Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 1

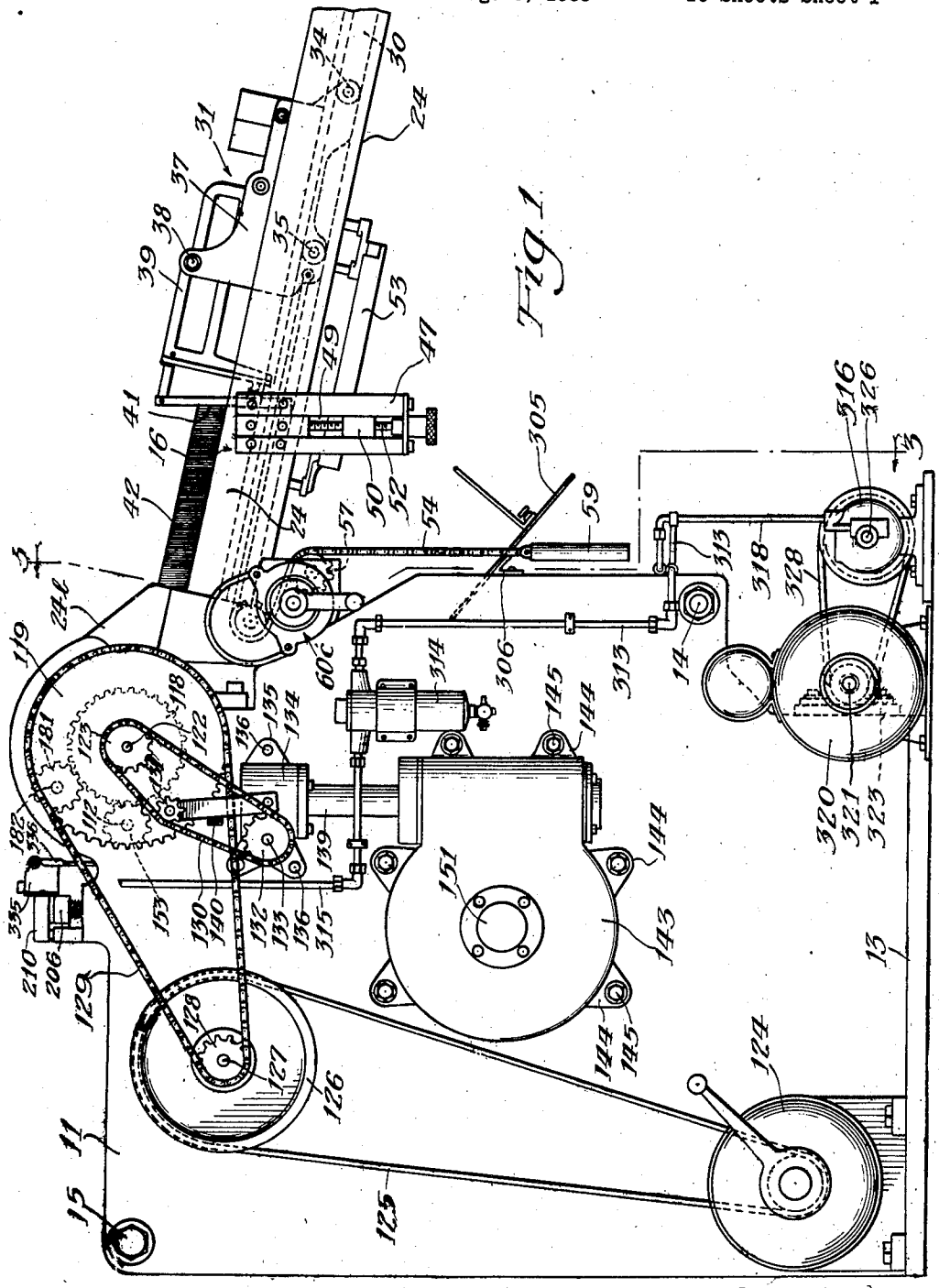


Fig. 1

Inventor:
Patrick Henry Roethe
By Dabel, Carlson, Leitzbaugh & Wells
Attorneys

Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 2

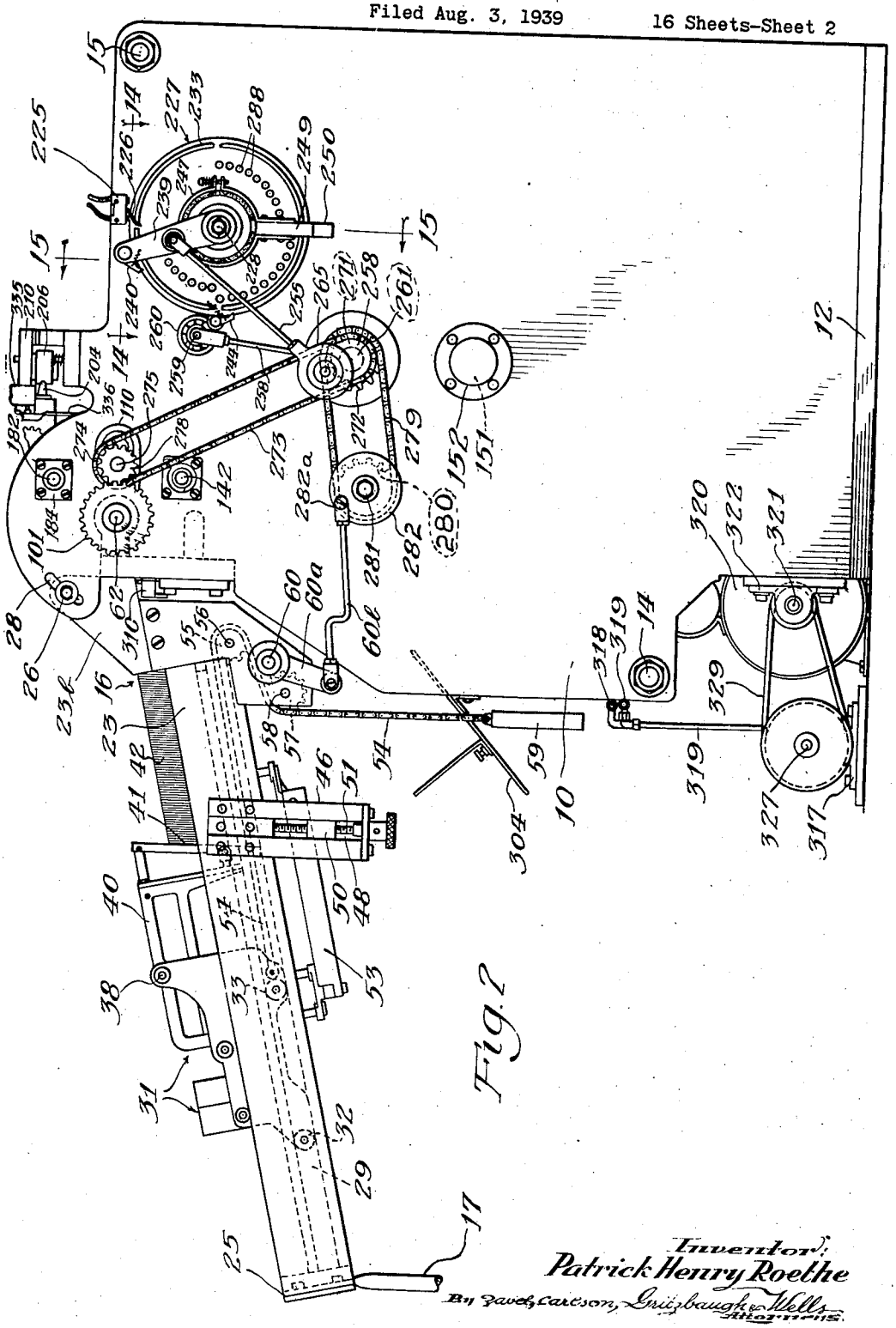


Fig. 2

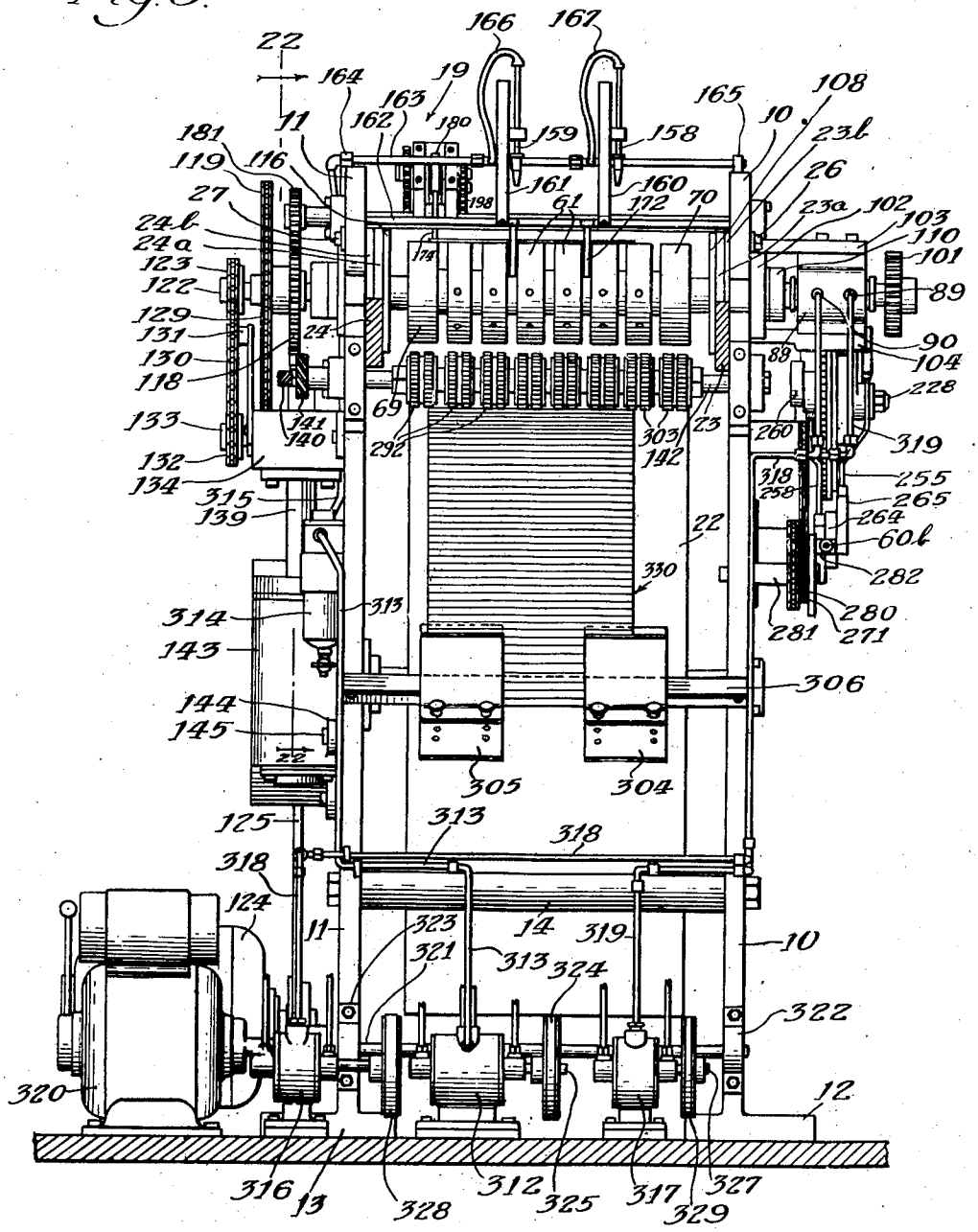
Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 3

Fig. 3.



Inventor:
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Attorneys

Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 4

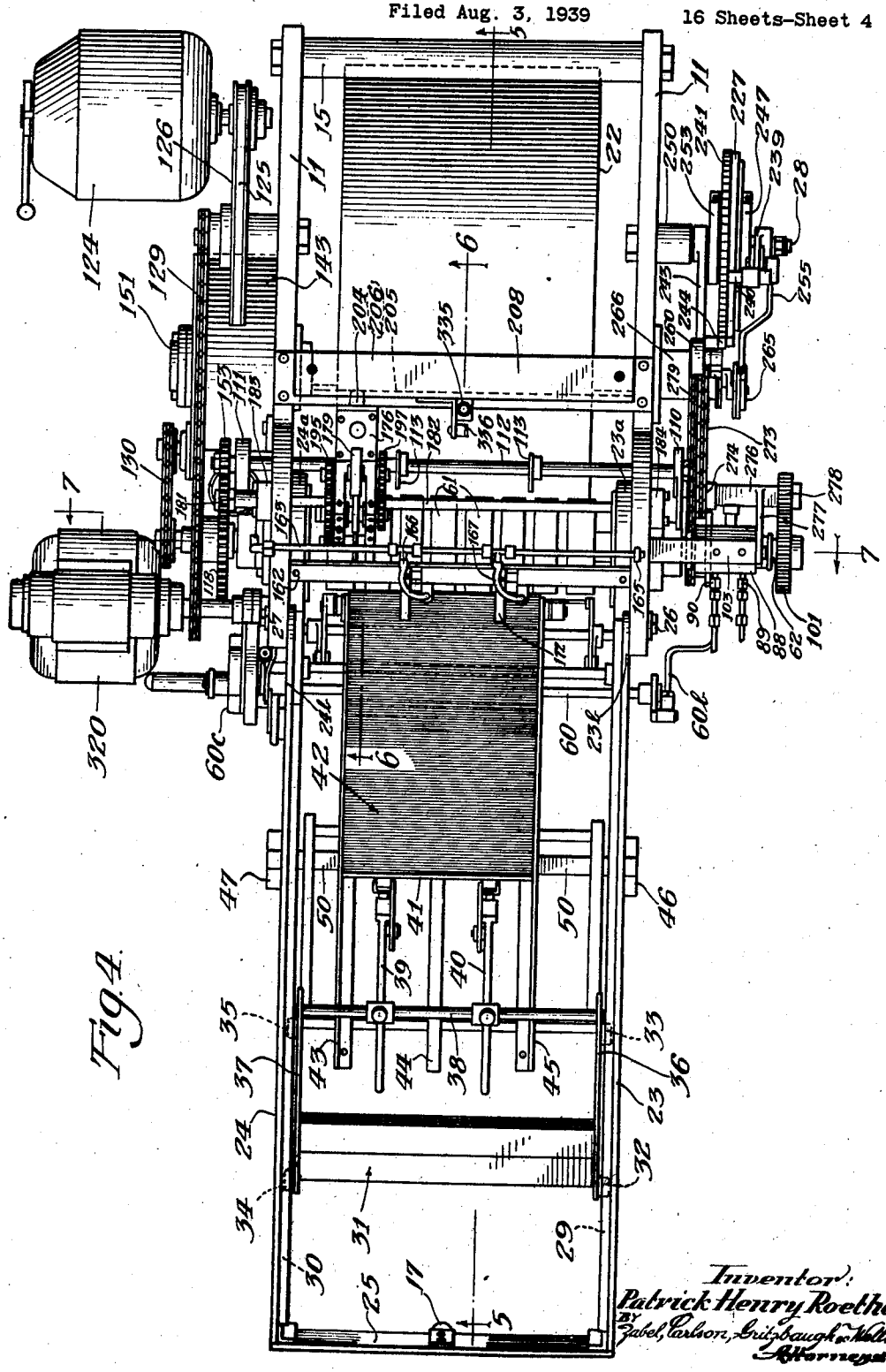


Fig. 4.

Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 5

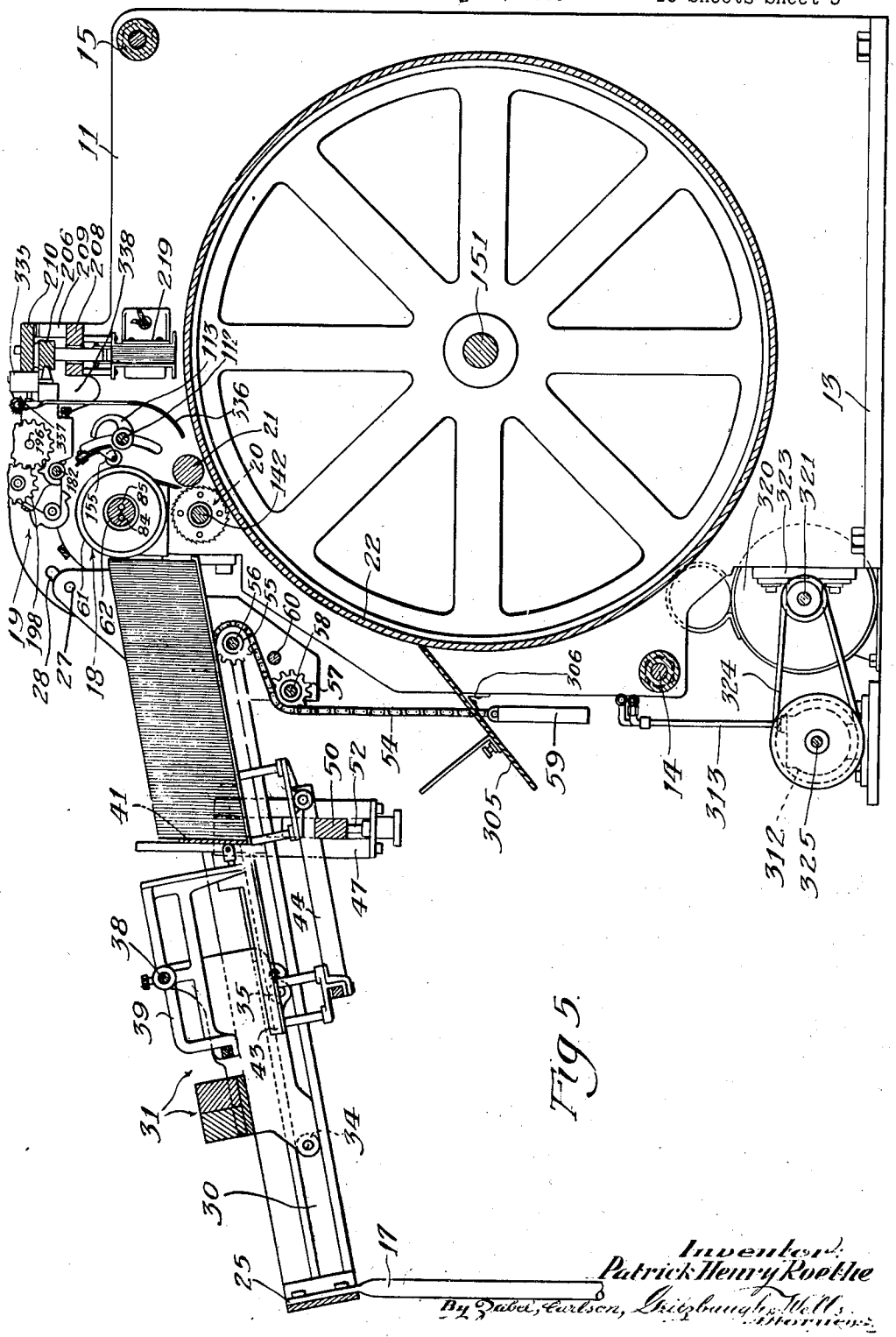


Fig 5.

Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 6

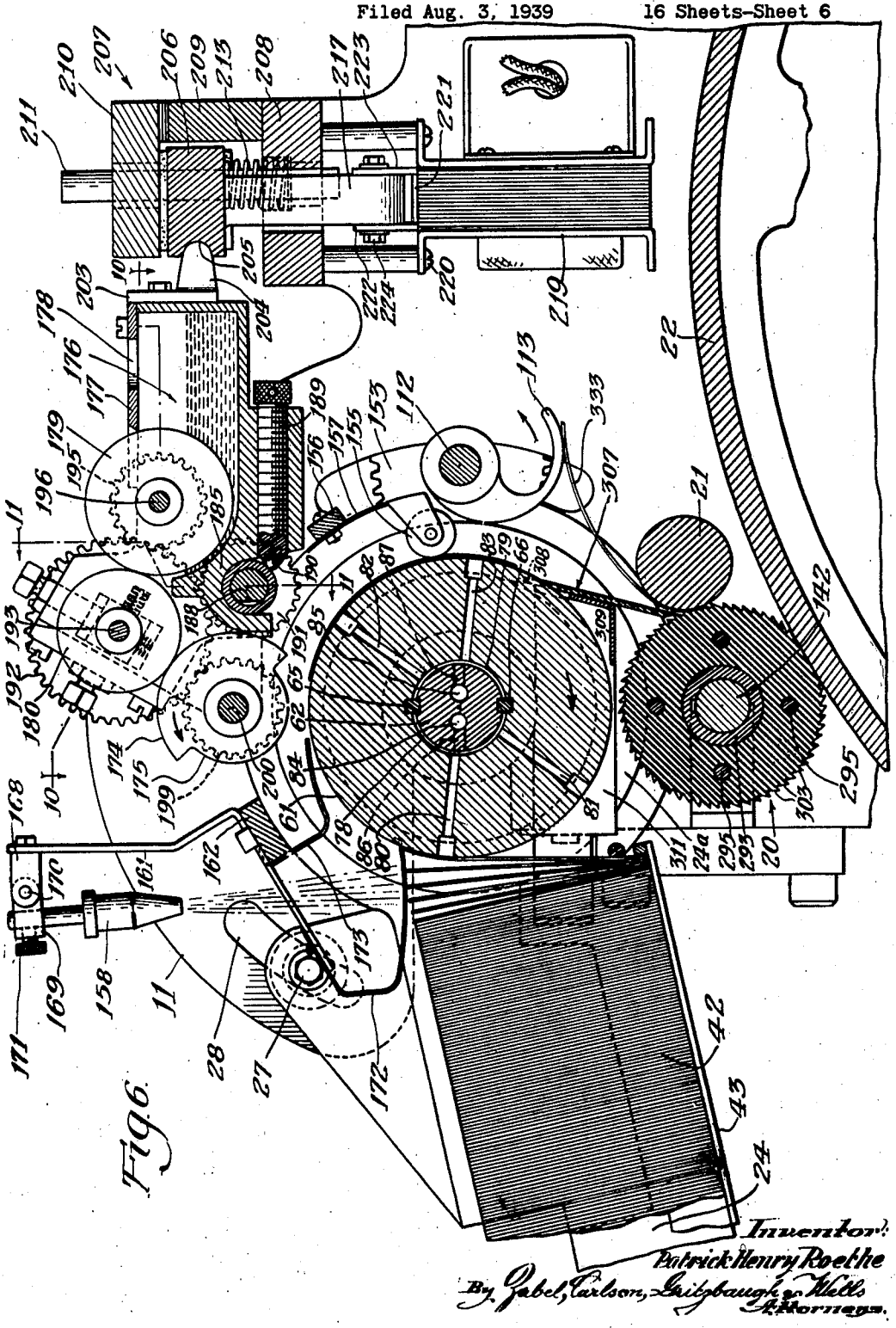


Fig. 6.

Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 7

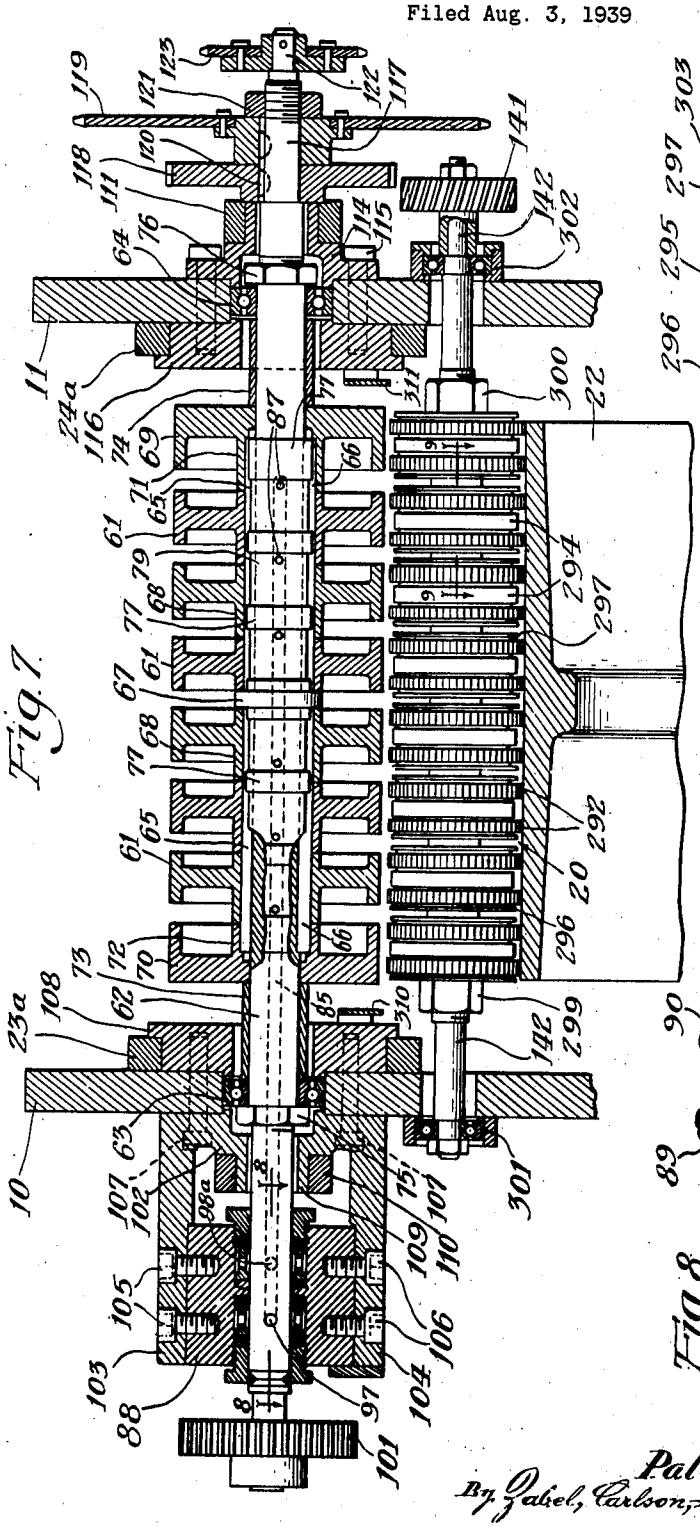


Fig. 7.

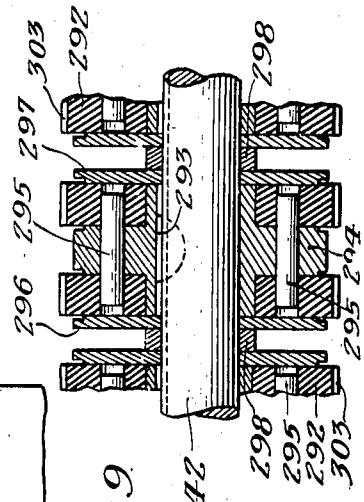


Fig. 9.

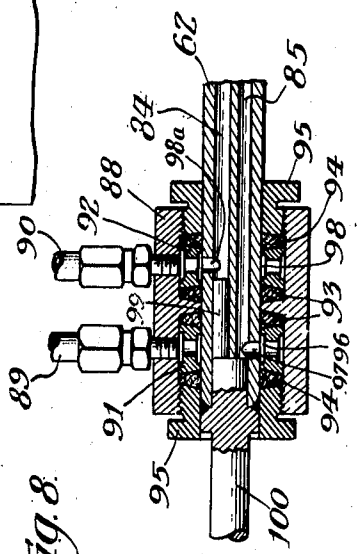


Fig. 8.

Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

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Fig. 10.

