June 15, 1926. 1,588,844

L. E. LA BOMBARD ET AL

ENVELOPE MACHINE

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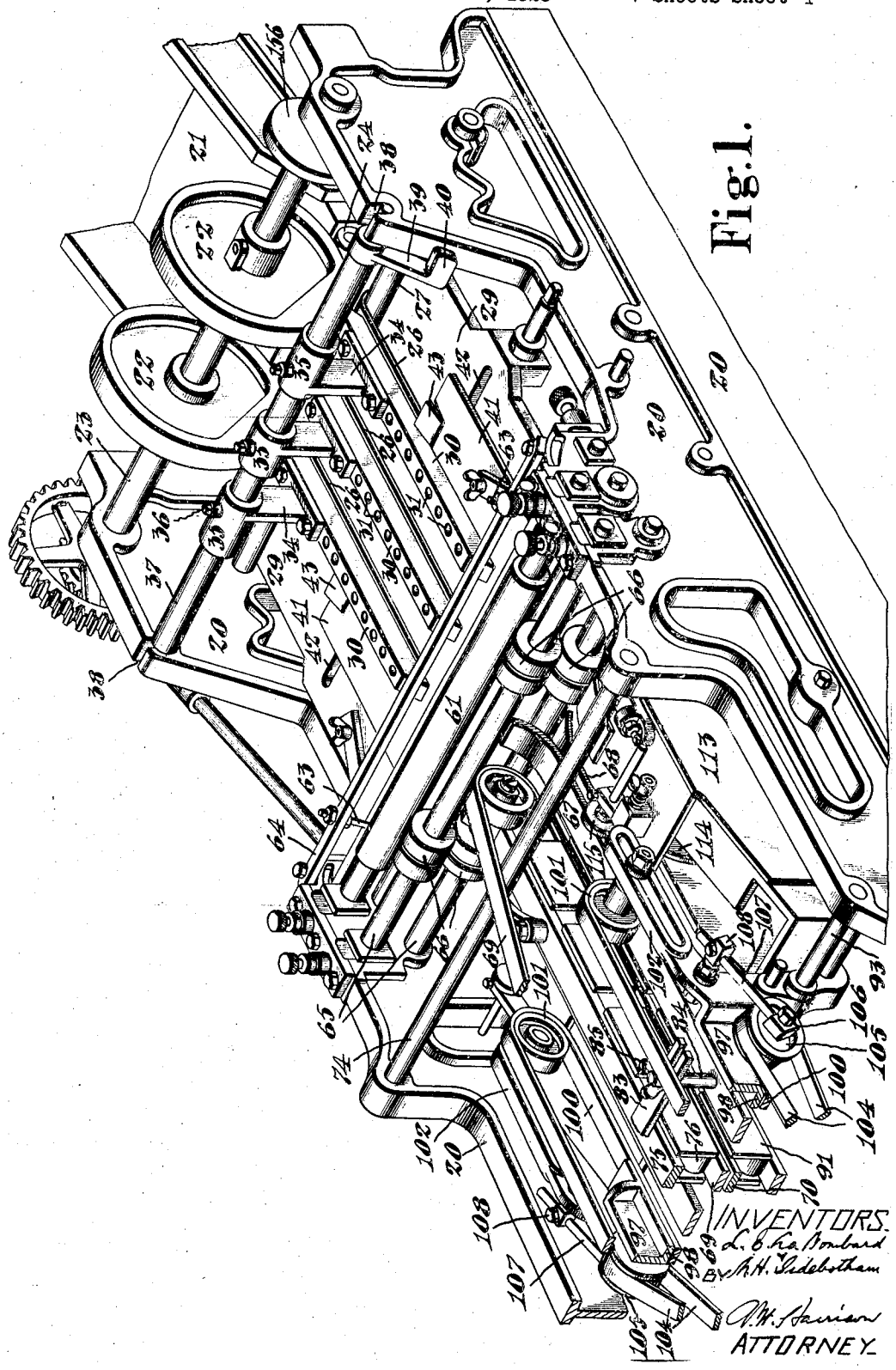


Fig. 1.

