No. 648,550. Patented May 1, 1900.

E. H. & C. P. COTTRELL.

APPARATUS FOR CUTTING AND FOLDING PAPER.

(Application filed Dec. 26, 1899.)

(No Model.) 5 Sheets—Sheet 1.

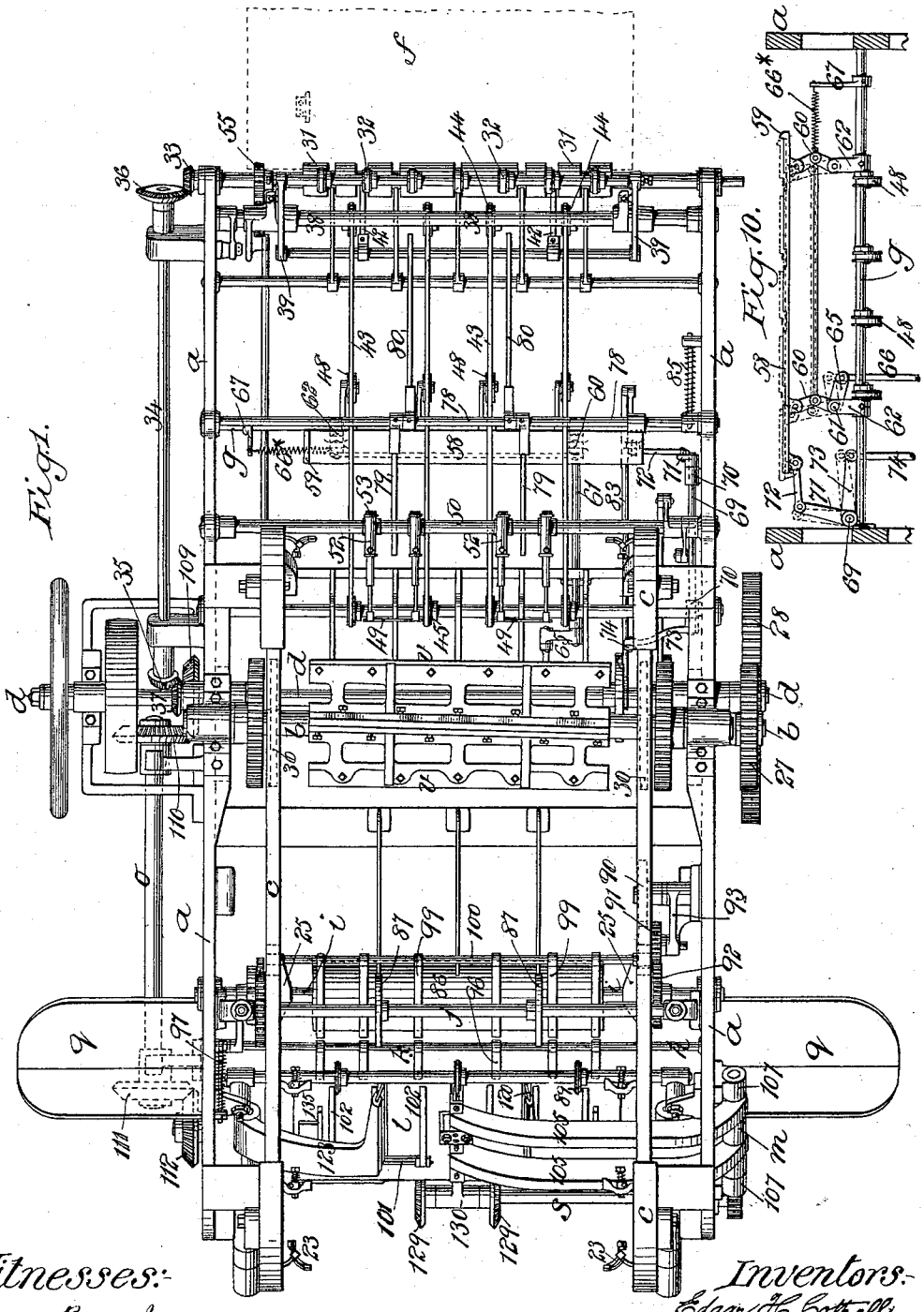

Fig. 1.

Fig. 10.

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(No Model.) 5 Sheets—Sheet 2.

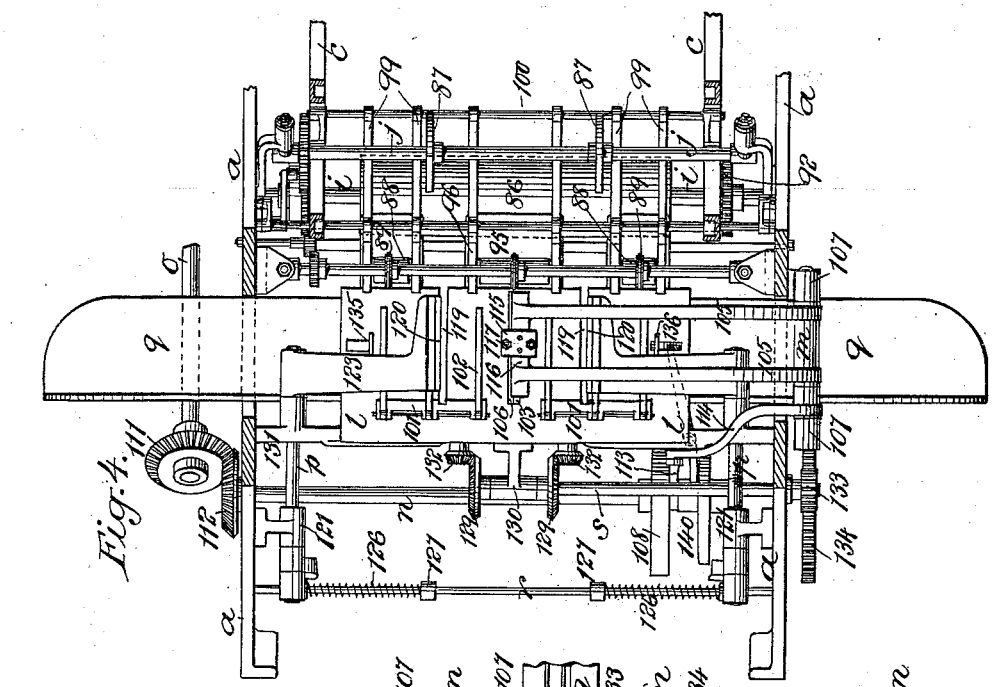

Fig. 4.