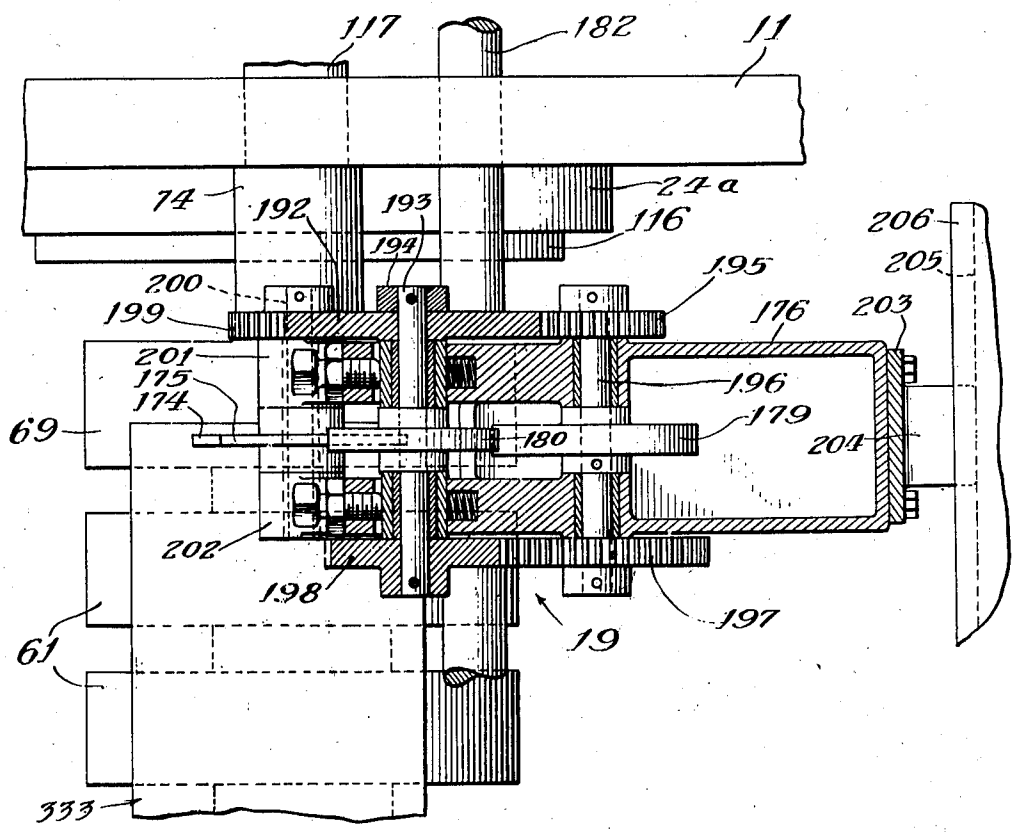
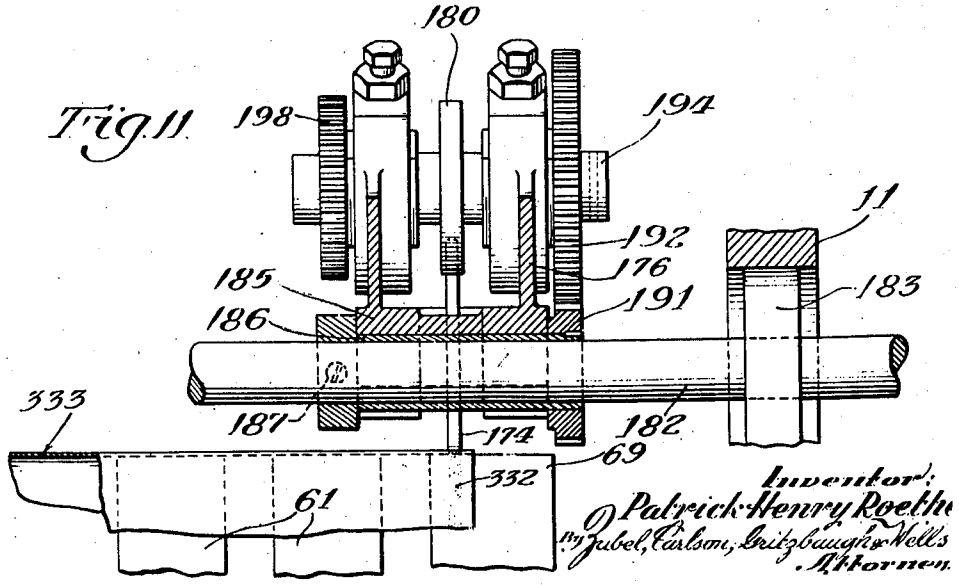


Fig. 11.



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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

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Fig. 12.

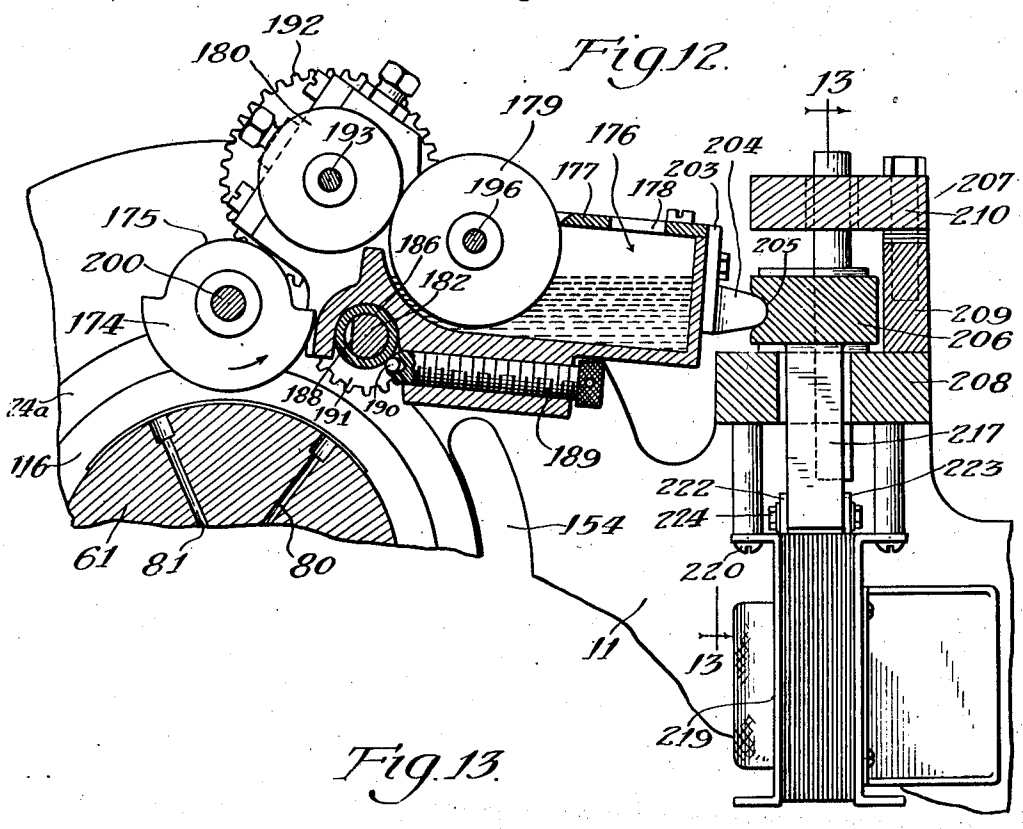
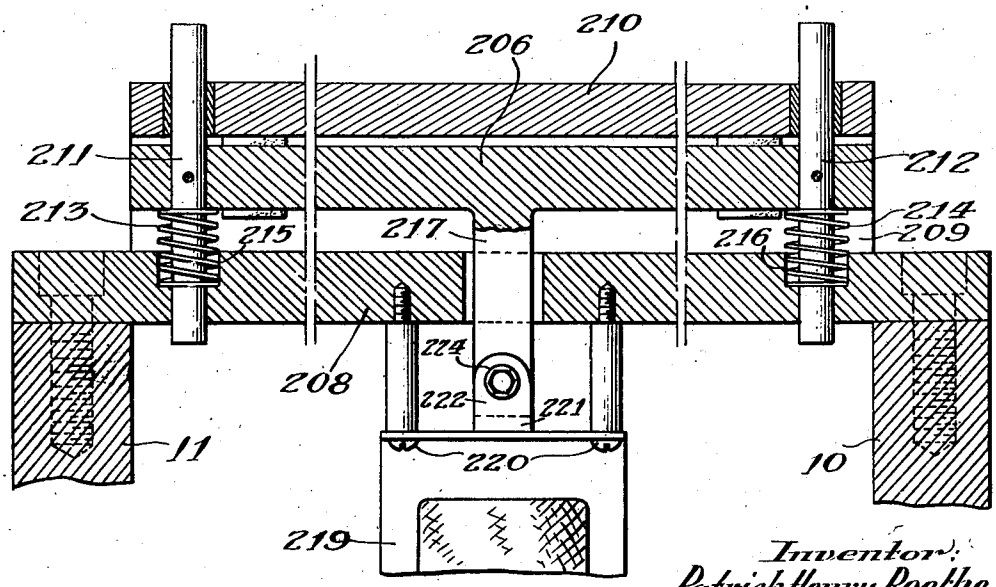


Fig. 13.



Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

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Fig. 14.

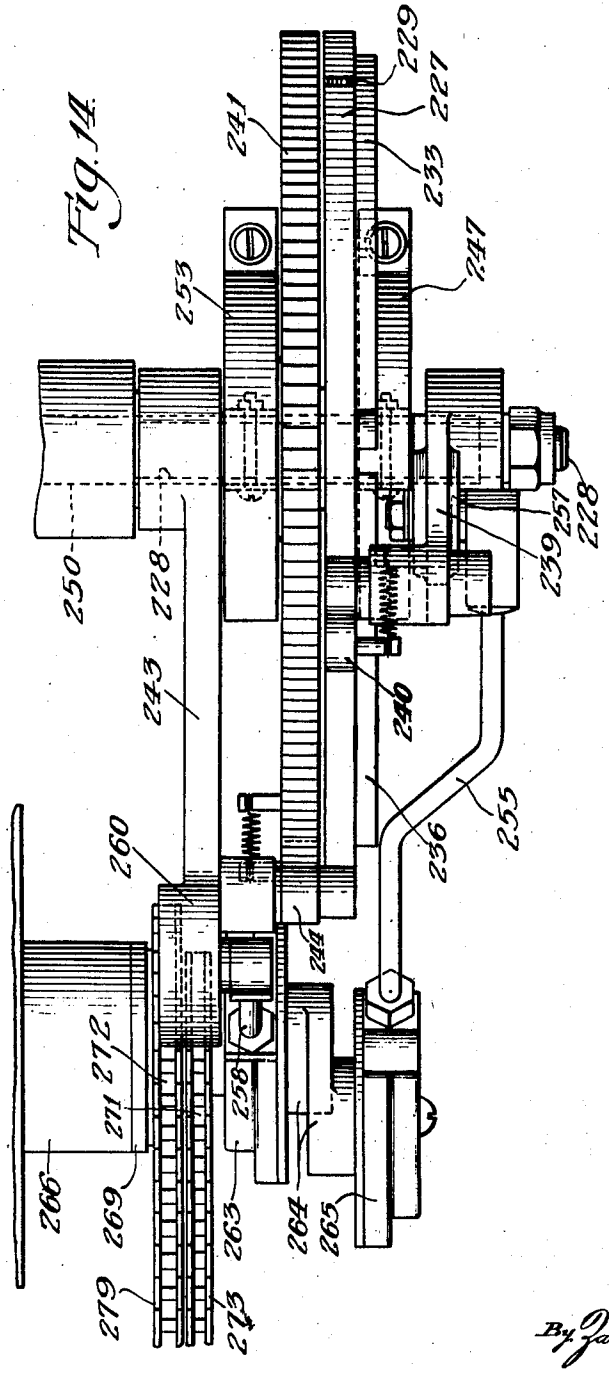


Fig. 19.

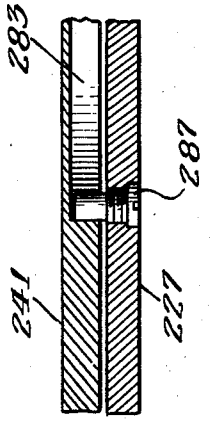
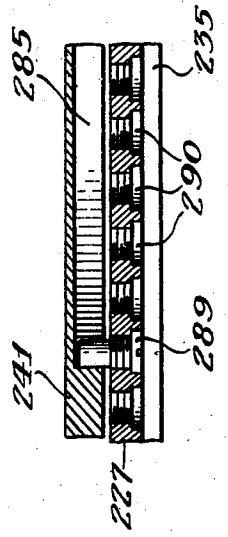


Fig. 18.



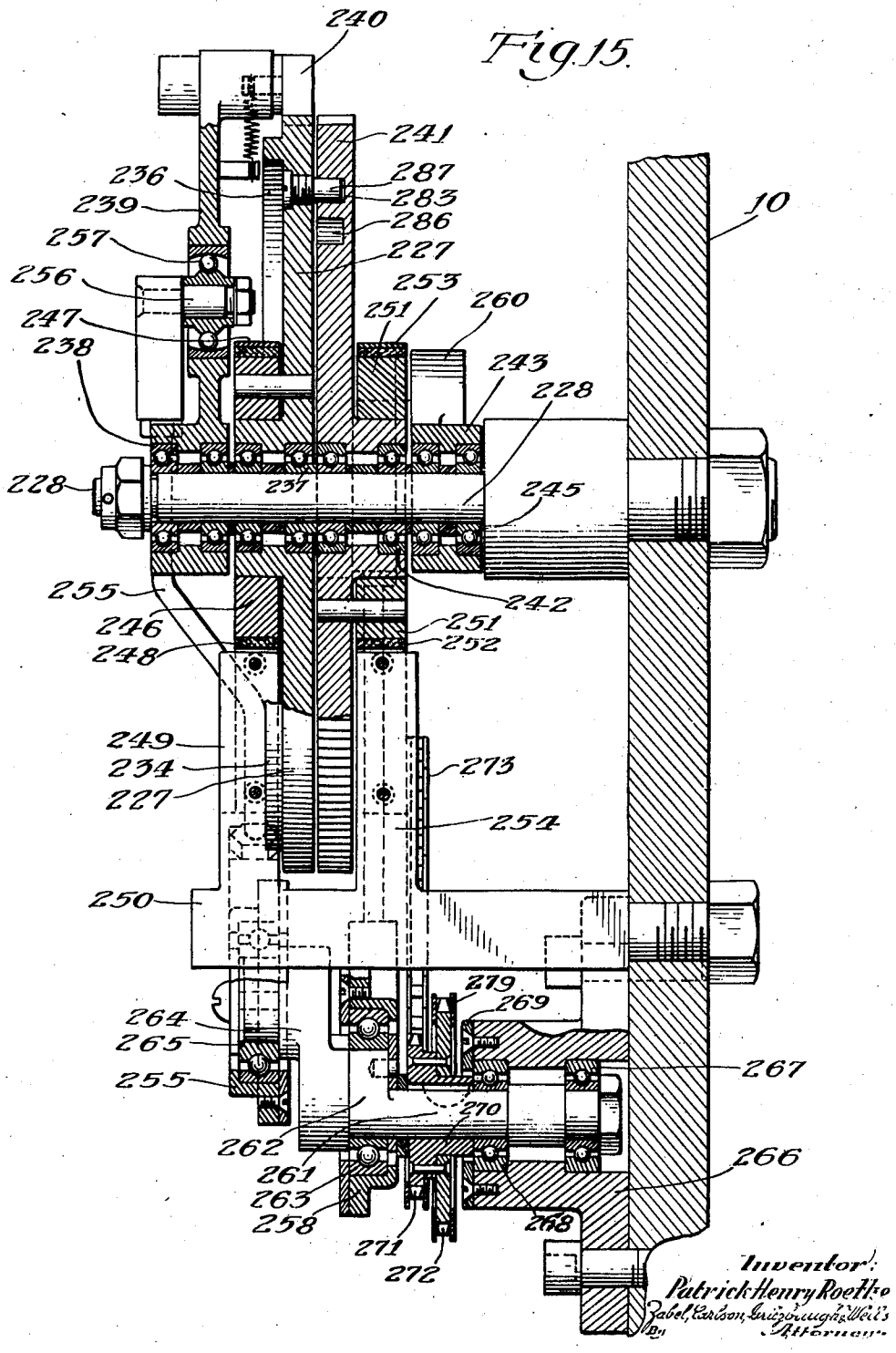
Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 11

Fig. 15.



