate all the paper and carbon webs simultaneously at the same point as though they were to be severed by the shear blade 138. The stationary knife 139 could be moved forward to provide a back plate for the perforating blade or a separate back plate can be provided. The perforated webs can then be fan-folded into a suitable pack.

Figures 27 to 32 show a slightly modified arrangement of the apparatus of this invention, whereby the adhesive applying apparatus can be eliminated and a wire stitching apparatus can be substituted for securing a plurality of inter-leaved paper and carbon webs in adjacent relationship which can be subsequently severed. Figures 30 to 32 disclose different arrangements for stitching a plurality of paper and carbon sheets together to produce an all set form. In Figure 30 the wire stitching 212 is provided along one side 213 of the all set form 214. This position of the stitching permits the all set form to be opened in the same manner as the leaves of a book. In Figure 31 the stitching 215 is disposed adjacent one end 216 of the all set form 217. In this instance the carbon sheets 218 extend to the edge of the right-hand end 216 of the figure so that the wire staples extending through the plurality of sheets will hold the carbon sheets between the paper sheets. In Figure 32 there is shown a continuous web 220 of all set forms which have been stitched along one side thereof (as shown in Figure 30) and are arranged in a fan-folded pack 221. The location of the stitching can be readily altered according to the form being fed through the machine by properly positioning a wire stapling machine adjacent the stack of paper and carbon webs as they pass beneath the stitching machine. The fan-folded arrangement shown in Figure 32 can readily be obtained by feeding the continuous web of forms through a suitable fan-folding apparatus.

In Figure 27 there is shown a detailed view of an apparatus adapted to force wire staples through a collated and interleaved web stack for locating the staples in the manner shown in Figure 30.

In this arrangement the collated and interleaved stack of paper and carbon webs passes along the table top 192 toward the shearing apparatus 193. The head 194 of the shearing apparatus 193 carries a knife blade 195 adapted to cooperate with a stationary shearing plate 196, which in this instance is shown as the edge of the table top 192. The head 194 is operated in the same manner as the head 137 of the shearing device 25 previously described. A suitable spring pressed clamping bar 197 is carried by the head 194 for engaging the stack of paper and carbon webs prior to the time the knife blade 195 shears the stack of webs.

The head 194 is provided with an extending bracket 198. A plate 199 is disposed adjacent the bracket 198 and is adapted to operate a wire stapling or stitching device 200. The bracket 198 has a slot 202 therein and the plate 199 has a slot 203 therein adapted to receive a bolt 201. Movement of the plate 199 with respect to the bracket 198 permits the wire stapling or stitching device 200 to be changed in its spaced relationship with respect to the head 194 for accommodating forms printed upon the face of the webs passing across the table 192 having different widths, whereby the stitching or stapling will always be disposed closely adjacent an edge of the form. The wire stapling or stitching device may be of any commercial type, such as those built by the Boston Wire Stitcher Company and known under the trade-name "Bostitch."

The actuating arm 204 of the wire stitching or stapling device 200 is actuated by the plate 199 so that the stapling or stitching operation occurs simultaneously with the shearing operation. Therefore, the same mechanism which operates the shearing device 193 drives the wire stitching or stapling device 200. The stapling device 200 is suitably secured to the table top 192 by means of bolts 205 which are adjustable in suitable slots provided in the table top 192 for permitting the stapling device to be moved with respect to the shearing device 193. A suitable anvil or clinching device 206 is disposed beneath the table 192 and cooperates with the stapling device 200 for bending or clinching the wire staples which have been forced through the web stack by the stapling device 200.