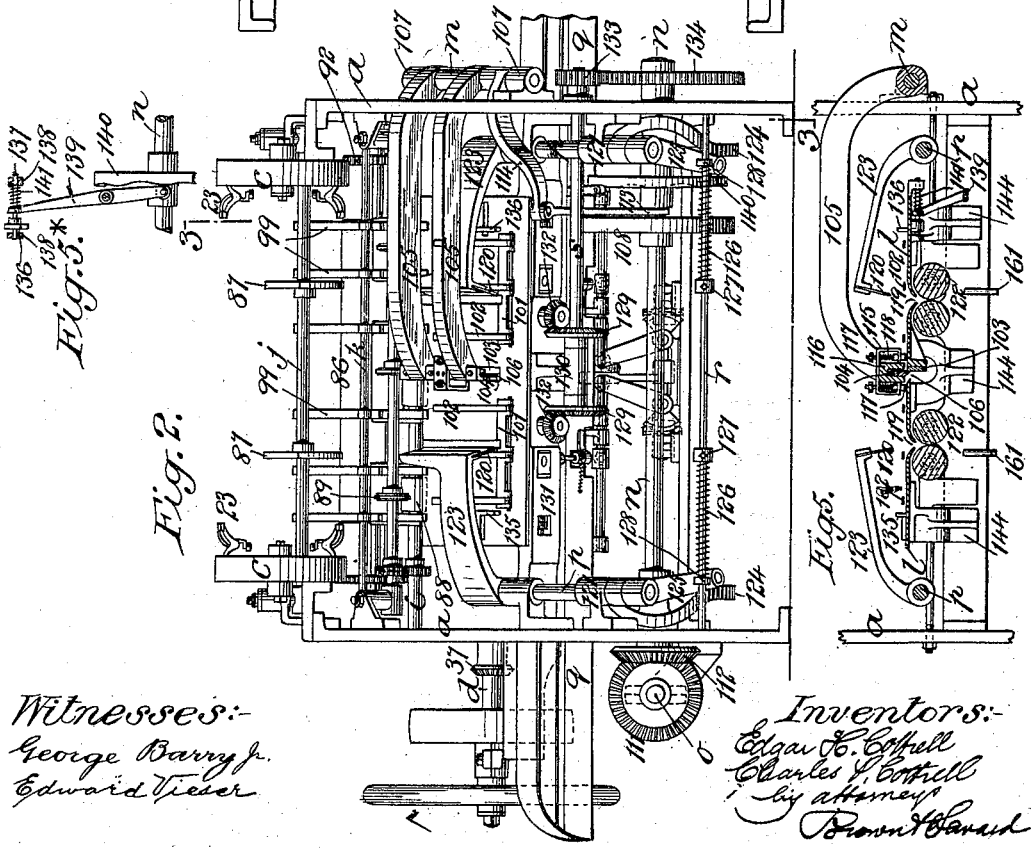

Fig. 2.

Fig. 3.

Fig. 5.