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ENVELOPE MACHINE

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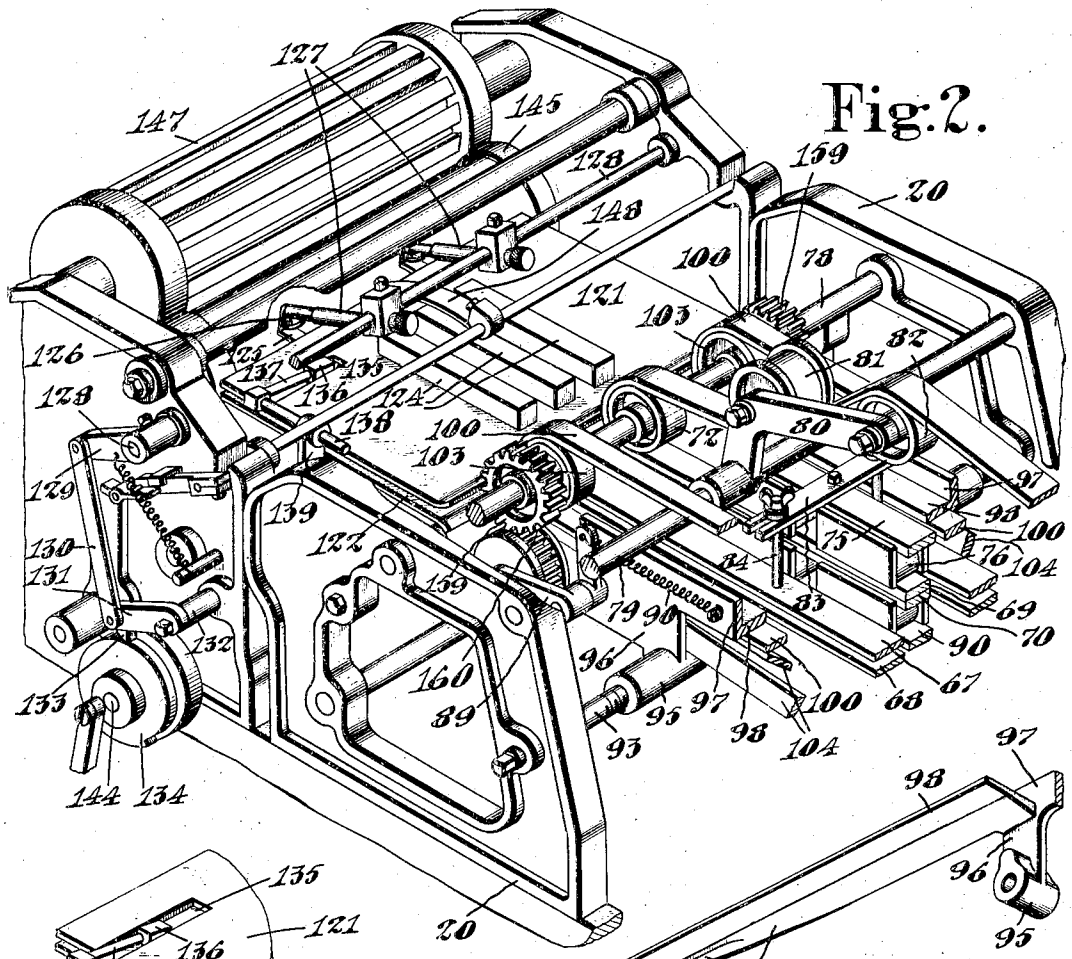


Fig. 2.

Fig. 11.

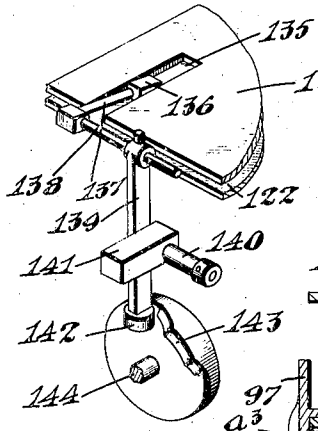


Fig. 12.

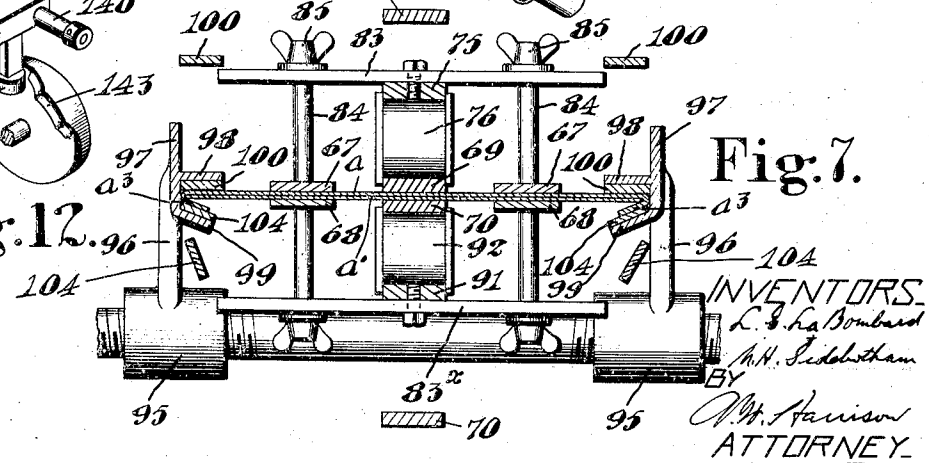


Fig. 7.

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ENVELOPE MACHINE

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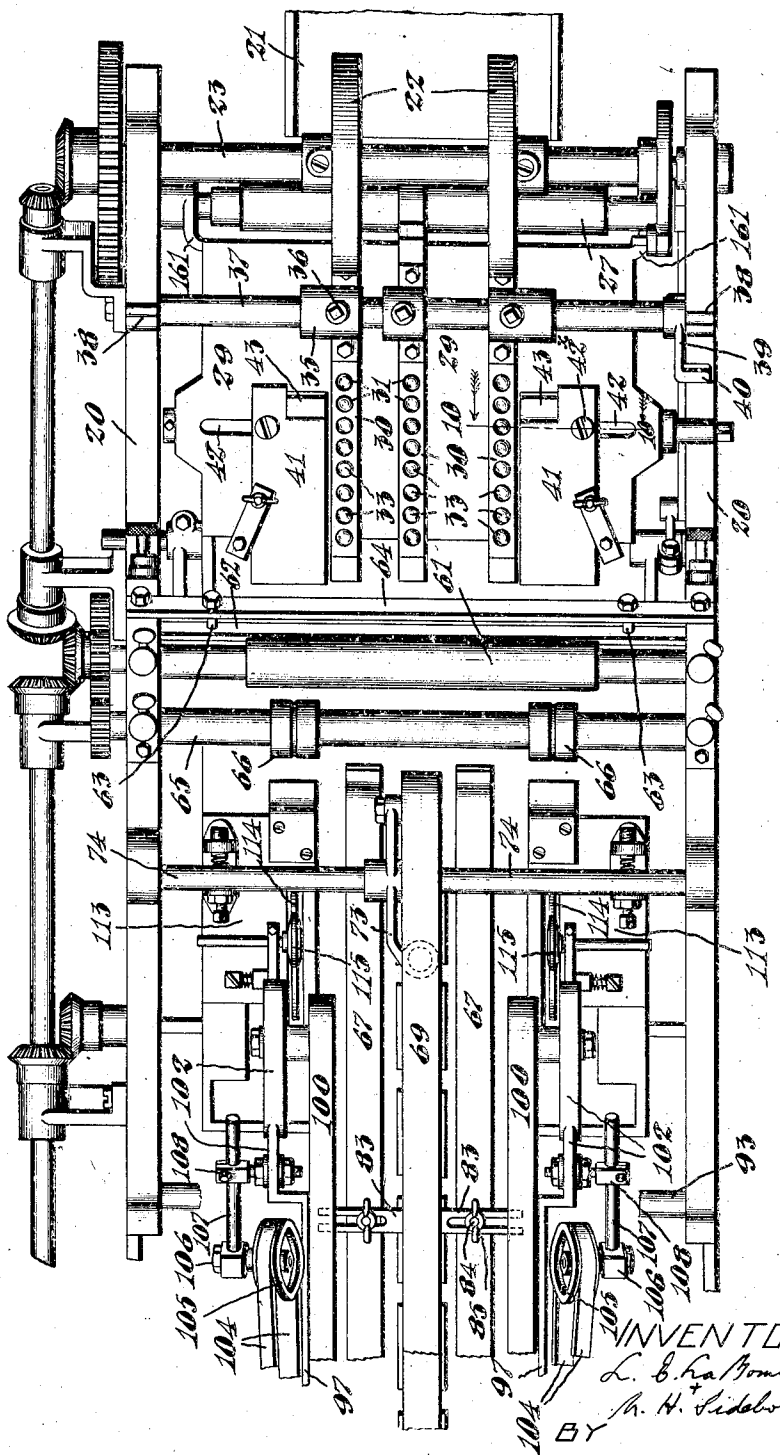