The paper and carbon webs are fed through the machine cooperating with the apparatus of Figure 27 in the same manner as heretofore described with regard to the apparatus of Figure 1. However, it may be desirable to remove a strip from the edge of the paper and carbon webs which has the holes therein for feeding and aligning the forms. If such is desirable a slot 207 is provided in the table top 192 which has a knife edge 208. The body 209 of the form rests upon the table top 192, while the narrow strip 210 along one edge of the body 209 of the web is directed downwardly through the opening 207. Thus, forward advancement of the body 209 of the web through the machine causes the knife edge 208 to sever the strip 210 from the body 209. It is of course understood that the severing of the strip 210 (as shown in Figures 27 and 28) is not limited to use with the apparatus shown in Figure 27, but that the same device can be used in combination with the apparatus disclosed in Figure 1 for removing the holes in the edge of the paper webs.

While the disclosure of the apparatus herein constitutes preferred forms of the apparatus, it is to be understood that modifications of the apparatus can be made to alter the mechanical construction thereof without departing from the spirit of the invention, and that such modifications are included with the scope of this invention, and are intended to be included within the scope of the appended claims.

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

1. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length, shearing means for severing lengths of web as fed by said feeding mechanism, a driving mechanism for said feed rolls and said feeding means comprising a power source, shaft means driven by said power source, a crank pin carried by said shaft means, an arm oscillated by said crank pin and engaging said feeding mechanism

for reciprocating the same, a friction disk carried by said shaft means, a friction wheel driven by said friction disk, means driven by said friction wheel for driving said feed rolls, and means driven by said shaft means for operating said severing means when said arm is in a predetermined position.

2. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length, shearing means for severing lengths of web as fed by said feeding mechanism, a driving mechanism for said feed rolls and said feeding means comprising a power source, shaft means driven by said power source, a crank pin carried by said shaft means, an arm oscillated by said crank pin and engaging said feeding mechanism for reciprocating the same, a friction disk carried by said shaft means, a friction wheel driven by said friction disk, means driven by said friction wheel for driving said feed rolls, and means driven by said shaft means for operating said severing means when said arm is moving away from said severing means.

3. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length, shearing means for severing lengths of web as fed by said feeding mechanism, a driving mechanism for said feed rolls, and said feeding means comprising a power source, shaft means driven by said power source, a crank pin carried by said shaft means, an arm oscillated by said crank pin and engaging said feeding mechanism for reciprocating the same, a friction disk carried by said shaft means, a friction wheel driven by said friction disk, means driven by said friction wheel for driving said feed rolls, and means for releasing driving engagement of said feed rolls upon the webs when manually adjusting the length of web between said drawing means and said feeding mechanism for compensating for error of said friction drive means.

4. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length, shearing means for severing lengths of web as fed by said feeding mechanism, means for reciprocating said feeding mechanism comprising drive means driven in a circle, an arm having pivot means mounting the same adjacent said drive means and engaged thereby for oscillation through a feeding stroke and a return stroke in a manner that said drive means said pivot means and the center of said circle are in alignment when said arm is at the median position of its oscillation stroke, whereby the feed stroke of oscillation is of substantially greater duration than the return stroke with an interval of substantially no movement thereof when the arm is passing through the transition point between feed and return strokes, and means actuating said shearing means co-ordinated with the stroke of said arm whereby to shear the web advanced thereto when the web is stationary.

5. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length, shearing means for severing lengths of web as fed by said feeding mechanism, means for reciprocating said feeding mechanism comprising drive means driven in a circle, an arm having pivot means mounting the same adjacent said drive means and engaged thereby for oscillation in a manner that said drive means, said pivot means and the center of said circle are in alignment when said arm is at the median position of its oscillation stroke, whereby one portion of the stroke of oscillation is of substantially greater duration than the other portion of the stroke, the movement of said arm being at the slowest point in the transition between the strokes of said arm, and means actuating said shearing means co-ordinated with the stroke of said arm whereby to shear the web advanced thereto when the arm has passed through said transition position.