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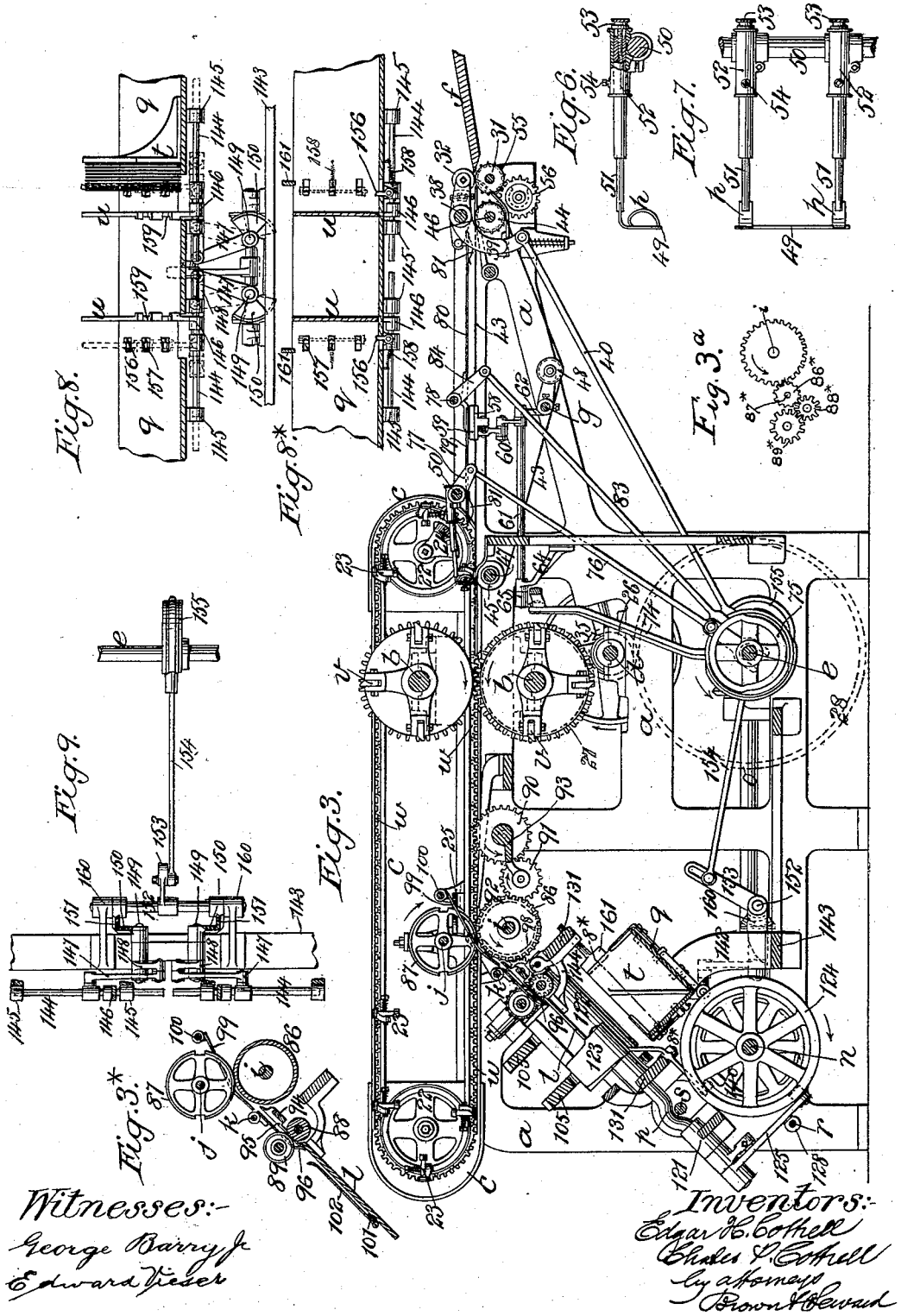
(No Model.) 5 Sheets—Sheet 3.



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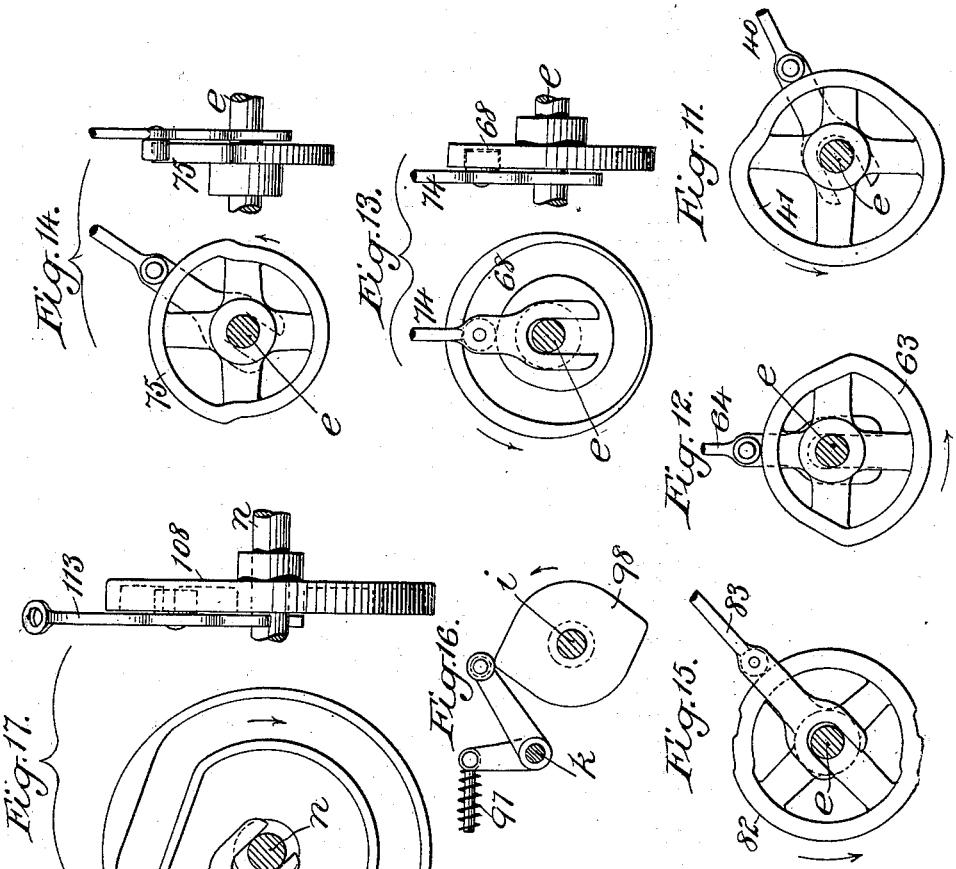
(No Model.) 5 Sheets—Sheet 4.



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APPARATUS FOR CUTTING AND FOLDING PAPER.

(Application filed Dec. 26, 1899.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 20.