Fig. 3.

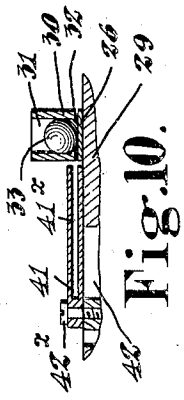


Fig. 10.

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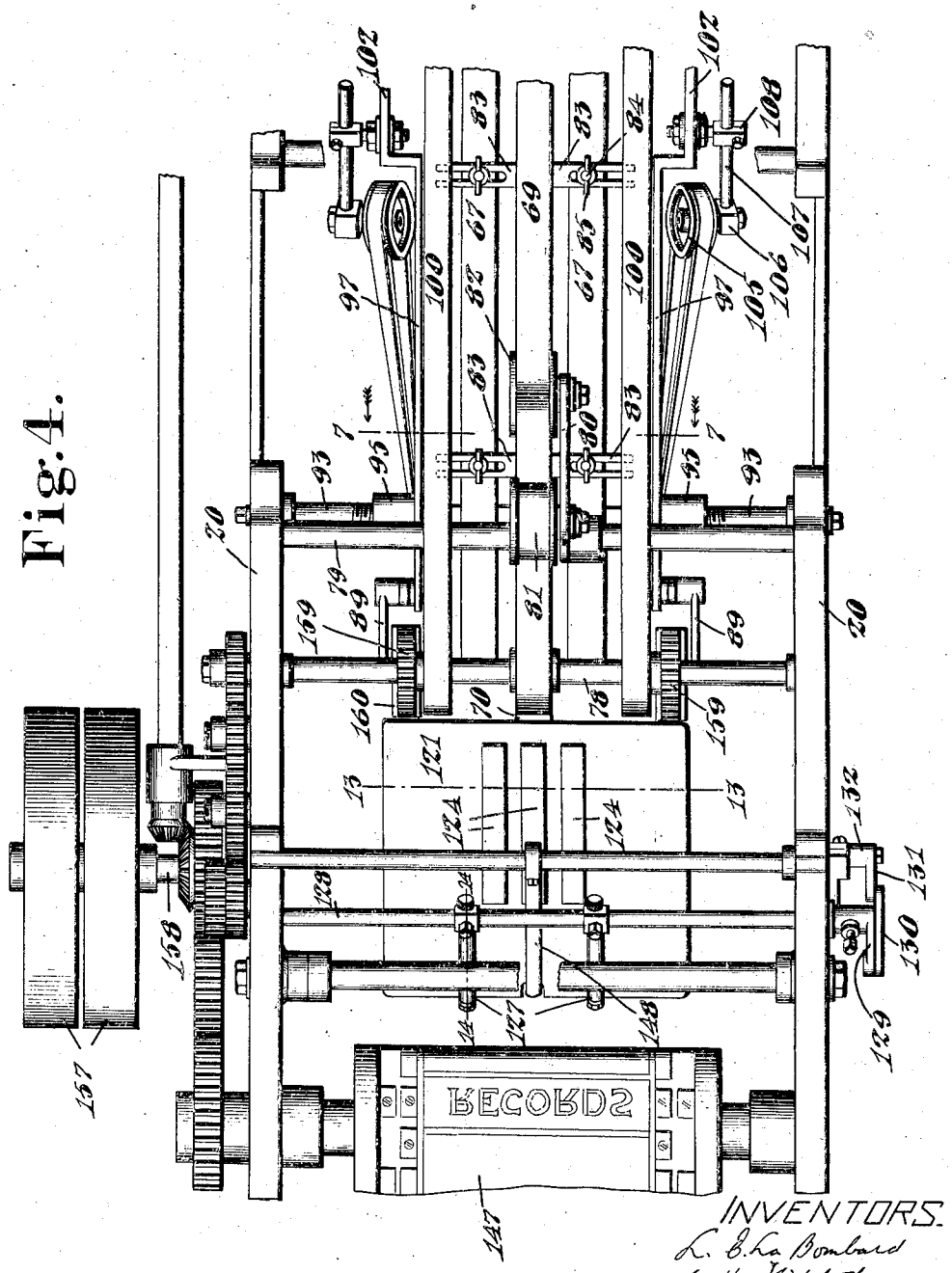
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ENVELOPE MACHINE

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Fig. 4.