Inventor:
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 12

Fig. 16.

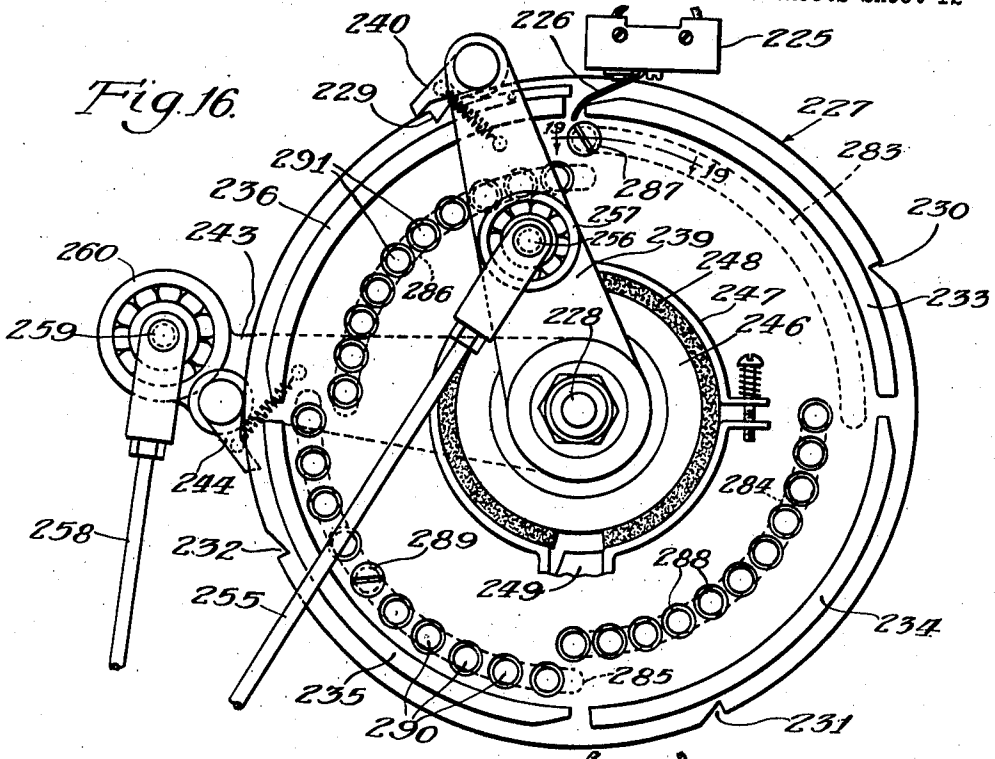
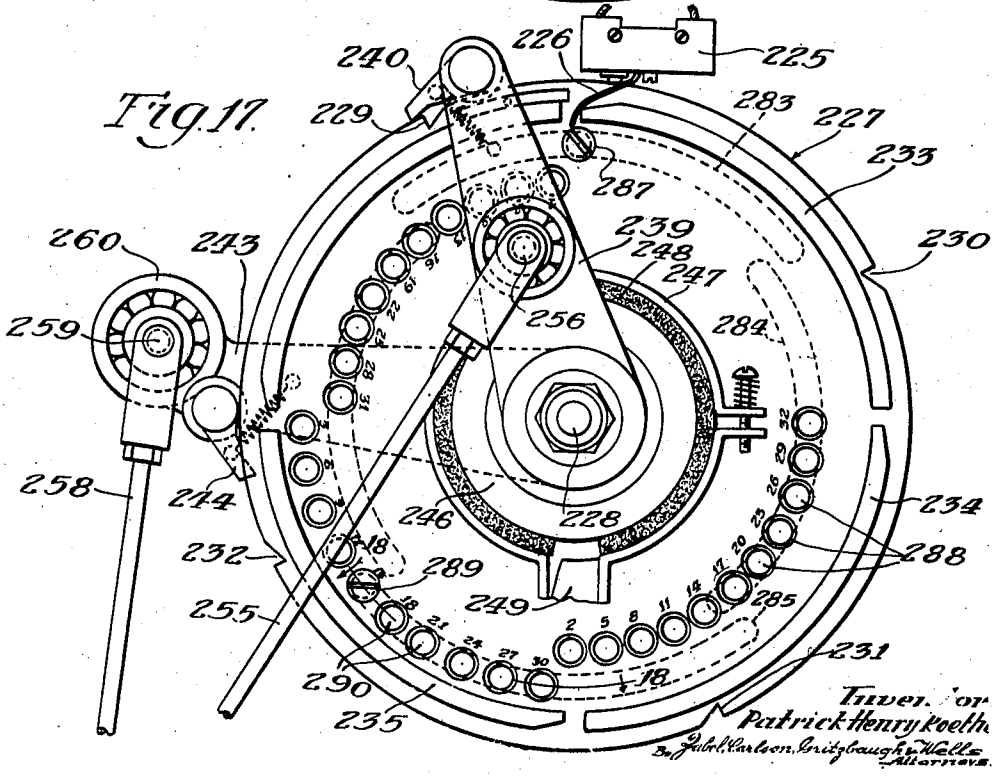


Fig. 17.



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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

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Fig. 20

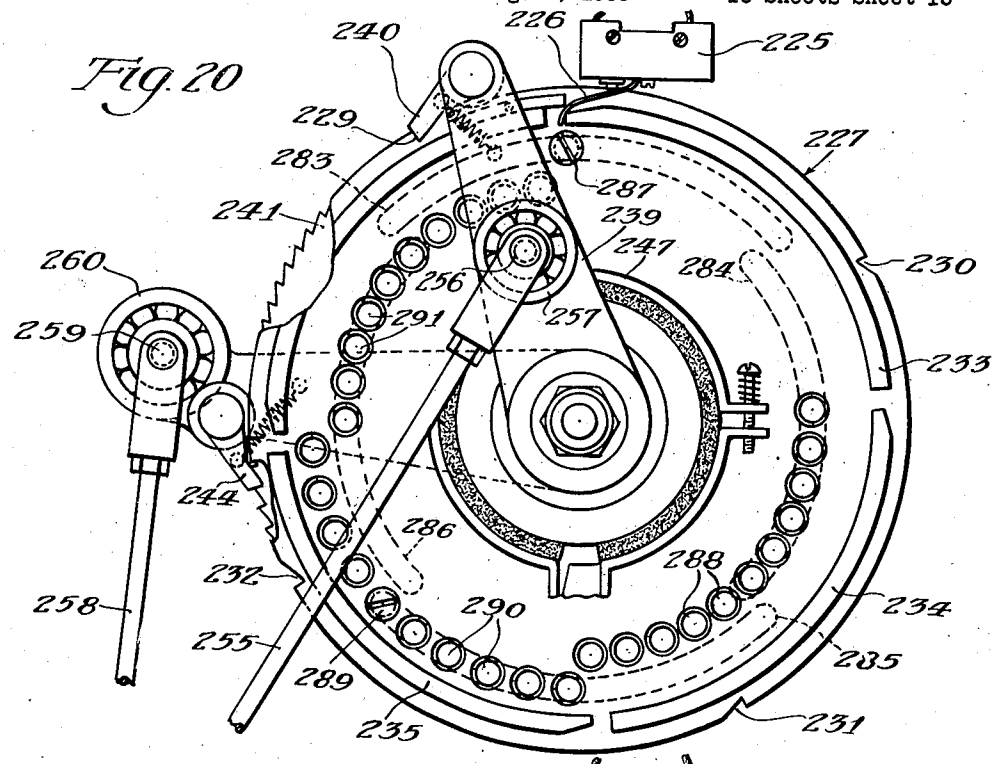
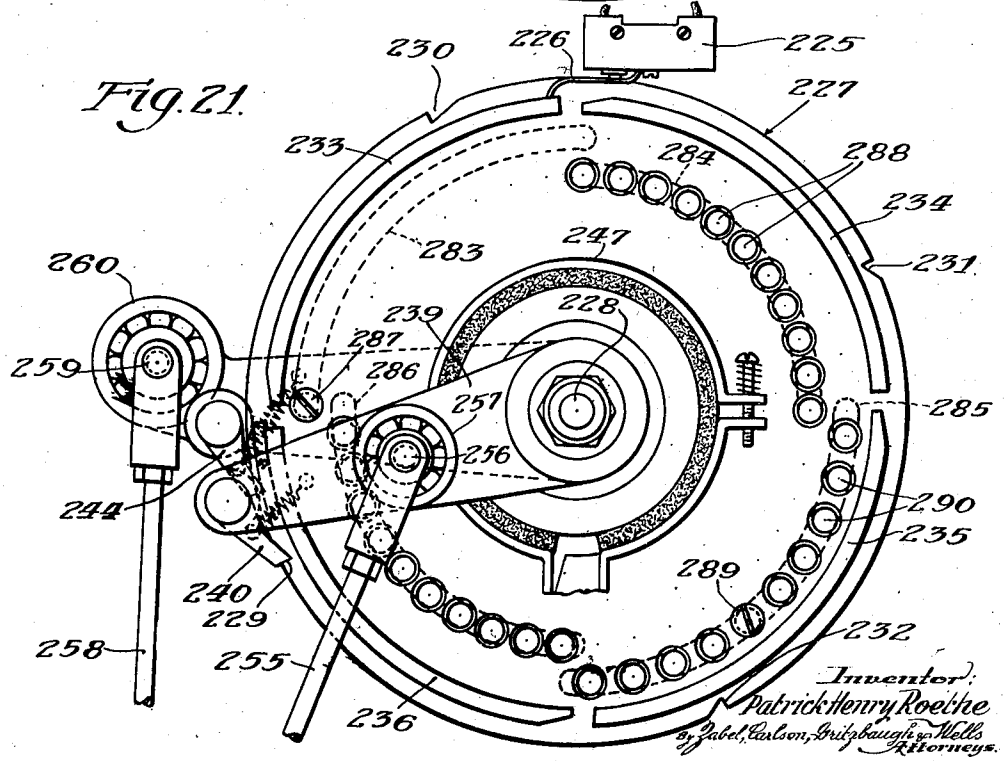


Fig. 21.



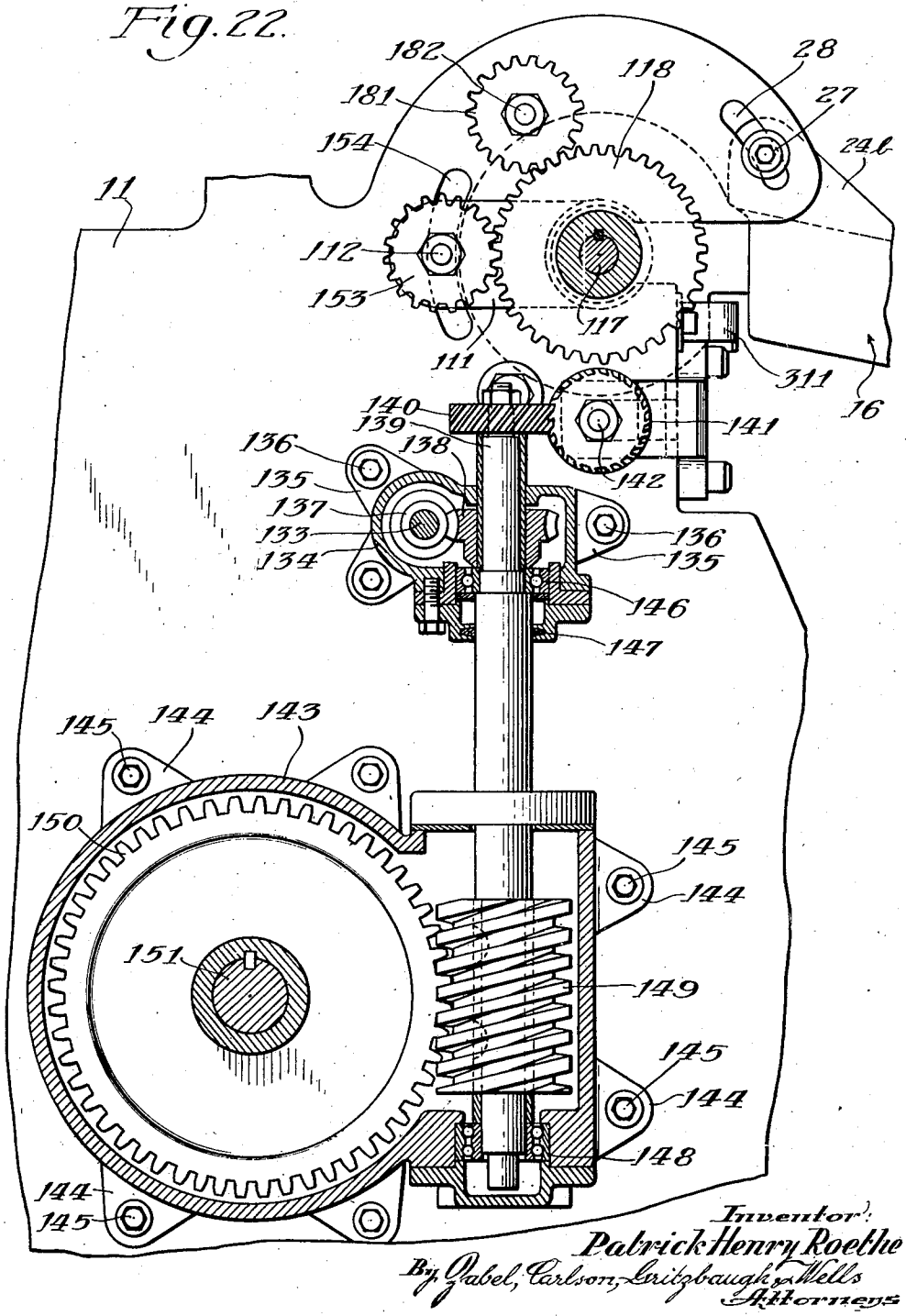
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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

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Fig. 22.