6. In a collating machine for gathering a plurality of paper webs having equidistantly spaced perforations along at least one edge thereof, means for drawing a plurality of paper webs from supply rolls, and reciprocable feeding means receiving the webs from the withdrawing means for feeding the webs in predetermined increments of length that includes a reciprocable frame member for reciprocating along an edge of the webs, reciprocable pin means carried in said frame adapted to extend through the perforations in the webs for moving the webs thereby, means continuously urging withdrawal of the pin means from the perforations in the webs, lock means for holding said last mentioned means from actuation of said pin means, means for releasing said lock means at one end of the stroke of reciprocation of said feeding means, and means for moving said pin means through the perforations of the webs against the action of said continuously urging means when said feeding means is at the opposite end of the stroke of reciprocation, said lock means acting to hold said pins against withdrawal.

7. In a collating machine for gathering a plurality of paper webs having equidistantly spaced perforations along at least one edge thereof, means for drawing a plurality of paper webs from supply rolls, and reciprocable feeding means receiving the webs from the withdrawing means for feeding the webs in predetermined increments of length that includes a reciprocable frame member, pin means supported in said frame member for reciprocation relative thereto for engaging the perforations in the webs whereby to move the webs thereby, resilient means normally holding said pin means in a position wherein they are retracted from the perforations in the webs, means for moving said pin means into engagement with the perforations in the webs against the action of said resilient means, means operably engaging the pin means for locking said pin means in said last mentioned position, and means for releasing said last mentioned means from operable engagement with said pin means at one end of the stroke of reciprocation of said frame whereby to permit said resilient means to withdraw said pin means from perforations in the webs.

8. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length,

shearing means for severing lengths of web as fed by said feeding mechanism, a driving mechanism for said feed rolls and said feeding means comprising a power source, a crank pin drivingly connected with said power source, an arm pivotally mounted adjacent said crank-pin and engaged thereby for oscillation about said pivot, means connecting said arm with said feeding mechanism for reciprocating the same, means for adjusting the throw of said crank-pin to regulate the stroke of movement of said feeding mechanism, a friction disc drivingly connected with said power source for operation simultaneously with said crank-pin, a friction wheel driven by said friction disc, means driven by said friction wheel for driving said feed rolls, means for adjusting the position of said friction wheel upon said friction disc to adjust the speed of feeding of said feed rolls, and means drivingly connecting said shearing means with said crank-pin for operation synchronously therewith at a predetermined position of said crank-pin irrespective of the throw to which said crank-pin is adjusted.

9. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length, shearing means for severing predetermined lengths of web as fed by said feeding mechanism and drive means for said aforesaid mechanisms comprising a crank-pin driven in a circle, an arm having pivot means mounting the same adjacent said crank-pin and engaged thereby for oscillation through a feeding stroke and a return stroke of said feeding mechanism which is attached thereto in a manner that said crank-pin, said pivot means and the center of said circle are in alignment when said arm is at the median position of its oscillation stroke, whereby the feed stroke of oscillation is of substantially greater duration than the return stroke, and means drivingly connecting said shearing means with said crank-pin for synchronization therebetween for operation of said shearing means at a predetermined position of said crank-pin in its rotation about the circle of rotation followed by the crank-pin.

10. In a collating machine, feed rolls for drawing a plurality of webs from supply rolls, a reciprocating feeding mechanism for receiving the webs as drawn from the feed rolls for advancing the same in increments of predetermined length, shearing means for severing predetermined lengths of web as fed by said feeding mechanism, a power driven crank-pin having a predetermined circle of rotation, means for adjusting the throw of said crank-pin, an arm pivotally mounted adjacent said crank-pin and engaged thereby for oscillation thereof, said crank-pin, said pivot means and the center of the circle of rotation of the crank-pin being in alignment when said arm is at a median position of its oscillation stroke to thereby cause said arm to move at a greater rate in one direction of its oscillatory movement than in the other direction, means drivingly connecting said arm with said feeding mechanism to reciprocate the same and to regulate the stroke thereof as regulated by the throw of said crank-pin, and means drivingly connecting said shearing means with said crank-pin to actuate said shearing means during the slow movement of said arm.