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ENVELOPE MACHINE

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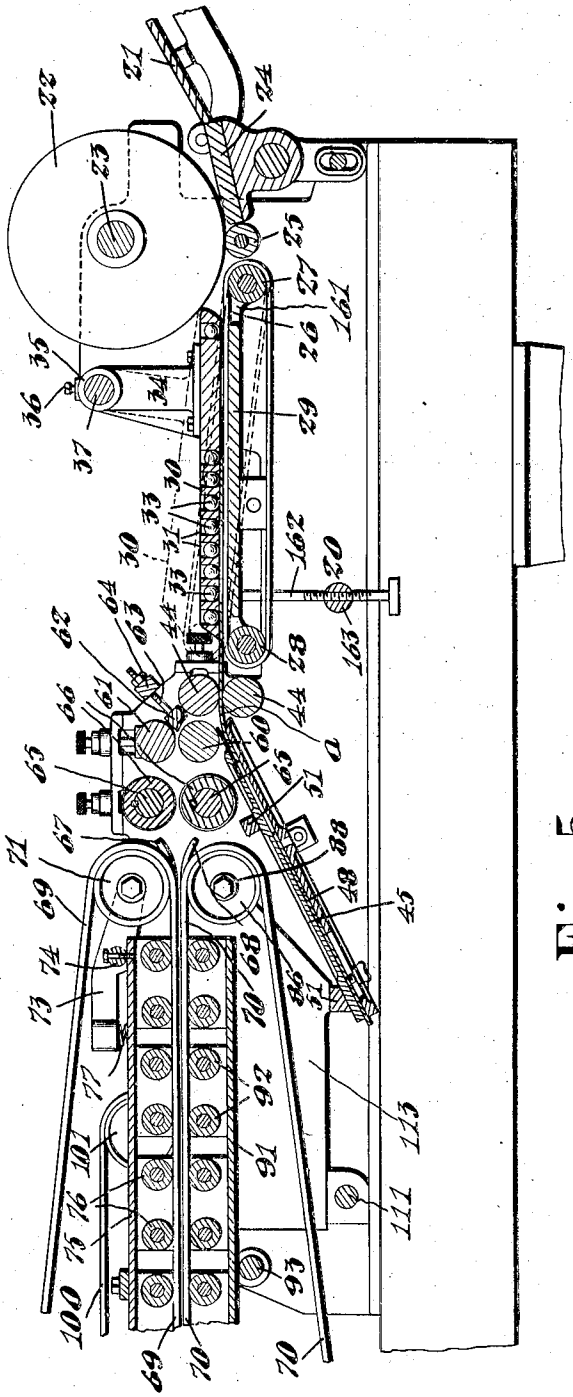


Fig. 5.

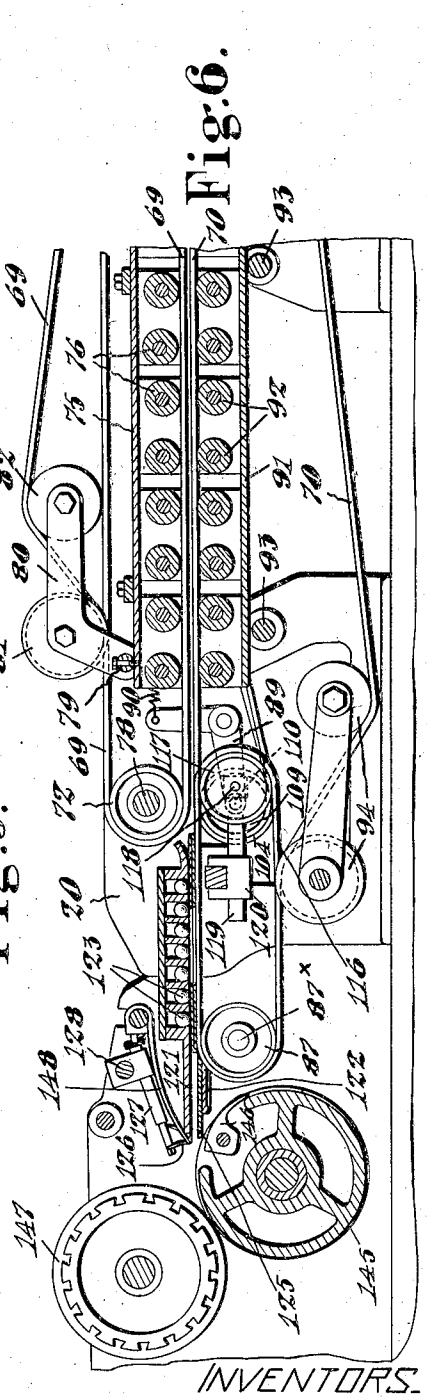


Fig. 6.

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ENVELOPE MACHINE

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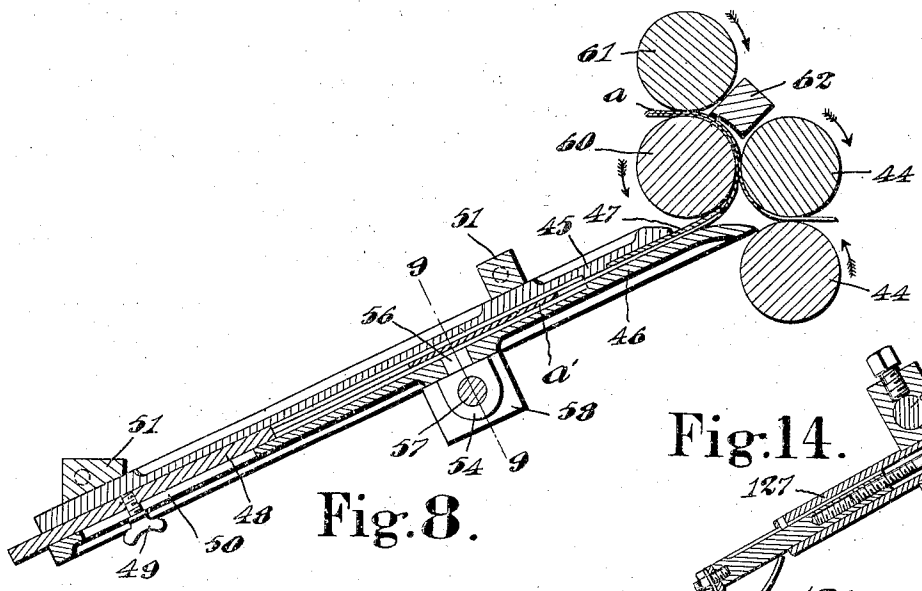