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Oct. 28, 1941. P. H. ROETHE 2,260,582

SHEET ASSEMBLING MACHINE

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Fig. 23.

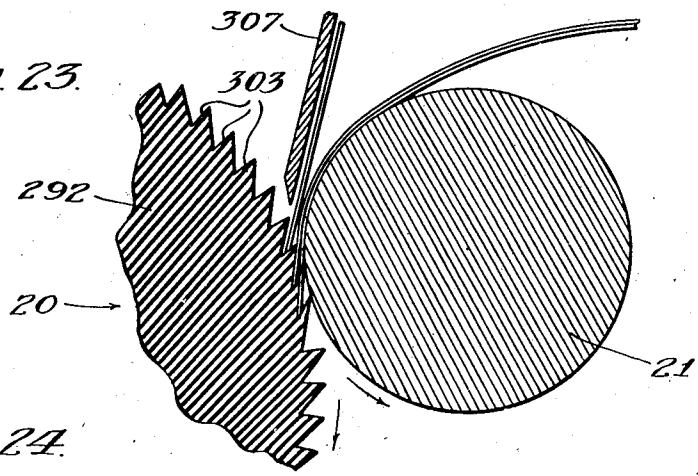


Fig. 24.

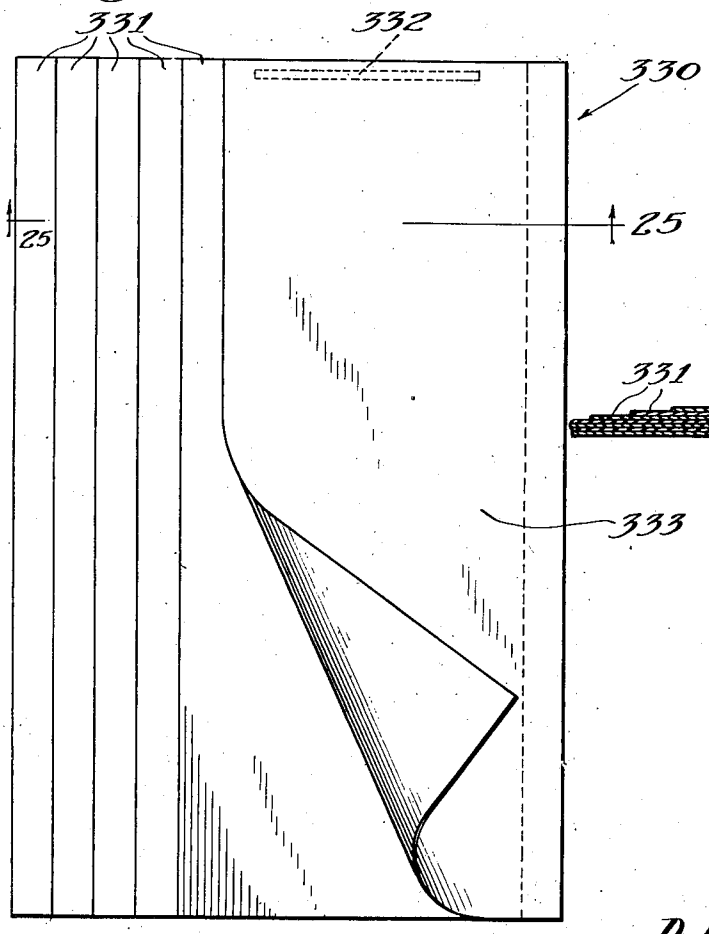
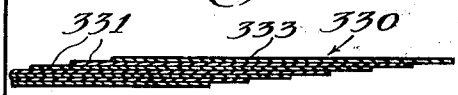


Fig. 25.



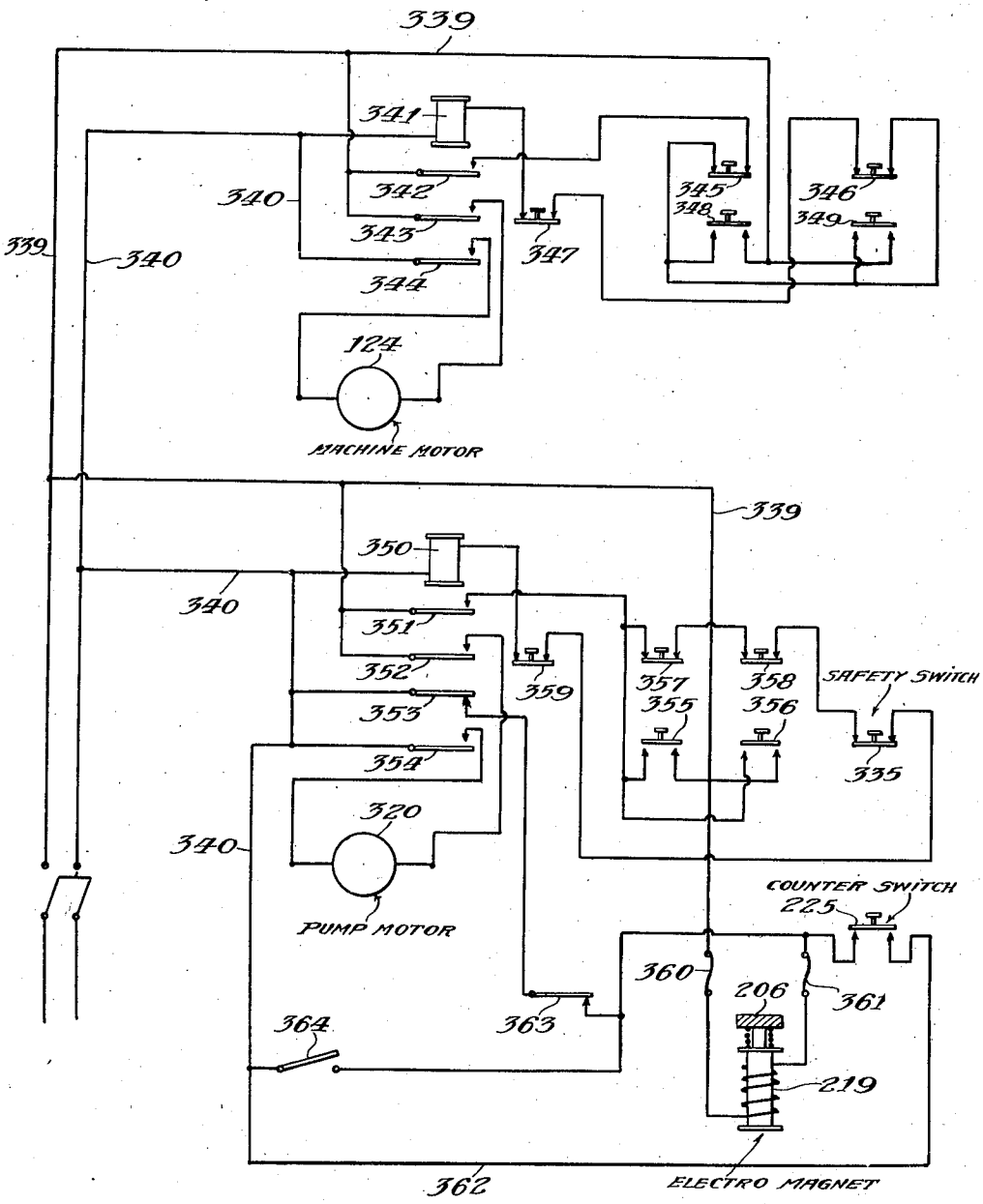
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SHEET ASSEMBLING MACHINE

Filed Aug. 3, 1939 16 Sheets-Sheet 16

Fig. 26.



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Patented Oct. 28, 1941 2,260,582

UNITED STATES PATENT OFFICE

2,260,582

SHEET ASSEMBLING MACHINE

Patrick Henry Roethe, Chicago, Ill., assignor to Ditto, Incorporated, Chicago, Ill., a corporation of West Virginia

Application August 3, 1939, Serial No. 288,152

35 Claims. (Cl. 93—1)

The present invention relates to sheet assembling devices and more particularly to devices of this character wherein sheets are assembled in groups so that a portion of each sheet adjacent to one edge is exposed to receive a legend, the remainder of the surface of each sheet, except the top sheet, being covered. The number of sheets in a group may be varied to fit the particular purpose for which the sheets are used, and the several sheets of a group are secured to each other along one edge. It is desirable that the edges of the sheets which are secured together be at right angles to the portions which are exposed. The sheets are secured together in such fashion that they may be readily separated.

The present invention has for its object the provision of a machine having means whereby individual sheets may be assembled, one after another, and arranged in overlapping relation with respect to adjacent sheets and wherein the overlapping sheets may be secured together in groups while the overlapping operation continues without interruption.

One form of the invention is preferably embodied in a machine having means to support and advance a stack of sheets to a separating and overlapping device. The separating and overlapping device is adapted to take individual sheets from the stack and arrange the sheets in overlapped relation. During the transfer of the sheets the several sheets are provided with means such as a line of glue or adhesive whereby they may be attached to each other. The assembled overlapped sheets are pressed together and then discharged from the machine. The attaching means is so arranged that, without interruption of the assembling and overlapping operation, a break in the attachment of sheet to sheet occurs at predetermined intervals. In this way the groups of sheets are formed.

The present invention contemplates also a novel mechanism whereby to control the operation of the sheet connecting means so as to govern the number of sheets in a particular group by a simple device under the control of the operator of the machine.

It is also a purpose of the present invention to provide a novel means for picking up sheets from a stack and applying an adhesive thereto while the sheets are in motion.

The features and advantages of the present invention will appear more fully as the description proceeds, reference being had to the accompanying drawings wherein a preferred form of the invention is shown.

In the drawings, Fig. 1 is a view in side elevation of a machine embodying the present invention;

Fig. 2 is a view in side elevation of the machine showing the side opposite from that shown in Fig. 1;

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a plan view of the machine;

Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged sectional view taken on the line 6—6 of Fig. 4;

Fig. 7 is an enlarged sectional view taken on the line 7—7 of Fig. 4;

Fig. 8 is a fragmentary sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a fragmentary sectional view taken on the line 9—9 of Fig. 7;

Fig. 10 is an enlarged fragmentary sectional view taken on the line 10—10 of Fig. 6;

Fig. 11 is a fragmentary sectional view taken on the line 11—11 of Fig. 6;

Fig. 12 is a fragmentary sectional view taken on the same line as Fig. 6, showing the parts in a changed position;

Fig. 13 is a sectional view on the line 13—13 of Fig. 12;

Fig. 14 is a fragmentary sectional view taken on the line 14—14 of Fig. 2;

Fig. 15 is a fragmentary sectional view taken on the line 15—15 of Fig. 2;

Fig. 16 is an enlarged fragmentary view in side elevation of the mechanism shown in section in Fig. 15;

Fig. 17 is a view like Fig. 16 but showing the parts in a changed position;

Fig. 18 is a fragmentary sectional view taken on the line 18—18 of Fig. 17;

Fig. 19 is a fragmentary sectional view taken on the line 19—19 of Fig. 16;

Fig. 20 is a view similar to Fig. 16 but showing a changed position of the parts;

Fig. 21 is another view similar to Fig. 16, but showing another position of the parts;

Fig. 22 is a fragmentary sectional view taken on the line 22—22 of Fig. 3;

Fig. 23 is a diagrammatic view illustrating the manner in which the several sheets are placed in overlapping relation;

Fig. 24 is a plan view illustrating a group of sheets arranged in overlapping relation;

Fig. 25 is a sectional view taken on the line 25—25 of Fig. 24, and

Fig. 26 is a diagrammatic view illustrating the electrical connections by which the operating parts of the machine are driven and controlled.

Referring now in detail to the drawings, the present invention is embodied in a machine of the type described wherein the numerals 10 and 11 indicate two frames which support the several operating elements of the machine. The side frames 10 and 11 have bases 12 and 13 which are adapted to be mounted upon any suitable

support. The side frames 10 and 11 are connected together by a plurality of cross tie rods such as those indicated at 14 and 15 in Figs. 1–5 inclusive.

The machine comprises a sheet stack holding and advancing mechanism 16, one end of which is supported by the side frames 10 and 11 and the other end of which is supported by a suitable standard 17. The machine also comprises a sheet transfer device 18 which is rotatably mounted in the side frames 10 and 11. A device for applying means to attach one sheet to another is illustrated generally by the numeral 19 and comprises an adhesive supplying mechanism. A spacing device 20 is arranged properly to space the sheets as they leave the transfer device 18 so that they overlap the desired amount. The overlapped sheets are then pressed together by a roller 21 and a drum 22 which successively engage the surface of the spacing device 20. The details of the operating mechanism for the devices hereinbefore described will be more fully understood from the following description in which each device will be taken up separately.

The device 16 for feeding a stack of sheets to the sheet assembling mechanism is shown best in Figs. 1, 2, 4 and 5. Two side frames 23 and 24 are connected at one end by a cross bar 25. At their other ends the two side frames 23 and 24 extend inside the side frames 10 and 11. The frames 23 and 24 have portions 23*a* and 24*a* pivoted on the side frames 10 and 11. The side frames 23 and 24 have upwardly extending portions 23*b* and 24*b* which are bolted to the side frames by suitable bolts 26 and 27. As shown, the side frames 10 and 11 are provided with elongated arcuate slots 28 which receive the bolts 26 and 27 and allow for adjustment of the side frames 23 and 24.