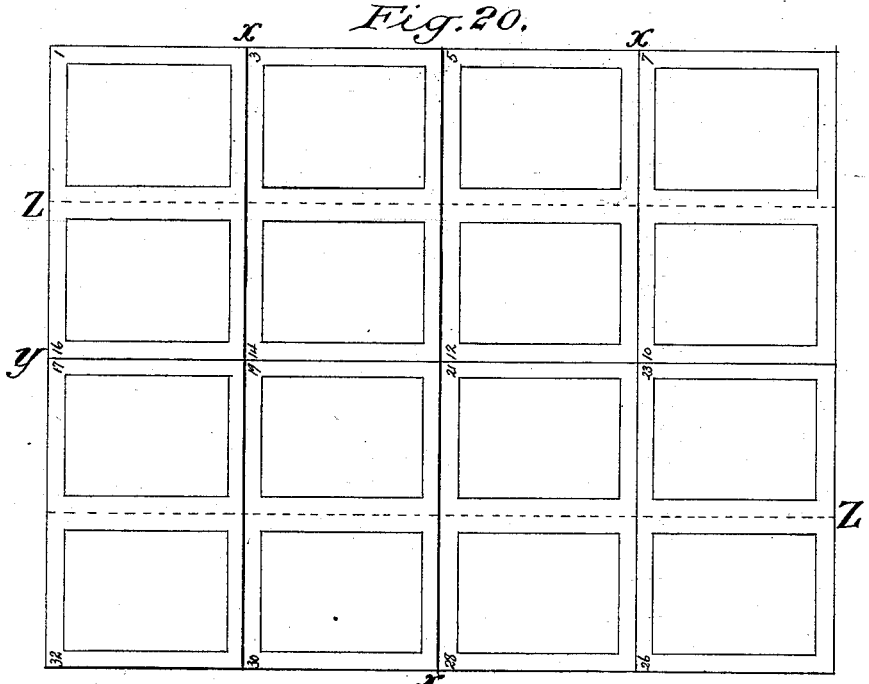
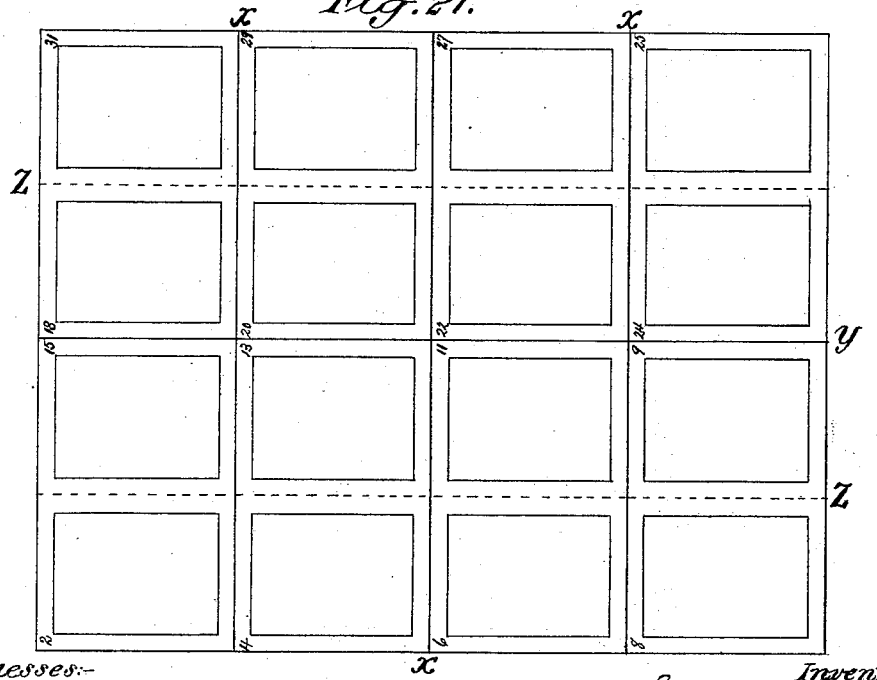


Fig. 21.



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UNITED STATES PATENT OFFICE.

EDGAR H. COTTRELL AND CHARLES P. COTTRELL, OF STONINGTON, CONNECTICUT, ASSIGNORS TO THE C. B. COTTRELL & SONS COMPANY, OF SAME PLACE AND NEW YORK, N. Y.

APPARATUS FOR CUTTING AND FOLDING PAPER.

SPECIFICATION forming part of Letters Patent No. 648,550, dated May 1, 1900.

Application filed December 26, 1899. Serial No. 741,626. (No model.)

To all whom it may concern:

Be it known that we, EDGAR H. COTTRELL and CHARLES P. COTTRELL, citizens of the United States, and residents of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Apparatus for Cutting and Folding Paper, of which the following is a specification.

A cutting and folding machine embodying this invention in its entirety is more especially intended to be used for taking sheets on each side of which several pages have been printed and cutting said sheets severally into a determined number of shorter sheets or sections, then assembling such number of shorter sheets or sections in a pile and while so assembled cutting them all together in a line at right angles to the lines in which they were cut from the original sheet to form two groups, and finally folding each of the two groups parallel with the line on which the pile was cut to form them, thereby forming signatures ready for stitching and binding. Some of the features of the improvement are, however, applicable to machines organized for cutting and folding otherwise than as hereinabove mentioned.

We have illustrated in the accompanying drawings and will proceed to describe a cutting and folding machine in which our whole invention is embodied, and will afterward point out its novelty in the claims.

Figure 1 represents a plan of the machine; Fig. 2, an elevation of that end of the machine which is to the left in Fig. 1; Fig. 3, a longitudinal vertical section taken on such lines, approximately indicated by 3 3 in Fig. 2, as to show most of the working parts; Fig. 3*, a vertical section of the folding-table and the devices for delivering cut sheet-sections in a line parallel with the section Fig. 3; Fig. 3ª, a side view of the gearing of the said devices for delivering cut sheet-sections; Fig. 4, a plan of the devices for assembling the sheet-sections into which the original sheet is cut, cutting the assembled sections into two groups, and separately folding the two groups; Fig. 5, a transverse section of the devices for cutting the assembled sheet-sections into groups and folding the groups of sheets. Figs. 5*, 6, 7, 8, and 9 are detail views which will be hereinafter explained. Figs. 10 to 19 are views of the cams, hereinafter described, for actuating the various parts of the machine. Figs. 20 and 21 are diagrams of two sides of a printed sheet which is to be cut and folded by the machine represented into two signatures of sixteen pages each.