Fig.8.

Fig.14.

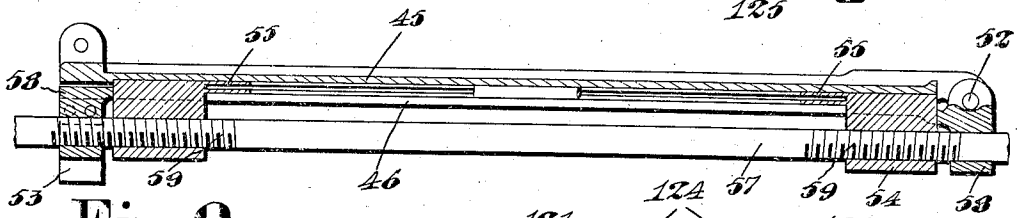


Fig.9.

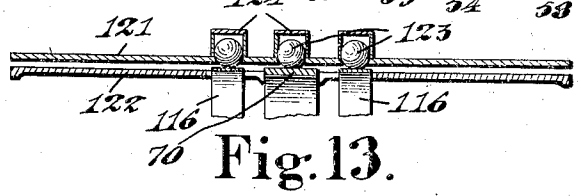


Fig.13.

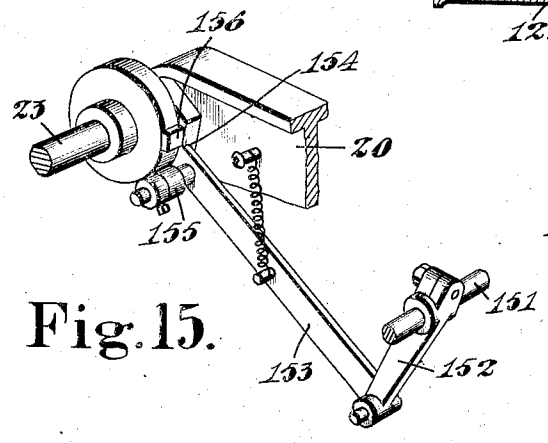


Fig.15.

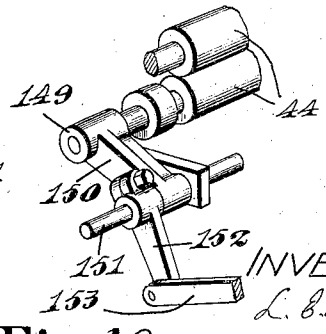


Fig.16.

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ENVELOPE MACHINE

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Fig.17.

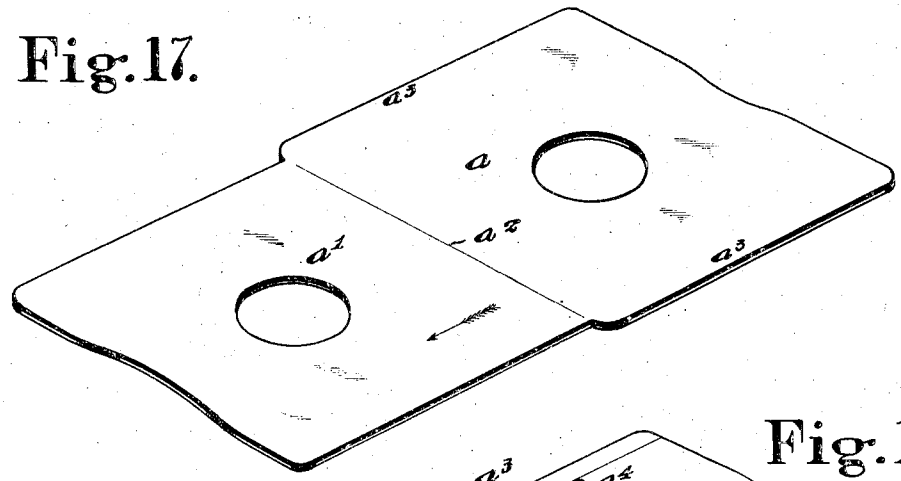


Fig.19.

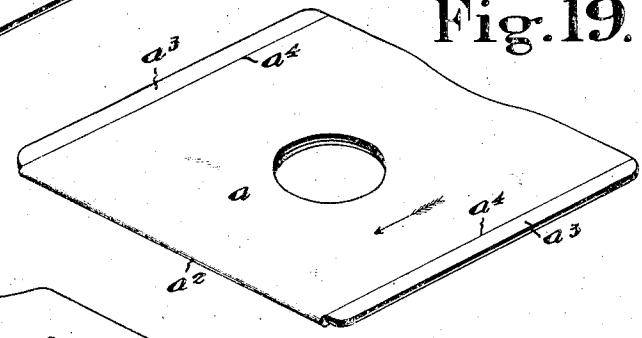


Fig.18.