The side frames 23 and 24 have guide grooves 29 and 30 extending lengthwise thereof. A carriage 31 has two rollers 32 and 33 riding in the groove 29 and two rollers 34 and 35 riding in the groove 30. The carriage 31 includes side frames 36 and 37. These side frames mount a cross rod 38 which, in turn, supports two arms 39 and 40 that engage a pressure plate 41 adapted to advance a stack 42 of sheets which are to be assembled. The stack 42 of sheets is carried upon three spaced guides 43, 44 and 45. The guides 43 and 45 are preferably angular in cross section so as to provide a side support as well as a bottom support for the sheets. These guides are also adjustable inwardly and outwardly to accommodate sheets of different sizes in the usual manner. The guides are also adjustable vertically with respect to the side frames 23 and 24. To provide for the vertical adjustment, two brackets 46 and 47 are mounted on the side frames 23 and 24 respectively. These brackets extend downwardly and are slotted as illustrated at 48 and 49 (see Figs. 1, 2 and 5) so as to receive and guide a cross bar 50. The cross bar 50 has a threaded aperture at each end adapted to receive two adjusting screws 51 and 52. The adjusting screw 51 is mounted on the bracket 46 and the adjusting screw 52 is mounted on the bracket 47. A bar 53 rides on the cross bar 50 and supports the guides 43, 44 and 45.

The carriage 31 has a sprocket chain 54 attached thereto. This chain is passed over a sprocket wheel 55 which is mounted at the front of the stack feeding device 16 on a shaft 56. The chain then passes over a sprocket wheel 57 which is keyed upon a shaft 58. A weight 59 is secured to the end of the sprocket chain so as to offset the weight of the stack feeding device and make it easier to move the stack of sheets into feeding position. A rock shaft 60 is adapted to be driven from the main drive mechanism of the machine by a crank arm 60*a* and a link 60*b*. The rock shaft is adapted to drive the shafts 56 and 58 through a mechanism indicated at 60*c* (see Figs. 1 and 4). The details of the stack advancing mechanism are not a part of the present invention and will not be described further.

The sheet transfer device 18 is made up of a plurality of rotary elements 61 which are shown as carried by a shaft 62. The shaft 62 is journalled in the side frames 10 and 11 by suitable ball bearings 63 and 64 (see Fig. 7). The several rotary elements 61 are substantially alike and are fixed upon the shaft 62 by a plurality of keys 65 and 66. The shaft 62 has a center enlargement 67, and the elements 61 are provided with hub portions 68 which slide onto the shaft 62 from either end, the hub portions abutting each other, as shown in Fig. 7. Outside of the elements 61 there are provided two end pieces 69 and 70 of the same diameter as the elements 61. The end pieces have hub portions 71 and 72 engaging the adjacent hubs of the elements 61. Two sleeves 73 and 74 extend from the end pieces 70 and 69 to the bearings 63 and 64. Outside the bearings 63 and 64 the shaft 62 is threaded to receive two clamping nuts 75 and 76 which clamp the several elements just described in place so as to prevent endwise movement thereof.

It will be noted that the shaft 62 has enlarged portions 77 spaced lengthwise thereof and that the hubs of the elements 61 and the end pieces 69 and 70 have portions fitting closely about the portions 77 of the shaft. The keys 65 and 66 extend through the length of that part of the shaft which is provided with the enlargements 77 and divide the spaces between the enlargements 77 into semi-circular passages 78 and 79. These passages are shown best in Figs. 6 and 7.

Each of the elements 61 has two air passages 80 and 81 extending from the periphery thereof to the passage 78, and two air passages 82 and 83 extending from the periphery thereof to the passage 79. The air passages 80, 81, 82 and 83 are enlarged at their outer ends, as shown in Fig. 6. The shaft 62 is provided with two longitudinal air ducts 84 and 85. The air duct 84 communicates with each of the passages 78 through suitable openings 86, and the air duct 85 communicates with each passage 79 through suitable openings 87. The air ducts 84 and 85 extend endwise through the shaft 62 beyond the bearing 63 and through an air inlet chamber 88. The chamber 88 has two suction pipe connections 89 and 90 which lead from two suction rings 91 and 92 within the chamber 88. The suction rings 91 and 92 are separated by two packing rings 93. The ends of the chamber 88 are also closed by two packing rings 94 and two screw plugs 95. The suction ring 91 includes an annular passage 96 which communicates with the air duct 85 through an aperture 97 in the shaft 62. The suction ring 92 includes an annular passage 98 which communicates with the duct 84 through an aperture 98*a* in the shaft 62. A plug 99 is utilized to close the end of the duct 84 beyond the aperture 98. The shaft 62 is extended beyond the chamber 88 and is provided with a reduced portion 100 which carries a gear 101.

The chamber 88 is mounted on the side frame 10 by means of a casting 102 which fits around

the shaft 62. This casting 102 has a top bar 103 and a bottom bar 104 between which the chamber 88 is received. Suitable screws 105 and 106 are used to secure the chamber 88 in position. The casting 102 is secured in place on the side frame 10 by a plurality of screw bolts 107 which pass through the side frame 10 and engage a mounting ring 108 on the inside of the frame. The mounting ring 108 is concentric with the shaft 62 and serves to pivotally support the side frame 23. The casting 102 has a sleeve portion 109 which is spaced from the shaft 62 and which serves as a mounting for an arm 110. This arm and a corresponding arm 111 carry a shaft 112 which operates a plurality of fingers 113 adapted to remove sheets from the periphery of the elements 61. The details of this construction will be more fully described hereinafter.

The right-hand end of the shaft 62, as shown in Fig. 7, passes through a casting 114 which supports the arm 111. This casting is bolted by suitable screw bolts 115 to a mounting ring 116. The ring 116 is concentric with the shaft 62 and provides a pivoted mounting for the side frame 24. Beyond the arm 111 the shaft 62 has a reduced portion 117 upon which a gear 118 and a sprocket wheel 119 are keyed by means of a key 120. A nut 121 is threaded onto the shaft portion 117 to hold the gear 118 and the sprocket wheel 119 in position. Beyond the nut 121 the shaft 62 has a portion 122 further reduced in diameter, and this portion serves to mount a sprocket wheel 123.

Power is supplied for rotating the shaft 62 from a motor 124 (see Fig. 1). This motor is a variable speed motor. The motor 124 is connected by a belt 125 to a pulley 126 which is mounted on a shaft 127 carried by the side frame 11. The pulley 126 has a sprocket wheel 128 fixed thereto. A sprocket chain 129 connects the sprocket wheel 128 with the sprocket wheel 119. The small sprocket wheel 123, which is also fixed to the shaft 62, drives a sprocket chain 130 which passes over an idler sprocket 131 and drives a sprocket wheel 132.

The sprocket wheel 132 (see Figs. 1 and 22) is fixed on a shaft 133 which extends into a gear housing 134. The gear housing 134 is fastened to the side frame 11 by a plurality of ears 135 on the housing and screw bolts 136. The shaft 133 is journalled in the housing 134 and has a worm 137 which meshes with and drives a worm gear 138 that is fixed upon a shaft 139. The shaft 139, at its upper end, has fixed thereto a gear 140 which meshes with a similar gear 141 upon a shaft 142. The shaft 142 drives the spacing device 20. The lower end of the shaft 139 extends down into a gear housing 143. The gear housing 143 has suitable ears 144 thereon which are secured to the side frame 11 by a plurality of screw bolts 145. A ball bearing 146 is provided for the shaft 139 where it passes downwardly out of the housing 137. A packing gland 147 is provided about the shaft 139 where it leaves the housing 137. The lower end of the shaft 139 is mounted in a bearing 148 within the housing 143. A worm 149 is mounted on the shaft 139 within the housing 143. This worm meshes with a gear 150 which is keyed to a shaft 151 that supports the drum 22. The shaft 151 has one end journalled in the housing 143, while the other end is journalled in a suitable bearing 152 provided in the side frame 10.

From the foregoing description it has been shown that the sheet transfer device 18, including the elements 61 and the fingers 113, is driven at a definite speed relation to the speeds of rotation of the spacing device 20 and the drum 22. If it is desired to change the relative speed of rotation of the spacing device 20 with respect to the transfer device, this can be readily accomplished by changing the ratio of the number of teeth on the sprocket wheel 132 to the number of teeth on the sprocket wheel 123.

The fingers 113 have already been described as being carried by a shaft 112 which is supported by two arms 110 and 111. The shaft 112 carries a gear 153 which meshes with the gear 118 (see Fig. 22). The arms 110 and 111 may be set in the proper position for the fingers 113 to engage the rear end of a sheet being carried by the sheet transfer device 18 and flip the sheet out into the position shown, for example, in Fig. 6. The slots 154 provided in the side frames 10 and 11 permit this adjustment. In order to facilitate holding sheets against the elements 61 until they are fed to the spacing device 20, spring pressed rollers 155 supported on a bar 156 may be used. The bar 156 is secured to the side frames 10 and 11. It carries suitable spring arms 157 for the rollers 155. The arms 157 are so spaced with respect to the fingers 113 as to avoid any engagement therewith.

In order properly to guide sheets individually to the rotary elements 61 so as to cause them to be held by suction applied through the air passages 80, 81, 82 and 83, a plurality of air blast nozzles 158 and 159 are utilized. These air blast nozzles are mounted upon two standards 160 and 161 which are, in turn, supported by a cross bar 162. The cross bar 162 is fastened to the side frames 10 and 11. An air supply pipe 163 extends across the top of the machine between the side frames 10 and 11 and is supported thereon by suitable clamps 164 and 165. The air blast nozzles 158 and 159 are connected by two flexible hose sections 166 and 167 to the pipe 163. The nozzles are adjustably mounted upon their standards 160 and 161 in the manner shown in Fig. 6. A bracket 168 is mounted on each standard. A clamp 169 is clamped to the bracket 168 and can be adjusted about a pin 170. The nozzle is held in place by a set screw 171 on the clamp 169. The air blast from nozzles 158 and 159 is directed downwardly against the top of the stack of sheets so as to blow the individual sheets over into contact with the elements 61. A plurality of spring fingers 172 are secured to the bar 162 and extend inwardly to pass between certain of the rotary elements 61. These spring fingers are very light so that if a sheet is once held to the elements 61 by suction, it will ride past them. However, if no suction is applied, the mere friction of the sheet on the elements 61 is not sufficient to cause the sheet to pass the fingers 172. A shield 173 is also mounted on the bar 162 so as to overlie the elements 61.

The shield 173 terminates directly in advance of an adhesive supplying roller 174. The roller 174 is shown as cut away to provide a portion 175 of reduced diameter which, in the normal operation, would not engage a sheet riding on the elements 61. The remainder of its periphery, however, will engage a sheet carried by the elements 61. The roller 174 is a part of the adhesive supplying mechanism 19. The adhesive supplying mechanism includes a receptacle 176 and a cover 177 which is provided with an aperture 178 to receive a supply of adhesive. The receptacle 176 has a roller 179 located therein and adapted to carry

the adhesive to a second roller 180, which, in turn, engages the roller 174.

The rollers 174, 179 and 180 are driven from the gear 118. A pinion 181 meshes with the gear 118 and is fixed upon a shaft 182. The shaft 182 is journalled in a bearing 183 on the frame 11 and extends through the frame 11 and the frame 10. A second bearing 184 is provided on the outside of the frame 10 to receive the end of the shaft 182. The receptacle 176 has a saddle portion 185 which rides on a sleeve 186. The sleeve 186 is slidable lengthwise of the shaft 182 (see Figs. 6, 10 and 11). The sleeve 186 is adapted to be secured to the shaft 182 by a set screw 187 so as to rotate with the shaft. The shaft 182 is provided with a flat surface 188 to be engaged by the set screw 187. In order to lock the saddle 185 upon the sleeve 186 so it cannot be lifted off, a pin 189 is threaded through the base of the receptacle 176 and is provided with a ball bearing 190 to engage the sleeve 186. A gear 191 is keyed upon the sleeve 186 and meshes with an idler gear 192. The idler gear 192 is journalled on a shaft 193 which carries the roller 180. A collar 194 is secured to the shaft 193 so as to hold the gear 192 in place. The idler gear 192 meshes with a gear 195 which is fixed on a shaft 196 that carries the roller 179. The shafts 193 and 196 are journalled in the side walls of the receptacle 176 and are connected together by a gear 197 on the shaft 196 and a gear 198 on the shaft 193. The idler gear 192 also meshes with a gear 199 that is fixed on a shaft 200 which carries the roller 174. It will be noted from an examination of Fig. 10 that the side walls of the receptacle 176 are extended beyond the saddle 185, as shown at 201 and 202 to provide bearing supports for the shafts 193 and 200.

The adhesive supplying device 19 may be rocked about the shaft 182 so as to move the roller 174 into and out of contact with sheets that are being transferred by the elements 61. The mounting of the saddle 185 on the sleeve 186 permits this rocking movement without interfering with the driving of the rollers 174, 179 and 180. The device 19 is adapted to be rocked about the shaft 182 at definite intervals so as to permit a sheet carried by the elements 61 to be transferred without receiving any adhesive.

The means by which the rocking motion is accomplished is shown best in Figs. 4, 6 and 12 to 21 inclusive. A bracket 203 is fixed to the end of the receptacle 176 and has a finger 204 which rides in a groove 205 provided in a cross bar 206. The cross bar 206 is mounted in a framework 207 which is supported by the side frames 10 and 11. The framework 207 comprises a plate 208 which is mounted on top of the side frames 10 and 11. The plate 208 has an upwardly directed portion 209 which supports a guide plate 210. The bar 206 carries two guide pins 211 and 212 which extend through the plates 208 and 210. Two springs 213 and 214 are seated in recesses 215 and 216 provided in the top of the plate 208. The springs bear against the under-surface of the bar 206 so as to hold it normally in the position shown in Fig. 6. The bar 206 has a lug 217 extending downwardly through an opening 218 in the plate 208. An electromagnet 219 is suspended from the plate 208 by means of a plurality of screws 220. The electromagnet has a movable core 221 which is secured to the lug 217 by two ears 222 and 223 and a bolt 224. When the electromagnet 219 is energized, it attracts its core 221 and pulls the bar 206 down, compressing the springs 213 and 214 and rocking the mechanism 18 from the position shown in Fig. 6 to that shown in Fig. 12. This rocking movement lifts the roller 174 sufficiently to clear a sheet riding on the elements 61.