11. A driving mechanism for a collating machine for operating a feeding mechanism and a shearing mechanism that consists of, a power driven crank-pin having a predetermined circle of rotation, means for adjusting the throw of said crank-pin, an arm pivotally mounted adjacent said crank-pin and engaged thereby for oscillation thereof, said crank-pin, said pivot means and the center of the circle of rotation of the crank-pin being in alignment when said arm is at a median position of its oscillation stroke to thereby cause said arm to move at a greater rate in one direction of its oscillatory movement than in the other direction, means drivingly connecting said arm with said feeding mechanism to reciprocate the same and to regulate the stroke thereof as regulated by the throw of said crank-pin, and means drivingly connecting said shearing means with said crank-pin to actuate said shearing means during the slow movement of said arm.

12. In a collating machine for collating a plurality of paper webs having equi-distantly spaced perforations along at least one edge thereof, means for drawing a plurality of paper webs from supply rolls, reciprocable feeding means for receiving the webs from the withdrawing means for feeding the webs in predetermined increments of length that includes, a reciprocable frame member reciprocable along an edge of the webs, pin means reciprocable in said frame and adapted to extend through the perforations in the webs for moving the webs thereby, an actuating member operably connected with said pin means, spring means for constantly urging said pin means out of engagement with the perforations in the webs, and means engaging said actuator upon actuation thereof to place said pin means in the perforations in the webs to hold said actuator and the pin means in the said position.

13. In a collating machine for collating a plurality of paper webs having equi-distantly spaced perforations along at least one edge thereof, means for drawing a plurality of paper webs from supply rolls, reciprocable feeding means for receiving the webs from the withdrawing means for feeding the webs in predetermined increments of length that includes, a reciprocable frame member reciprocable along an edge of the webs, pin means reciprocable in said frame and adapted to extend through the perforations in the webs for moving the webs thereby, an actuating member operably connected with said pin means, spring means for constantly urging said pin means out of engagement with the perforations in the webs, means engaging said actuator upon actuation thereof to place said pin means in the perforations in the webs to hold said actuator and the pin means in the said position, and means for releasing said last mentioned means when said feeding means is at one end of its stroke of movement to allow said spring means to withdraw said pin means from the perforations in the web.

14. In a collating machine for collating a plurality of paper webs having equi-distantly spaced perforations along at least one edge thereof, means for drawing a plurality of paper webs from supply rolls, reciprocable feeding means for receiving the webs from the withdrawing means for feeding the webs in predetermined increments of length that includes, a reciprocable frame member reciprocable along an edge of the webs, pin means reciprocable in said frame and adapted to extend through the perforations in the webs for moving the webs thereby, an actuating member operably connected with said pin

means, spring means for constantly urging said pin means out of engagement with the perforations in the webs, means engaging said actuator upon actuation thereof to place said pin means in the perforations in the webs to hold said actuator and the pin means in the said position, means for releasing said last-mentioned means when said feeding means is at one end of its stroke of movement to allow said spring means to withdraw said pin means from the perforations in the web, and resiliently acting means placed under compression by said feeding means when moving in the opposite direction of movement and released by said feeding means upon additional movement thereof in said opposite direction to move said actuating member for placing said pin means in engagement with perforations in the web.

CLAYTON E. WYRICK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
763,195	Mertz	June 21, 1904
1,497,296	Jappe	June 10, 1924
1,537,749	Colgrove	May 12, 1925
1,925,586	Fulk	Sept. 5, 1933
1,968,122	Brenn	July 31, 1934
2,100,776	Fulk	Nov. 30, 1937
2,148,586	Scudds	Feb. 28, 1939
2,168,415	Laukhuff	Aug. 8, 1939
2,210,567	Carroll	Aug. 6, 1940
2,308,086	Landrock	Jan. 12, 1943