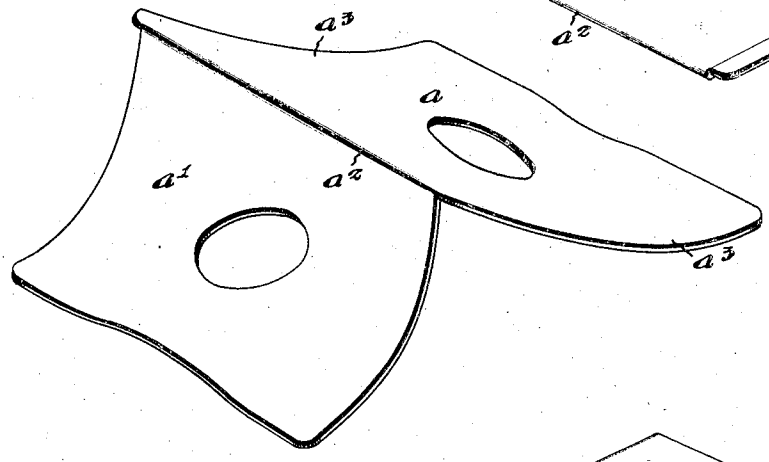
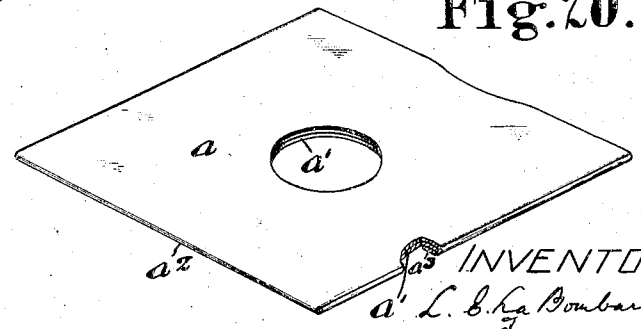


Fig.20.



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UNITED STATES PATENT OFFICE.

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ENVELOPE MACHINE.

Application filed March 14, 1923. Serial No. 624,898.

This invention relates to machines for making paper bags or pocket-shaped envelopes from blanks which are substantially rectangular and which are folded or doubled at about their mid-length and then sealed along two opposite margins at a right angle to the transverse fold.

Envelopes or bags of the general character referred to are well known, and machines for making them have long been in use. So far as we are aware however, such prior machines have been quite complicated and not capable of producing the articles at very high speed, due to the fact that some of the parts of the machines have reciprocating motions.

One of the objects of the present invention is to provide a machine for making envelopes or bags of the kind mentioned, which machine is continuous in its operation and therefore capable of operating at a high speed of production.

Another object is to provide a machine of this character which is comparatively inexpensive to build and to operate.

The blanks which are employed for making bags or envelopes of the kind mentioned are not of uniform width because they have narrow side flaps extending along about half their length, which flaps are folded and secured to the margins of the other half length. This irregular formation of the side edges of the blanks has heretofore interfered with proper registration of the blanks with the mechanism for transversely folding them. Therefore another object of the invention is to provide means for correctly registering the blanks as they approach the transverse folding mechanism, by laterally guiding both the narrow and the wider portions of the blanks.

Another object of the invention is to provide means for ensuring correct registration or lateral positions of the blanks as they leave the folding mechanism, so that they can correctly receive further treatment, such as printing.

Another object is to provide a machine for converting blanks into envelopes or bags and delivering them to printing mechanism, which machine can then be adjusted to feed the same folded and printed blanks, without action by the folding mechanism, through again to the printing mechanism for printing on the other side of the folded blanks.

With the above and other objects in view, our invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings:—

Figures 1 and 2 are perspective views which, taken together, represent the entire machine so far as concerns the subject matter of the present application, said two views indicating the machine as it would appear to one standing by one side thereof and looking first toward the end where the blanks are supplied and then toward the delivery end.

Figures 3 and 4 are plan views of, respectively, those portions of the machine shown in Figures 1 and 2.

Figures 5 and 6 represent sectional elevations of, respectively, those portions of the machine shown in Figures 3 and 4.

Figure 7 represents a section on line 7—7 of Figure 4 on a larger scale.

Figure 8 is a sectional view similar to a portion of Figure 5, but on a larger scale.

Figure 9 represents a section on line 9—9 of Figure 8.

Figure 10 represents a detail section on line 10—10 of Figure 3.

Figure 11 is a perspective view of one of the guide bars for the twisted folding belts.

Figure 12 is a perspective detail of the mechanism for actuating the registering pusher shown in Figure 2.

Figure 13 represents a section on line 13—13 of Figure 4 on a larger scale.

Figure 14 represents a section on line 14—14 of Figure 4 on a larger scale.

Figures 15 and 16 are perspective views of certain details hereinafter explained.

Figures 17 to 20 inclusive are perspective views of one of the blanks in successive conditions resulting from the operation of the machine.

Similar reference characters indicate similar parts in the different views.

The frame of the machine includes side members 20.

Suitably supported at one end of the frame is an inclined table or hopper 21 for

the blanks which are taken singly and successively from the hopper by combing feed disks 22 carried by shaft 23, and fed over retarding strips 24 (Fig. 5) and a roll 25 and delivered onto carrier belts 26 mounted on roll shafts 27, 28. The upper runs or stretches of the belts 26 extend over the bed plate 29 which is suitably supported in fixed position by the frame of the machine. In the embodiment of the invention illustrated there are three belts 26 (Fig. 1) but we do not limit ourselves to this specific plurality.

Above the upper run of each belt 26, and normally parallel therewith, is a bar 30 (Figs. 1, 3 and 5) having a row of holes 31 the lower ends 32 of which are contracted as best shown in Figure 10. The holes are so formed that each constitutes a pocket for a ball 33 fitting loosely therein and free to revolve in any direction, being prevented from dropping through by the annular rib or shoulder 32. Each bar 30 is rigidly connected with a hanger 34 having its hub 35 adjustably secured by a set screw 36 to a transverse supporting rod 37 the ends of which rest in open-top recesses 38 in the frame members 20. Near one end of the rod 37 is a rigid arm 39 having a lateral lug 40 which normally rests against a portion of the frame as best shown in Figure 1.