Similar letters and numbers of reference designate corresponding parts in all the figures.

a designates the side framing of the machine, and *b b* two rotary cutter-shafts mounted in bearings in or on the framing and carrying cutters *v*, which operate together in pairs in a well-known manner. The number of cutters will depend on the number of sections or short sheets into which the original sheet is to be cut. In the example represented there are three pairs of cutters, set to make the three cuts necessary to cut into four. On the top of the framing *a* are two side frames *c* for the support of an endless carrier in and by which the sheets are presented to the cutters *v* and by which the cut sheet-sections are carried onward to be assembled and further cut and folded. These carriers are of a well-known kind, consisting of endless toothed racks *w*, which run on wheels 22, pivoted in the frames *c*, and are furnished with grippers 23, which take hold of the edges of the sheet, the said grippers being closed by springs and opened at the proper time to take the sheets by stationary cams 24 and at the proper time to liberate the sheet-sections by stationary cams 25.

The cutter-shafts *b*, the endless carrier-racks *w*, and all the other parts of the machine derive motion from the driving-shaft *d*, which runs in suitable bearings in or on the framing *a*. The said shaft carries a pinion 26, the position of which is indicated by a dotted circle in Fig. 3, which engages with and drives a spur-gear 27 (see Fig. 1) on the lower cutter-shaft *b* and also engages with and drives a spur-gear 28, (see Fig. 1,) fast on a shaft *e*, which carries several cams, to be hereinafter described, for actuating different parts of the machine. The position of the gear 28 is also indicated by a dotted cir-

cle in Fig. 1. The cutter-shafts *b* are geared together by gears 29. The lower one of said shafts is also furnished with gears 30, (shown in dotted outline in Fig. 1,) which gear with the teeth of the endless carrier-racks and so drive the said carrier.

f designates a portion of a feed-board such as is commonly used in hand-fed printing-machines, upon which the sheets to be cut up and folded are placed. At the foot of this board there is arranged in fixed bearings a feed-roll 31, and over the said feed-roll is a drop-roll 32. The feed-roll 31 is furnished with a bevel-gear 33, (see Fig. 1,) which derives motion through a shaft 34 and bevel-gears 35 36 from a bevel-gear 37 on the driving-shaft *d*. The drop-roll is carried by a rock-shaft 38, one of the arms 39 of which is connected by a rod 40 with the yoke of a cam 41 (see Fig. 11) on the shaft *e*. The arms 39 of the rock-shaft carry also fingers 42, which constitute a stop-gage which rises and falls with the drop-roll. This drop-roll and stop-gage are common in printing and folding machines, and therefore need not be further explained.

Between the feed-rolls 31 32 and the endless gripper-carrying racks there is a carrier consisting of tapes 43, which run on rolls 44 45 on shafts 46 47, having stationary bearings in or on the framing. The purpose of this carrier is to receive the sheets from the feed-board and deliver them to the carrier *w*, in which they are cut up into shorter sheets. The proper tension of the tapes 43 is provided for by means of adjustable idler-pulleys 48, carried by arms fast on a stationary bar *g*, extending across the framing. This tape-carrier must be at least as long as the sheets to be cut. It is driven from the feed-roll 31 by a gear 55 on the latter, which gears through an intermediate gear 56 with a gear on the shaft 46. Close under the upper or active run of the carrier-tapes 43 is arranged a sheet-jogger 58, which is shown in Figs. 1 and 3 and also shown in the transverse sectional detail view Fig. 10. This jogger, which is for the purpose of evening the side edges of the sheets, consists of a transversely-arranged plate or bar the length of which should be not less than the width of the sheets to be cut, and it has at one end an upwardly-turned flange 59 to act against one of the side edges of each sheet received by the carrier-tapes 43. The said jogger is carried, as shown in Figs. 3 and 10, by two toggles 60, which are supported in stands 62, secured on the stationary bar *g*, and it has a rising-and-falling movement and a limited reciprocating movement crosswise of the tapes. The rising movement is produced by the straightening of the toggles produced by a cam 63 (see Fig. 12) on the shaft *e* through a rock-shaft 61, which is supported in one of the stands 62 on the bar *g* and in another stationary bracket 64 on the framing, the said rock-shaft having secured to it the lower link of one of the toggles 60 and having an arm 65, which is connected by a rod 66 with the yoke of the cam 63. The falling of the jogger is produced by the flexure of the toggles produced by a spring 66*, which connects the joint of one of the latter with an arm 67 on the supporting-bar *g*. The movement of the jogger crosswise of the tapes is produced by a cam 68 (shown in front and side views in Fig. 13) on the shaft *e* through a rock-shaft 69, (see Figs. 1 and 10,) which is supported in brackets 70 on the framing, and of which one arm 71 is connected by a rod 72 with the jogger and another arm 73 is connected by a rod 74 with the yoke of the cam 68.