The electromagnet 219 is energized by the closing of a switch 225 which is mounted on the side frame 10 (see Figs. 2 and 16). The switch 225 is periodically closed by a switch lever 226 which is actuated by an intermittently rotated ratchet wheel 227. The ratchet wheel 227 is mounted on a stub shaft 228 which is fastened to the side frame 10 (see Figs. 15–21). The ratchet wheel 227 has four notches 229, 230, 231 and 232. The ratchet wheel also carries four cam segments 233, 234, 235 and 236. The several cam segments are spaced from each other so as to permit the arm 226 to drop down between the cam segments as shown in Fig. 16.

The shaft 228 has a bearing 237 for the ratchet wheel 227. It also has a bearing 238 for an arm 239 which carries a pawl 240 that is adapted to engage in the notches 229, 230, 231 and 232. Another ratchet wheel 241 is journaled on the shaft 228 by a bearing 242. An arm 243 carries a pawl 244 which is adapted to engage the ratchet wheel 241. A ball bearing 245 is provided on the shaft 228 for the arm 243.

In order to prevent the ratchet wheels 227 and 241 from overrunning when they are advanced by the pawls, each ratchet wheel is provided with a braking device. The ratchet wheel 227 has a brake drum 246 fixed thereon. This drum is engaged by a brake band 247 which is provided with a friction ring 248. The band 247 is supported by a lug 249 at the outer end of a bracket 250 which is carried by the side frame 10. The ratchet wheel 241 has a brake drum 251 thereon which is engaged by a friction ring 252 of a brake band 253. The band 253 is carried by a lug 254 on the bracket 250.

The arm 239 is adapted to be operated by a link 255. The link 255 has a pin 256 journalled in a bearing 257 in the arm 239. Another link 258 is adapted to operate the arm 243. This link has a pin 259 journalled in a bearing 260 provided on the arm 243. The links 255 and 258 are adapted to be driven from a shaft 261. The shaft 261 has an eccentric 262 which is provided with a bearing 263 for the link 258. The shaft 261 also has a bell crank 264 projecting beyond the eccentric 262 and provided with a bearing 265 for the link 255. The shaft 261 is journalled in a bearing box 266 which is mounted on the side frame 10. There are two ball bearings 267 and 268 within the box 266 for the shaft 261. A cover plate 269 is provided on the box 266.

The shaft 261 has a sprocket wheel hub 270 keyed thereon between the bearing 268 and the eccentric 262. This hub carries two sprocket wheels 271 and 272. The sprocket wheel 271 is a drive sprocket for rotating the shaft 261. This sprocket wheel is connected by a sprocket chain 273 to a corresponding sprocket wheel 274 which is secured to one end of a shaft 275. The shaft 275 is journalled in a bracket 276. The bracket 276 is mounted on the casting 102, as shown in Fig. 4. The bracket 276 has an arm 277 which serves to mount it on the casting. A gear 278 is provided on the shaft 275 in position to mesh with the gear 101 on the shaft 62. (See Figs. 4 and 7.)

The sprocket wheel 272 is connected by a chain 279 to a sprocket wheel 280 journalled on a stub shaft 281 which is carried by the frame 10. The

sprocket wheel 280 is connected by a disc 282 and a pin 282a to the link 60b for operating the shaft 60.

Referring now to Figs. 15–20 inclusive, the manner in which the pawls 240 and 244 are caused to actuate the ratchet wheels 227 and 241 respectively will be described. It is desired to have the switch 225 closed after a certain pre-determined number of sheets have been advanced by the elements 61 past the adhesive supplying roller 174. If, after a pre-determined number, say ten sheets, have been advanced, the roller 174 is lifted while one sheet is passing beneath it, the sheets following that particular sheet will not be secured to it, and thus the sheets which are arranged in overlapping relation will be secured in units of ten sheets. In some instances, it is desirable to have only a few sheets per unit, while in other instances it may be desirable to have as many as thirty sheets in a unit. The function of the pawls and ratchet wheels just referred to is that of determining how many sheets there will be in each unit. The operator, by properly setting certain pins on the ratchet wheel 227, may close the switch 225 after the feeding of any desired number of sheets from two to thirty-two. Of course the number can be increased by using different wheels 227 and 241 so as to include a greater number of sheets.

The ratchet wheel 241 has four slots 283, 284, 285 and 286 formed in the face thereof which is toward the ratchet wheel 227. These slots are arcuate about the shaft 228 as a center. It will be noted that the slots are extended throughout substantially 90°. The ratchet wheel 227 has a single pin 287 which rides in the slot 283. This pin is located at the advancing edge of the segment 233 which lifts the arm 226. The ratchet wheel 227 has a series of openings 288 spaced inwardly from the segment 234. These openings are screw threaded to receive a pin 289 which is of the same size and shape as the pin 287. If the pin 289 is inserted in one of the openings 288, it would then ride in the slot 284 of the ratchet wheel 241. The ratchet wheel 227 has another series of openings 290 threaded to receive the pin 289. This series of openings is spaced inwardly from the cam segment 235. A third series of openings 291 threaded to receive the pin 289 are spaced inwardly from the cam segment 236. The pin 289, when inserted in one of the openings 290, will ride in the slot 285, and when inserted in one of the openings 291, will ride in the slot 286.

It will be noted that both the pawls 240 and 244 are advanced by the links 255 and 258 at the same time. The pawl 244, however, is advanced only a very short distance because of the size of the eccentric 262. This enables the pawl 244 to move the ratchet wheel 241 a distance which is equal to the distance between teeth of the ratchet wheel for each stroke of the pawl. This distance is equal to one-third the distance between any two succeeding openings in one of the groups of openings 288, 290 or 291. The groups of openings overlap, however, so that the adjacent openings of the groups 288 and 290 are spaced apart only the angular distance equal to one tooth of the ratchet wheel 241. The adjacent openings at the junction of the groups 290 and 291 are spaced apart a distance equal to two teeth of the ratchet wheel 241. By setting the pin 289 in the proper one of the openings 288, 290 or 291, the pawl 240 can be caused to advance the ratchet wheel 227 and thus actuate the switch 225 for two or more advancing movements of the pawl 244.

The driving connection from the shaft 62 to the shaft 261 which operates the pawl 244 is such that the pawl 244 advances its ratchet wheel 241 one step each time a sheet is fed past the adhesive supplying roller 174. Therefore, if we take the parts as they are shown in Fig. 16 and move the pin 289 into the opening numbered 15 of the group 290, and start the machine in operation, the two pawls 240 and 244 will advance each time a sheet is fed by the elements 61 past the roller 174. The roller will apply adhesive to each of the sheets until the ratchet wheel 241 has been advanced fourteen times. During all this time the slots 283, 284, 285 and 286 are being advanced with respect to the pins 287 and 289. The pin 287 is riding in the slot 283 and the pin 289 is riding in the slot 285. At the beginning of the fourteenth stroke of the pawl 244, the parts are in the position shown in Fig. 17, that is, the pin 289 is engaged in the rear end of the slot 285. The pin 287 has been rocked back toward the center of the slot 283.

Fig. 20 shows the position of the parts after the two pawls 240 and 244 have returned from completing the fourteenth stroke. The pawl 240 has now dropped into the notch 229 because on the fourteenth stroke the pin 289 was engaged by the back end of the slot 285 sufficiently to advance the ratchet wheel 227 so that the pawl 240 could drop into the notch 229. On the fifteenth stroke, therefore, the pawl 240 advances the ratchet wheel 227 as shown in Fig. 21. This advance is through an arc of substantially 90°. During the advance movement of the ratchet wheel 227, the arm 226 rides on the cam 233 so as to close the switch 225 and energize the electromagnet 219. When the ratchet wheel 227 advances far enough to bring the pin 287 to the front end of the slot 283, this pin then causes the ratchet wheel 241 to travel with the ratchet wheel 227 for the remainder of its advance movement. After its advance stroke, the pawl 240 returns to the position shown in Fig. 16. The pin 287, however, is now in the position shown in Fig. 21, and the pawl 240 stops just short of engagement with the notch 230.

Repeated operations of the pawl 244 on the ratchet wheel 241 will again bring the pin 289 to the rear of the slot 285 so as to repeat the operation just described. Upon the repeated operation, the switch arm 226 would be lifted by the cam segment 234 and the notch 231 would be advanced into position to be engaged by the pawl 240 upon the succeeding operation.

By moving the pin 289 into the desired one of the openings 288, 290 or 291, the operator may obtain anywhere from two to thirty-two operations of the pawl 244 for each advance of the ratchet wheel 227 by the pawl 240. Each advance of the ratchet wheel 227 closes the switch 225, energizes the electromagnet 219, and causes it to lift the roller 174 so as to prevent it from applying adhesive to one sheet. Thus it is a simple matter for the operator to provide as many sheets in a unit as he desires.

Referring now to the spacing device by which the overlapping of the sheets is accomplished, this device is shown as mounted on the shaft 142 and driven by the gear 141. The spacing device is made up of a plurality of rubber rings 292 (see Figs. 6, 7 and 9). The rubber rings 292 are mounted upon metal hubs 293 which are keyed upon the shaft 142. The hubs 293 include central

annular ribs 294 against which the sides of the rings 292 are placed. Four pins 295 are mounted in the ribs 294, and the rings 292 are apertured so as to receive these pins. Two discs 296 and 297 are placed outside the two rings to hold them on the pins 295. A spacing sleeve 298 is provided between adjacent assemblies of the two rubber rings, the hub and the two discs. In this way the spacing device is built up to the proper length. The shaft 142 has nuts 299 and 300 thereon for clamping the several units of the spacing device in place. The shaft 142 is supported in the side frames 10 and 11 by two ball bearings 301 and 302 mounted on the outside of the side frames, the side frames being provided with slots extending inwardly from their front edges to receive the shaft.

Each of the rubber rings 292 is provided with teeth 303, as shown best in Fig. 6. These teeth are spaced circumferentially of the rings so as to give the desired degree of overlapping of the successive sheets in the manner shown in Fig. 23 of the drawings. The roller 21 engages the sheets and presses them one against the other as they are positioned between the teeth. It will be noted that the teeth are compressed on the sheets by the roller 21 so as to prevent the sheets from slipping. The roller 21 is journalled in the side frames 10 and 11 and is free to rotate by its engagement with the rings 292 or the sheets held therein. The drum 22 is mounted on the shaft 151 and is driven directly by this shaft to rotate at the same peripheral speed as the rings 292. The drum 22 presses the sheets together between it and the rings 292 so as to assure adhesion of one sheet to another by means of the adhesive material applied by the roller 174.

The several sheets are carried by the drum 22 onto receiving trays 304 and 305 which are carried by a cross bar 306 mounted on the side frames 10 and 11.

In order to assure stripping of the sheets from the elements 61, a stripper bar 307 is mounted adjacent to the elements 61 and is provided with fingers 308 that extend between the several elements 61. The stripper bar 307 guides the sheets into the bite between the roller 21 and the spacing device 20. The stripper bar 307 is welded or otherwise suitably secured to a supporting frame 309, the ends 310 and 311 of which are extended forwardly and fastened to the side frames 10 and 11.

The air supply means for the nozzles 158 and 159 comprises a pump 312 (see Fig. 3). This pump is connected by a pipe 313 to a reservoir 314 mounted on the side frame 11. The pipe 163 is connected to the outlet of the reservoir 314 by a pipe 315.

Two suction pumps 316 and 317 are provided for applying suction to the sheet transfer device 18. The suction pump 316 has an inlet pipe 318 which extends across the machine and leads to the suction inlet 90. A pipe 319 leads from the suction inlet 89 to the suction pump 317. The pumps 312, 316 and 317 are all driven by a motor 320 which has a drive shaft 321 extending across the front of the frames 10 and 11 and supported in two bearings 322 and 323 on the side frames. The shaft 321 is connected by a belt 324 to a drive shaft 325 of the pump 312. Similarly, the drive shafts 326 and 327 of the pumps 316 and 317 are connected to the drive shaft 321 by belts 328 and 329.

In Figs. 24 and 25, one unit 330 of assembled sheets is shown as it appears when removed from the machine. The unit 330 is shown here as composed of five sheets overlapped so as to leave an exposed portion 331 on each of the sheets which is beneath the top sheet 333. The several sheets are secured together at the side edge shown at the top of Fig. 24 by reason of a small strip 332 of adhesive material such as glue which was applied to each of the sheets with the exception of the top sheet 333. The several sheets can be readily separated when it is desired to file them individually, yet the unit can be handled and passed through a printing or duplicating machine while the several sheets are together. Thus the exposed portions 331 of the sheets may be written or printed upon while the sheets are together, and the remainder of each sheet may then receive an individual message.

In passing the sheets through the machine, it is desirable to protect the machine against the possibility of damage in the event that sheets picked up by the transfer device 18 fail to pass through the spacing device 20. In the event of this happening, the sheets would be piling up beneath the back of the fingers 113. In Fig. 5, means are shown to protect the machine in the event of the difficulty just referred to. A safety switch 335 is mounted upon the guide plate 210. A paper engaging lever 336 is suspended from a bracket 337 on the housing for the switch 335 so as to extend into the path of any sheets which might fall beneath and back of the fingers 113. The lever 336 is adapted to engage a push button 338 and operate the switch 335.

The present machine is adapted to be controlled electrically so that the operating motor 124 may be started and stopped at the will of the operator, and the pump motor 320 may be started and stopped in the same fashion. The safety switch 335 is in the circuit for the pump motor 320 so as to shut off the suction pumps 316 and 317 and thus render the transfer device 18 inoperative to move sheets from the stack 42. In order that the details of the electric circuits necessary for the operation of the machine may be more clearly understood, a diagrammatic view of the circuit is illustrated in Fig. 26.

Referring now to Fig. 26, the operating motor 124, the pump motor 320, the adhesive control electromagnet 219, the counting switch 225 and the safety switch 335 are illustrated in their proper positions in the electrical circuit. Power is supplied for the control and operation of the device over two leads 339 and 340. In the upper part of Fig. 26 the control connections for the motor 124 are shown. A relay 341 has three armatures 342, 343 and 344. The relay 341 is controlled by a plurality of normally closed push button switches 345, 346 and 347 and two normally open push button switches 348 and 349. If the operator desires to start the motor 124, he may close either one of the switches 348 or 349, one of which is located at one side of the machine and the other at the other side of the machine. Upon closing either of the normally open push button switches, the relay 341 is energized since a circuit is completed for the relay from the lead 339 through the switch 348 or 349 that is closed and through the normally closed switches 346 and 347. The relay 341, when energized, attracts its armature 342 and closes a circuit for itself under the control of the switch 345. The relay also attracts its armatures 343 and 344 to close the circuit for the motor 124. The motor 124 may be stopped at any time by opening either of the three normally closed push button switches. The

two switches 345 and 348 are adapted to be operated together so that the operator may cause the motor 124 to be only momentarily energized and thus cause the mechanism to be moved only a slight amount for each such energization. This is of particular advantage in observing the machine at the beginning of any particular operation to see that everything is properly adjusted.