The three bars 30 are supported a slight distance above the upper runs of the belts 26 (Fig. 5) so as to permit the blanks to pass without being subject to any frictional retard due to said bars. Said distance is such, however, that the portions of the balls which extend down through the contracted bottoms of the pockets may bear on the passing blanks and hold them in contact with the carrier belts 26. Each ball is an independent weight which is freely revolved by the moving blanks, and the total weight required to ensure accurate forwarding of the blanks by the belts is distributed by said balls over a large area of each blank, the weight at each point being quite small. This is an important feature when the blanks are of thin paper such as usually employed for envelopes of the type for which the present machine is especially adapted. Since the balls are free to revolve in any direction they readily permit lateral shifting of the blanks against side guides employed to ensure proper registration.

It is sometimes necessary to temporarily displace the bars 30 and their balls from normal position. This is effected by lifting the rod 37 from its bearing sockets 38, or by slightly rocking the rod, so as to lift the bars above their normal plane. When the rod 37 is returned to normal position, the weight of the bars and their balls causes the lug 40 to bear properly against the frame as shown in Figure 1 so that said lug and frame maintain the rod and the bars and balls in proper position for operation (Fig. 5).

The lateral margins of the blanks at the wider portions thereof are guided by plates 41 having channels 41^x (Fig. 10) into which said margins extend. The plates 41 are adjustably mounted on the bed plate 29 which has slots 42 to enable the guide plates to be laterally adjusted by means of screw clamps 42^x according to the widths of the blanks being operated upon. Said plates 41 have flaring lips 43 (Figs. 1 and 3) to enable the marginal portions of the blanks to properly enter the channels in the plates.

Each blank advanced by the carrier belts 26 is taken by two positively driven rolls 44 (Figs. 5 and 8) and is pushed by said rolls into a narrow space or pocket between two inclined plates 45, 46, the upper plate 45 having a thin guide plate 47 secured to it as by brazing or soldering or otherwise. The bottom of said pocket consists of a stop plate 48 adjustable by means of a thumb screw 49 passing through a slot 50 in the plate 46 and into plate 48.

The upper plate 45 is supported by two tie rods 51, and the lower plate 46 has a hinged connection therewith as at 52 (Fig. 9). A suitable latch, a portion of which is indicated at 53 in Figure 9, engages a lug at the other edge of the lower plate 46 to hold the two plates normally in the relative positions shown in Figures 8 and 9. The hinge and latch construction just described is to enable the pocket into which the blanks are delivered by the rolls 44 to be opened if desired for any purpose such as the removal of a possibly crumpled blank.

A pair of blocks 54 having thin recessed extensions 55 to form guides for the edges of the narrower portions a' (Fig. 17) of the blanks entering the pocket under the pushing action of the rolls 44, are adjustable toward and from each other along slots 56 in the lower plate 46 (Figs. 8 and 9). The adjustment is effected by a rod or shaft 57 mounted to be rotated in lugs 58 of the plate 46 and having oppositely threaded portions 59 operatively engaging the blocks 54.

When the narrow portion of each blank reaches the guides 55, the edges of the wider portion of the blank are still in the channels of the guide plates 41. Therefore, since both the wide and narrow portions of the blank are simultaneously guided there is no liability of the blank shifting askew.

When the front edge of the portion a' (Fig. 17) of each blank contacts with the stop 48 (Fig. 8) the continuous urging by the rolls 44 causes the blank to bulge up transversely between the upper roll 44 and a driven roll 60 which two rolls instantly convert the bulged portion into a transverse fold a^2 (Fig. 18), drawing the lower edge of

the blank away from the stop 48 as shown in Figure 8. The reason why the blank indicated in Fig. 8 is not completely sectioned by cross-hatch lines is that the machine is illustrated as operating on blanks for making bag-shaped envelopes for phonograph records, which envelopes usually have circular holes through which printed matter on the records is readable.

The continued urging by the rolls 44 causes the fold of the blank to contact with the concaved surface of a guide strip 62 which then directs said folded edge between the top of the roll 60 and an upper driven roll 61. The strip 62 is adjustable by means of its two threaded stems 63 (Figs. 1 and 3) passing through a supporting bar 64 and having suitable binding nuts. This mounting of the bar or strip 62 not only enables it to be adjusted to properly direct the folded blanks, but renders it readily removable for a purpose hereinafter described.

When the blank is being drawn up, doubled, between the rolls 44, 60, it is somewhat as indicated in Figure 18. It then issues or passes along to be further operated upon in the condition indicated in Figure 19, crease lines a^4 being formed in the blank by crease rolls 66 carried by driven shafts 65 (Figs. 1, 3 and 5).

The transversely folded blank now passes between upper and lower guide strips 67, 68, being drawn along between and by an upper carrier belt 69 and a lower carrier belt 70, said two belts engaging the mid-width of the blank (Fig. 7) in its doubled or transversely folded condition. The upper belt 69, at one end, is mounted on a pulley 71 (Fig. 5) and at the other end on a pulley 72 carried by shaft 78 (Figs. 2 and 6). The pulley 71 is mounted on a stud shaft carried by a bracket arm 73 (Fig. 5) pivoted on rod 74. A spring 77 acts on the arm 73 to cause the pulley 71 to yield relatively to the pulley below it for the lower belt 70, the mounting and drive of which lower belt will be presently described.

A housing 75 carries rolls 76 (Figs. 1, 2, 5 and 6) which bear upon the upper surface of the lower run or operative stretch of the belt 69, said housing being supported at one end by the rod 74 and at the other end by a rod 79. An arm 80 adjustably mounted on the rod 79 carries tightener pulleys 81, 82 for the belt 69.