Above the line where the tape-carrier is to deliver the sheets to the endless rack-carrier there are located the downwardly-projecting straight edges 49 of a rising and falling gage, the purpose of which is to insure the presentation of the sheets squarely to the last-mentioned carrier and to the rotary cutters. The said gage, which is shown in Figs. 1 and 3, has its construction better shown in Figs. 6 and 7, which are on a larger scale and represent, respectively, a partly-sectional side view and a plan. The said gage is represented as consisting of straight-edged strips or blades 49 of metal, which are carried by a rock-shaft 50, which is arranged crosswise of the machine in suitable fixed bearings. The said blades 49, of which there may be one or more, but of which two are represented, are each attached to the rock-shaft 50 by two stems 51, to which the blade is permanently attached, and two sockets 52, which are fastened on the rock-shaft and in which said stems are adjustable lengthwise to set the blades in line with each other and square with the sheet-carriers. This adjustment is provided for, as shown in the sectional portion of Fig. 6, by headed screws 53, which are inserted through the open rear ends of the sockets 52 and screw into the butts of the stems 51 and the heads of which abut against the rear ends of the sockets. The adjustment is secured by binding-screws 54 in the sockets screwed down onto the stems. The blades 49 are furnished with guards *h* behind and just above their edges for the purpose of preventing the rising or buckling up of the heads of the sheets of paper as the latter strike the said guards. These guards have left below them only a sufficient projection of the edges of the blades to stop the sheets. The said gage is operated by a cam 75 (shown in face and side views in Fig. 14) on the shaft *e*, the yoke of said cam being connected by a rod 76 with an arm 77 on the rock-shaft 50.

Behind the rock-shaft 50 of the gage above described there is arranged over the tape-carrier 43, in fixed bearings in or on the framing, a rock-shaft 78, from which project backward and forward what are termed "lazy-fingers" 79 80, arranged opposite the spaces between the tapes. These fingers are furnished on their under faces with spring-

pressers 81, which by the oscillation of the rock-shaft are caused—first those of the rearward fingers 80 and afterward those of the forward fingers 79—to press lightly on the sheets on the tapes 43 to check any tendency of the sheets to fly forward too rapidly under any momentum they may acquire from the movement of the feed-rollers 31 32. The movement of the rock-shaft 78 is derived from a cam 82 (see Fig. 15) through the connection, by means of a rod 83, of an arm 84 on said rock-shaft and the yoke of said cam. A spring 85 (see Fig. 1) is applied to an arm of the rock-shaft 78 to keep the said rock-shaft and its cam connections in operative relation to the cam.

At a proper distance in advance of the rotary cutter-shafts *b* and just in advance of the gripper-opening cams 24 there are arranged in suitable fixed bearings the shafts *i j* of rolls 86 87, which take from the endless rack-carrier the sheet-sections which have been cut by the cutters *v* and which are to be further cut and folded on the inclined folding-table *l*, which is arranged below and in advance of said rolls. Between these rolls 86 87 and the upper edge of the table *l* there are arranged delivery-rolls 88 89, which receive the sheet-sections from the said rolls 86 87 and carry them onward and deposit them one upon another in a pile on the table. The rolls 86 87—the upper one 87 centered within the carrier *w* and the lower one 86 centered below it—are geared together and derive their rotary motion from one of the endless racks of said carrier through gears 90 91 92, the said gears 90 91 being carried by a bracket 93 on the framing, the gear 90 gearing with one of the endless-carrier racks and the gear 91 gearing with said gear 90 and with the gear 92 on the shaft *i* of the roll 86. The rolls 88 89 are geared together by gears 88* 89* (see Fig. 3ª) and derive motion from the gear 92 on the roll-shaft *i* through an intermediate gear 86*, which turns loosely on a fixed stud 87*, carried by one of the frames *c*, and which gears with 92 and 88*, the two last-mentioned gears being so proportioned to each other and to the circumferences of the rolls 86 87 and of those 88 89 that the latter have a surface velocity higher than that of 86 87, which corresponds with that of the endless carrier *w*. This higher velocity expedites the delivery of the cut sheets to the table *l*. Between the rolls 86 87 and those 88 89 there is arranged a stationary bar 94, which carries a skeleton sheet-supporting plate or series of fingers 95, which project between the rolls 88 89. There is arranged above the said supporting plate or fingers and supported in suitable fixed bearings a rock-shaft *k*, which carries a series of fingers 96, which project between the rolls 88 89 and over the rear edge of the table *l* for the purpose of holding down the tail ends of the sheets passing to said table while the heads of the succeeding sheets pass over them. The said fingers 96 are held up from the table at all times but when required to depress the tails of the sheets by means of a spring 97, (see Fig. 1,) applied to an arm of their rock-shaft *k;* but at the proper time they are depressed by the action on another arm of their rock-shaft of a cam 98 (see Fig. 16) on the roll-shaft *i*. To direct the cut sheet-sections downward from the rolls 86 87 to the supporting plate or fingers 95, there are between the rolls 86 87 downwardly-turned fingers 99, carried by a stationary bar 100, arranged behind the rolls 86 87. On the lower part of the table *l* there are fixed stops 101 to stop the sheet-sections in proper position for further cutting and folding, and from these stops fingers 102 project over the table to loosely confine the sheets thereto during the said further cutting and at the commencement of the folding.

The table *l* has in it in the direction of the runs of the several carrying and delivering devices a central slot 106, (see Figs. 4 and 5,) at one edge of which is secured the stationary blade 103 of a pair of shears, the other blade 104 of which is carried by the arms 105, which project over the table from a rock-shaft *m*, which is arranged in fixed bearings 107 outside of the framing. This rock-shaft *m* derives the necessary motion to produce the slitting of the sheet-sections centrally to their width, and so dividing them into two groups, from a cam 108 on a shaft *n*, which is arranged parallel with the shafts *d e* in fixed bearings on the framing *a* and which derives motion from the said shaft *e* through an intermediate shaft *o* and bevel-gears 109 110 and 111 112 on the said shafts *e*, *n*, and *o*, respectively. The cam 108, of which a side view and an edge view are given in Fig. 17, operates on the rock-shaft *m* by a connection of its yoke-rod 113 with an arm 114 of said rock-shaft. In order to hold the sheet-sections firmly to the table on both sides of the cutting-line during this slitting operation, there is a yoke 115 firmly secured to the stock 116, which is provided on the arms 105 of the rock-shaft *m* to carry the shear-blade, and to this yoke, on opposite sides of the stock 116 and the blade, there are fitted two pressers 117, (see Figs. 2, 4, and 5,) which yield under the control of springs 118. When the stock 116 and its cutting-blade descend to produce the slitting operation, the pressers come down upon the paper before the edge of the blade strikes it. As the stock and blade continue their descent the pressers hold down the paper during the slitting operation, and they continue to so hold it down as the stock and blade ascend until after the blade 104 is clear of that 103, when the pressers ascend with it.