In the lower part of Fig. 26, the energizing circuit for the motor 320 and the electromagnet 219 is shown. The motor 320 is adapted to be energized under the control of a relay 350. This relay has four armatures 351, 352, 353 and 354. The armature 353 is adapted to open a circuit when the relay 350 is energized, while the other armatures close circuits. The relay 350 is adapted to be energized by closing either of two normally open switches 355 or 356, one of which is located at each side of the machine. There are three normally closed switches 357, 358 and 359, either of which when opened will deenergize the relay 350. The normally closed safety switch 335 is also in this circuit in series with the normally closed switches 357, 358 and 359. The operation of this circuit for controlling the pump motor 320 is substantially the same as that described for controlling the motor 124. The electromagnet 219 is energized from the lead 339 through suitable fuses 360 and 361 under the control of the counting switch 225. It will be remembered that the counting switch 225 is closed periodically by means of the ratchet wheel 227. Whenever the switch 225 closes, it completes the circuit from the electromagnet 219 to the lead 340 over a lead 362.

It will be observed that the electromagnet 219 is also connected to the lead 340 through the armature 353 and a normally closed switch 363. When the machine is stopped by deenergizing the relays 341 and 350, the electromagnet 219 is energized by the closing of the armature 353. This is done in order that the adhesive applying roller 174 will be lifted clear of the transfer device 18. The operator may then move the roller 174 until the reduced part thereof faces the transfer device, after which he may easily deenergize the electromagnet 219 by opening the switch 363.

It is sometimes desirable to operate the machine, including the sheet transfer device, without applying any adhesive at all. In such case, the electromagnet 219 may be continuously energized to hold up the roller 174. This is done by closing a normally open switch 364 which is connected in parallel with the counting switch 225.

The operation of the machine has been described in detail in connection with the description of the several parts. However, a brief résumé will be given here in order to emphasize the simplicity of the operation. An operator who desires to assemble sheets in units of a desired number places a stack 42 of the sheets to be assembled in a stack holding and advancing mechanism 16. Any other suitable means may be used to supply sheets to the transfer device 18. The motor 320 is then energized to create suction in the rotary elements 61 of the sheet transfer device 18. The motor will also operate the pump 312 so as to supply air to the nozzles 158 and 159. The main operating motor 124 is energized when it is desired to start the machine. Before this is done, however, it is necessary to see that the adhesive supplying mechanism 19 is in proper order and that the counting mechanism comprising the ratchet wheels 227 and 241 is set to close the switch 225 at the desired intervals. It is also necessary to see that the switch 364 is open and that the switch 363 is closed, so that the counting switch 225, when closed, will cause energization of the electromagnet 219 and thus cause the roller 174 to be lifted out of contact with a sheet on the transfer device 18 at the proper time.

When the machine is energized by starting the motor 124, sheets will be fed by the transfer device 18 successively to the spacing device 20 which is made up of the rubber rings 292. Each sheet, as it passes beneath the roller 174, will receive a small strip 332 of glue or other adhesive on the top surface thereof. The sheets are forced down into the notches of the rubber rings 292 by the elements 61 and the rollers 155. The fingers 308 on the stripping device 307 cause the sheets to be guided to the teeth 303 of the rings 292. In order that each sheet will be lifted out of the path of the next succeeding sheet, the fingers 113 are so rotated as to drop in behind each sheet as it is advanced to the teeth 303 and to swing the rear end of the sheet out of the way of the next sheet after its front end is engaged and held by the teeth 303 and the roller 21.

The roller 21 and the drum 22 cooperate to hold the sheets in overlapped relation and to press them together as they travel around the spacing device 20. The pressure of the roller 21 and the drum 22 on the sheets insures the adhesion of the several sheets of a unit to each other. The drum 22 carries the units downwardly and discharges them into the receiving trays 304 and 305.

At pre-determined intervals the switch 225 is closed to energize the electromagnet 219 and thus cause the roller 174 to skip a sheet. In this way, the overlapped sheets, although being fed continuously, are secured together in units with no adhesive material exposed on either outer surface of a unit, but with adhesive material between all adjacent sheets of the unit.

While I have shown and described certain forms of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as described in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as possible, in view of the prior art.

I claim:

1. A machine of the character described comprising, in combination, a paper feeding member, means to apply an adhesive to paper being fed by said member, a device for receiving the paper from said member and positioning a plurality of strips thereof in overlapping relation wherein the leading edges of successive strips are longitudinally spaced from one another to expose a portion of the surface of each strip, said last named means being operable to advance the overlapped strips together.

2. A machine of the character described comprising, in combination, a transferring member operable to separately feed and transfer strips of sheet material, a device individually operable to apply an adhesive to the several strips of material as they are transferred, means receiving said strips from said transfer member and adapted to hold them in overlapping relation, said means including a roller for pressing the adhesive containing parts of the strips together.

3. A machine of the character described com-

prising in combination, a sheet transfer member, means to supply sheets to said member, means to apply an attaching medium to a sheet on said member, a device for holding sheets in overlapping relation, said last named device being positioned to receive sheets from said transfer member, and control means operable at predetermined intervals to render said sheet attaching means inoperative with respect to one sheet whereby the sheets are attached to each other in groups.

4. A machine of the character described comprising, in combination, a sheet holding device adapted to hold a stack of sheets, a sheet transferring member operable to remove sheets individually from said stack, a device individually operable to apply an adhesive to sheets removed from said stack, means receiving said sheets from said transfer member and adapted to arrange them in overlapping relation, a roller for pressing the adhesive containing parts of the sheets together, and control means operable at predetermined intervals to render said sheet attaching means inoperative with respect to one sheet whereby the sheets are attached to each other in groups.

5. In a sheet assembling machine of the character described, means for arranging a succession of sheets in overlapping relation so that each sheet has the advancing end thereof exposed, adhesive applying means adapted to apply adhesive to a side edge of each sheet, and control means operable to cause said adhesive applying means to skip certain sheets.

6. In a sheet assembling device, means for supporting a stack of sheets, a sheet transfer member operable to remove the sheets individually from the stack, and a sheet positioning member receiving the sheets from the transfer member and operable to arrange them as received in overlapping relation with the advancing end of each sheet exposed a predetermined amount.

7. In combination, a sheet transfer member, means to apply a sheet attaching medium to a sheet on said member, and control means operable periodically to cause said applying means to skip a sheet on said transfer member.

8. A machine of the character described comprising a paper feeding device, means to press together a plurality of strips or sheets fed by said device and advance them as a single unit, and means operable to apply adhesive between the several strips before they are pressed together, said first named means including means holding the several strips or sheets in overlapping relation with a portion of the surface of each strip or sheet exposed.

9. A machine of the character described comprising a paper feeding device, means to press together a plurality of strips or sheets fed by said device and advance them as as single unit, and means operable to apply adhesive between the several strips before they are pressed together, said first named means including means holding the several strips or sheets in overlapping relation with a portion of the surface of each strip or sheet exposed, said adhesive applying means being positioned to apply the adhesive along a line at right angles to said exposed portions of the sheets.

10. In combination, a sheet transfer member, means to apply a sheet attaching medium to a sheet on said member, and control means operable periodically to cause said applying means to skip a sheet on said transfer member, said control means being adjustable to vary the number of sheets between skipped sheets.

11. In a sheet assembling machine of the character described, means for arranging a succession of sheets in overlapping relation so that each sheet has the advancing end thereof exposed, and adhesive applying means adapted to apply adhesive to a side edge of each sheet, said adhesive applying means engaging the sheets before they are brought together.

12. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, and an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together.

13. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said transfer device comprising a rotating element having peripherally open suction tubes therein, and means to apply suction to said tubes.

14. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, and an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said transfer device comprising a plurality of axially spaced rotary elements having suction tubes therein, a shaft carrying said elements and having an air passage communicating with said tubes and means to apply suction to said air passage.

15. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, and an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said transfer device comprising a shaft, air passages extending lengthwise of said shaft, separate suction means for each passage, a suction nozzle element on said shaft, said element having at least a suction tube leading to each air passage from its periphery, said tubes being circumferentially spaced on said element.

16. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said transfer device comprising a plurality of axially spaced rotary elements hav-

ing suction tubes thereon, a shaft carrying said elements and having an air passage communicating with said tubes and means to apply suction to said air passages, and a stripper having fingers between said elements for stripping sheets from the transfer device.

17. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said second device comprising a resilient toothed member receiving the several sheets between the teeth thereon, and means to press the sheets against said member.

18. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, and an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said second device comprising a rotatable member having notches in the periphery thereof adapted to receive sheets from said transfer device.

19. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said second device comprising a rotatable member having notches in the periphery thereof adapted to receive sheets from said transfer device, and means to guide the advancing edges of the sheets from the transfer device into said notches.

20. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said second device comprising a rotatable member having notches in the periphery thereof adapted to receive sheets from said transfer device, means to guide the advancing edges of the sheets from the transfer device into said notches, and means to strip the rear ends of sheets fed into said notches out of the path of succeeding sheets.

21. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said second device comprising a rotatable member having notches in the periphery thereof adapted to receive sheets from said transfer device, means to guide the advancing edges of the sheets from the transfer device into said notches, and means to strip the rear ends of sheets fed into said notches out of the path of succeeding sheets, said last named means comprising rotary fingers engaging the rear ends of the sheets.

22. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising an applicator operable to contact the sheets carried by said transfer device, and means to supply an adhesive material to said applicator.

23. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising an applicator operable to contact the sheets carried by said transfer device. and means to supply an adhesive material to said applicator, said applicator being mounted for movement between an operative position to contact the said sheets and an inoperative position out of the path of the said sheets.

24. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising an applicator operable to contact the sheets carried by said transfer device, means to supply an adhesive material to said applicator, said applicator being mounted for movement between an operative position to contact the said sheets and an inoperative position out of the path of the said sheets, and control means operable to hold said applicator in inoperative position.

25. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising an applicator operable to contact the sheets carried by said transfer device, means to supply an adhesive material to said applicator, said applicator being mounted for movement between an operative position to contact the said sheets and an inoperative position out of the path of the said sheets, and intermittently actuated means adapted to place said applicator

in inoperative position during the transfer of a sheet past it.

26. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising a roller adapted to engage sheets on said transfer device, a receptacle for adhesive material, means to feed the material from said receptacle to said roller, and means to move said roller out of operative position.

27. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising a roller having a portion only of its periphery adapted to engage sheets on said transfer device, a receptacle for adhesive material, means to feed the material from said receptacle to said roller, and means to move said roller out of operative position.

28. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising a roller adapted to engage sheets on said transfer device, a receptacle for adhesive material, means to feed the material from said receptacle to said roller, an electromagnet, means movable by said electromagnet to bring said roller out of its operative position, and control means for said electromagnet responsive to the sheet transferring movements of said transfer device.

29. A machine of the character described comprising, in combination, a transfer device, a second device fed by said transfer device and adapted to press sheets together one upon another in overlapped relation with a strip along one edge of each sheet exposed, an adhesive supplying device operable to supply an adhesive to one side of the sheets so that the several overlapped sheets will adhere to each other when pressed together, said adhesive supplying device comprising a roller adapted to engage sheets on said transfer device, a receptacle for adhesive material, means to feed the material from said receptacle to said roller, an electromagnet, means movable by said electromagnet to bring said roller out of its operative position, and control means for said electromagnet responsive to the sheet transferring movements of said transfer device, said control means being adjustable to vary the number of sheet transfer movements necessary to energize said electromagnet.

30. A method of combining a plurality of sheets from a stack into a unit strip wherein all of the sheets are secured together along one side edge and each sheet is overlapped with the others to expose a strip of each sheet at one surface of the unit, said method comprising the steps of separating the sheets one by one from said stack, then applying adhesive to one surface of each sheet excepting one outside sheet of the unit and thereafter overlapping the sheets and pressing them together.

31. A method of combining a plurality of sheets into a unit strip, which comprises the steps of feeding the sheets separately while applying adhesive thereto and spacing the leading edges thereof from one another after the adhesive has been applied to the sheets, and then pressing the sheets together while they are maintained in longitudinally spaced relationship.

32. A method of combining a plurality of sheets into a unit strip, comprising the steps of positioning the leading edge of each sheet of a succession of sheets a predetermined distance behind the leading edge of the preceding sheet, displacing the trailing edge of each sheet while the leading edge of the succeeding sheet is being positioned, and securing said sheets to one another while the sheets are maintained in such overlapped relationship.

33. A method of combining a plurality of sheets from a stack into a unit strip wherein all of the sheets are secured together along one side edge and each sheet is overlapped with the others to expose a strip of each sheet at one surface of the unit, said method comprising the steps of separating the sheets from said stack, advancing said sheets at a given rate of speed, decreasing the rate of advance of said sheets thereby causing the overlapping thereof, and causing the sheets to be secured to each other during their advance at said decreased rate.

34. A method of combining a plurality of sheets from a stack into a unit strip wherein all of the sheets are secured together along one side edge and each sheet is overlapped with respect to the others on a unidirectionally moving positioning device to expose a strip of each sheet at one surface of the unit, said method comprising the steps of continuously advancing said sheets one by one at a given rate of speed into engagement with said positioning device, maintaining the leading edge of a given sheet in engagement with said positioning device while the latter is advanced at a lesser rate of speed whereby succeeding sheets may be positioned in overlapping arrangement, and securing said sheets to each other in overlapped relationship while the position of the sheets is maintained by said positioning device.

35. A method of combining a plurality of sheets from a stack into a unit strip wherein all of the edges are secured together along one side edge and each sheet is overlapped with respect to the others on a rotating positioning device to expose a strip of each sheet at one surface of the unit, said method comprising the steps of advancing said sheets one by one at a given rate of speed into self-aligning engagement with said positioning device, advancing said positioning device at a lesser rate of speed whereby succeeding sheets may be positioned in overlapping relationship, and securing said sheets to each other in overlapped relationship while the aligned position of the sheets is maintained by said positioning device.

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