At equal and proper distances from the edge of the blade 103, on opposite sides thereof, there are provided in the table, parallel with said blade, slots 119, through which work two folding-blades 120, (see Figs. 2, 4, and 5,) which are carried by the arms 123 of two rock-shafts *p*, which work in bearings in brackets 121, affixed to the sides of the fram-

ing. Under the table, on opposite sides of the slots 119, are pinching-rollers 122 for completing the folds commenced by the blades 120 in the two groups of sheets, into which the sheet-sections cut by the rotary cutters and piled on the table have been slit by the shears 103 104, the said rollers also serving in the apparatus described to deliver signatures produced by this folding to a packing-trough *q*. The rock-shafts *p* derive motion from two cams 124, on the shaft *n* of one of which an edge view and a face view are given in Fig. 18, the said cams acting upon arms 125 of the said rock-shafts to raise the folding-blades and the said blades having their downward or folding movement produced by the coil-springs 126, which abut against stops 127 on a fixed cross-bar *r* and against swivel-eyes 128 on the said arms 125. The pinching-rolls 122, those of each pair being geared together, derive their motion from bevel-gears 129 on a rotary shaft *s*, (see Figs. 2 and 4,) which runs in a bearing on the side framing and a bearing in a bracket 130 on one of two cross-braces 131 of the framing, which also supports the table by brackets 144. The bevel-gears gear with and drive bevel-gears 132 on one of the pinching-rolls of each pair. The shaft *s* derives motion from the shaft *n* through spur-gears 133 134, (see Figs. 2 and 4,) one on each of said shafts.

For the purpose of bringing all the sheet-sections deposited in a pile on the table *l* to a proper position laterally and relatively to the edges of the slitting-shears and the folding-blades there is provided on the said table, near one side, a stationary gage 135, and there is also provided near the other side of the table a laterally-reciprocating jogger 136, which projects upward from below through a slot in the said table. This gage and jogger are shown in Figs. 2 and 5; but they and their operating mechanism are better shown in the transverse sectional view Fig. 5*. The jogger 136 is carried by a horizontal rod 137, which slides in fixed guides 138 under the table, and this rod is connected with one end of a lever 139, working on a fulcrum-pin in the lower cross-brace 131 of the framing, the other end of the lever being acted upon by a cam 140 on the shaft *n* and a spring 141, coiled upon said rod 137 between the said lever and one of the fixed guides under the table. A side view and an edge view of this cam are given in Fig. 19. The inward movements of this jogger push the sheet-sections evenly up to the gage 135.

The packing-trough *q*, hereinbefore mentioned, is shown in Figs. 1, 2, 3, 4, and 5; but it and its packing devices are better shown in Figs. 8 and 8*, of which the former is a vertical section and the latter a section on the line 8*. The said trough is arranged under the folding-table and the pinching-rolls 122, where it is supported in brackets 142 on the cross-brace 143 of the framing. The said trough is square in its transverse section and wide and deep enough to receive the folded signatures delivered by the rolls 122, and it is set at an inclination corresponding with that of the table *l* and said rolls. It has fitted to slide easily within it two reciprocating packers, consisting of upright plates *u*, having stems 146, which project through slots in the bottom of the trough *q* and which are attached to two reciprocating rods 144, which slide in fixed guides 145 under the trough. There are also fitted loosely to said trough, outside of the reciprocating packers, packing-heads *t*, between which and the said packers *u* the folded signatures are deposited by the rolls 122. The folded signatures are so deposited while the packers *u* are drawn inward or back from the said heads *t*, and as the packers are moved outward they pack the signatures against the said heads, which, although they are heavy enough to produce the necesssary resistance for the packing, yield step by step to the accumulation of the signatures. The mechanism for producing the reciprocating movement of the packers *u* is shown partly in Fig. 8 and completely in Fig. 9, which is a plan view of said mechanism. The rods 144 before mentioned, which carry the said packers, are connected by rods 147 with the arms 148 of two short rock-shafts 149, which work in bearings on the cross-brace 143 of the framing. These rock-shafts are furnished with toothed sectors 150, which engage with toothed sectors 151 on a rock-shaft 152, working in bearings in brackets 160 on the cross-brace 143. The latter rock-shaft has an arm 153, which is connected by a rod 154 with an eccentric 155 on the shaft *e*.

To retain the packed signatures when the packers *u* retire to make room for more, there are pivoted to the exteriors of two inclined sides of the packing-trough short fingers 156, which project through small slots 157 a very little way into the interior of the trough. These retaining-fingers have applied to them, as shown at the bottom of Fig. 8*, springs 158, which tend to pull and hold them against the backs of said slots. When the packers *u* move outward or advance to produce the packing operation, these fingers yield to allow the signatures to pass over them, and when the latter return the said fingers are thrown in again by the springs 158 against the backs of the slots 157, where they are held rigidly by the backward pressure of the packed signatures. To enable the packers to pass by these retaining-fingers, they have notches 159 (see Fig. 8) provided in their edges opposite the said fingers. Fixed retaining-stops 161, (see Figs. 3, 5, and 8*,) attached to one of the cross-braces 131, project over the edge of the upper part of the trough. The edges of the sheets will spring past these stops when pushed forward by the packer, but will not repass when the packer retires.

It may be readily understood that by the ap-

paratus hereinabove described a sheet such as is illustrated in Figs. 20 and 21, printed on both sides for thirty-two pages and fed to and running through the apparatus in the direction of the arrows shown on those figures, is first cut transversely by the rotary cutters v on the lines x into four sheet-sections. Then these sheet-sections after having been assembled on the folding-table are by the shears 103 104 slit centrally, the four together in the line y in the direction of the run of the sheets and their cut sections making two assembled groups of four small sheets, which two groups are separately folded, those of each group together in the dotted lines $z\,z$ to form two signatures of eight pages each, having all their edges open, so that when bound no cutting of the edges is necessary.

What we claim as our invention is—

1. In a machine for cutting and folding paper, the combination of a stationary table, devices for delivering a plurality of sheets one upon another on said table, slitting devices for dividing the so delivered and superposed sheets into separate groups on lines parallel with the movement of said delivering devices, and folding devices on opposite sides of said slitting devices for folding separately in lines parallel with their division the separate groups of divided sheets, substantially as herein described.

2. In a machine for cutting and folding paper, the combination of a carrier, cutters for cutting paper into sheets in said carrier, a stationary table, devices for delivering the so-cut sheets one upon another upon said table, a slitting device for dividing the so delivered and superposed sheets into separate groups on lines transverse to the line of cut of the first-mentioned cutters, and folding devices on opposite sides of said slitting device for folding separately the separate groups of sheets, substantially as herein described.

3. In a machine for cutting and folding paper, the combination of a sheet-carrier, means for presenting separate sheets to said carrier, cutters for cutting said sheets into shorter sheets in said carrier, a stationary table, devices for receiving said shorter sheets from said carrier and delivering them one upon another in a pile on said table, and a slitting device for dividing the so delivered and superposed sheets into separate groups upon the table in a line transverse to the line of cut of the first-mentioned cutters, substantially as herein described.

4. In a machine for cutting and folding paper, the combination of a feed-board, a sheet-carrier and cutters for cutting up separate sheets into shorter sheets in said carrier, a sheet-carrier interposed between said feed-board and the first-mentioned carrier and a jogger having a reciprocating movement crosswise of the carriers for evening the side edges of the sheets in the so-interposed carrier, substantially as herein described.

5. In a machine for cutting and folding paper, the combination of a feed-board and a rising-and-falling stop-gage in front thereof, a sheet-carrier and cutters for cutting up separate sheets into shorter sheets in said carrier, a sheet-carrier interposed between said feed-board and stop-gage and the first-mentioned carrier, and a rising-and-falling stop-gage between the two sheet-carriers, substantially as herein set forth.

6. In a machine for cutting and folding paper, the combination of a feed-board, a feed-roller in front of said feed-board, a drop-roller over said feed-roller, a sheet-carrier in front of said feed-roller, a second sheet-carrier in front of the first-mentioned carrier, cutters for cutting up into shorter sheets in said second carrier the sheets carried thereby, a rising-and-falling stop-gage between the two sheet-carriers, and a sheet-jogger for evening the edges of the sheets in the first-mentioned carrier, substantially as herein described.

7. The combination of a sheet-carrier, a stationary table, devices for receiving from said carrier a plurality of sheets and delivering them one upon another on said table, a pair of shears the blades of which are arranged parallel with the run of said carrier and delivering devices and one of which blades is at one edge of a slot in said table, and means for operating the other blade of said shears, substantially as herein described.

8. The combination of a sheet-carrier, a stationary table, devices for receiving from said carrier a plurality of sheets and delivering them one upon another on said table, a pair of shears the blades of which are arranged parallel with the run of said carrier and delivering devices and one of which blades is at one edge of a slot in said table, folding-blades arranged parallel with the shear-blades at opposite sides thereof and operating through slots in the table for separately folding two groups of sheets into which the first-mentioned sheets are cut by the shears, and means for operating the said folding-blades and the other of said shear-blades, substantially as herein described.

9. The combination of an endless carrier provided with sheet-holding grippers, rolls centered respectively within and below said carrier and having a surface velocity corresponding with the speed of the carrier for taking sheets from the grippers thereof, a stationary folding-table below said carrier, and rolls located between the table and the first-mentioned rolls and having a higher surface velocity than said first-mentioned rolls for receiving sheets from the latter and depositing them upon the table, substantially as herein described.

10. The combination of a stationary table, a slitting device for dividing into two groups sheets piled upon said table, folders consisting of blades operating through openings in

said table, and cam-actuated mechanism for operating said slitting device and folders, substantially as herein described.

11. The combination of a stationary table, slitting devices for the division into groups of sheets piled upon said table, folding devices one for each group of sheets for folding them into signatures, a receiving-trough for the folded signatures and packing devices in said trough for separately packing each group of signatures, substantially as herein described.

12. The combination of a stationary table, slitting devices for the division into groups of sheets piled one upon another on said table, folding devices on opposite sides of said slitting devices for folding the groups of divided sheets into signatures, a receiving-trough under said table for the reception of said signatures, separate packing-heads and separate packers in said trough for separately packing the signatures from each folding device, and cam-actuated mechanism for operating the packers, substantially as herein described.

13. The combination of a table, a stationary cutting edge at one side of a slot in said table, a reciprocating shear-blade, and yielding pressers connected with said blade one on each side thereof for holding sheets upon the table on both sides of said slot while being cut by said blade, substantially as herein described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 20th day of November, A. D. 1899.

EDGAR H. COTTRELL.
CHARLES P. COTTRELL.

Witnesses:
A. R. STILLMAN,
B. F. LAKE.