Extending laterally from the housing 75 are slotted arms 83 (Figs. 1, 2, 3, 4 and 7) which support the guide strips 67 by means of stems 84 of the latter which extend up through the slots of said arms and are secured by wing nuts 85.

The lower carrier belt 70 is mounted on pulleys 86, 87, (Figs. 5 and 6), the pulley 86 being carried by a shaft 88 and the pulley 87 being carried by a driven shaft 87^x. Below the upper run of the belt 70 is a housing 91 having rolls 92 to support said run. The housing 91 is supported by two transverse rods or shafts 93. Suitable tightener pulleys for the belt 70 are indicated at 94 (Fig. 6). As indicated in Figure 7, arms 83^x extend laterally from the housing 91, and said arms support the lower guide strips 68 in a manner similar to that in which the previously described arms 83 support the upper guide strips 67.

Each blank is carried along, fold a^2 in advance, by the belts 69, 70, in the condition indicated in Figure 19, and shortly after being taken by said belts each blank receives narrow stripes of glue on the under surfaces of the two narrow flap portions a^3, by mechanism presently described, and then said flap portions are turned down and folded in and up against the under surfaces of the marginal portions of the narrower section a' (see Figure 20). This folding is effected by the cooperation of pairs of belts guided or backed by bars each comprising hub portions 95 (Figs. 1, 2, 4, 7 and 11) uprights 96, a vertical wall 97, a horizontal web 98, and a partially spiral web 99 which will be hereinafter referred to as the twist web because it forms a backing for the twisted run of a folding belt presently described. The hubs 95 of the guide bars are supported by the rods 93 which are formed or provided with screw threads engaging said hubs and are rotatable to adjust the two bars toward or from each other to adapt the machine for different widths of blanks.

Running parallel with the web 98 of each guide bar is a belt 100 (Fig. 7) said belt being mounted at one end (Fig. 1) on an idle pulley 101 carried by a stud shaft adjustably secured to the slotted arm 102 of the bar, and at the other end on a driving pulley 103 (Fig. 2) carried by the shaft 78. The lower or operative run of said belt 100 is backed by the horizontal web 98 of the guide bar.

Cooperating with each belt 100 is a folder belt 104 in position to turn a marginal flap a^3 of the blank down and fold it as hereinbefore mentioned. Each of the folder belts 104 is mounted at one end on an idle pulley 105 (Figs. 1, 3 and 4) carried by a stud shaft projecting from a block 106 having a shank 107 adjustably secured in a clasp member 108 projecting from the arm 102 of the guide bar. The other end of each belt 104 is mounted on a pulley 109 (Fig. 6) carried by a stud shaft 110 which projects laterally from an elbow lever 89 the upper arm of which is connected by a spring 90 (see also Fig. 2 to one side of the bar portion 97. Each elbow lever also carries a pinion 160 hereinafter described, secured to the stud shaft 110.

The upper or operative run of each belt

104 is twisted and is backed by the twist web 99 of the guide bar (Fig. 7).

Mounted on suitable cross bars one of which is shown at 111 in Figure 5, are two glue boxes 113 (Figs. 1 and 3) in each of which is a rotating disk 114 to apply a stripe of glue to the under surface of the portion a^3 of the blank passing over said disk. To ensure contact of said portion of the blank with the disk 114, a wheel 115 is mounted to revolve idly above said disk and slightly spaced therefrom.

As the blank travels along, with glue applied to the under surface of each of the flaps a^3 (Fig. 19), said flaps are turned down and folded in under the side edges of the narrower portion a' of the blank (Fig. 20) by the action of the folder belts 104 which travel along the twist webs 99 (Fig. 7). The portions of the belts 104 beyond the far ends of the guide bars travel close to the belts 100 so that the folded flaps are pressed to final folded condition. The folded blanks are then delivered onto belts 116 the upper runs of which are in the same plane as the far end of the belt 70. Said belts 116, at their far ends, are mounted on pulleys carried by the shaft 87^x, the other ends of said belts being mounted on pulleys 117 (Fig. 6) the stud shafts 118 of which are carried by rods or stems 119 adjustably held by any suitable means in fixed blocks 120.

Above the belts 116 and the continuation of belt 70 is a plate 121 (Figs. 2, 4, 6 and 13) below which is a plate 122 slotted for the passage of the said belts. These two plates are separated by a space slightly greater than the thickness of a transversely folded blank which is delivered between them. It is frequently desirable that the folded blanks shall receive further treatment after they have been folded as described and that they shall be delivered from the folding mechanism properly registered in position for such further treatment. To illustrate this feature of the invention, we have chosen a simple form of printing mechanism as that which is to operate on the folded blanks, such printing mechanism however forming no part of the invention claimed herein. It will be readily understood that when the folded blanks are to be printed it is highly desirable that they shall be delivered to the printing mechanism properly registered—that is, that they shall not leave the folding mechanism in other than squared up condition. To ensure delivery of the articles in squared up or registered positions, certain features associated with the plates 121, 122, are employed, which features we will now describe.

Coacting with the extension of belt 70 and with the two belts 116, to ensure travel of the blanks, are rows of small spherical weights or balls 123 in pockets formed in housings or bars 124 attached to the plate 121 (Figs. 2, 6 and 13). Said bars and their ball weights are similar in structure and operation to the bars 30 and their ball weights 33 hereinbefore described. The balls 123 are free to rotate in any direction and therefore their function of holding the folded blanks down on the belts is not interfered with by anything which may cause the balls to rotate laterally when a blank is pushed sideways, for registering purposes, as presently described.

In order that each folded blank may be temporarily arrested before leaving the machine, and then released for proper timed delivery to the mechanism which is to further act thereon, such as printing mechanism, stops 126 (Figs. 2 and 6) are provided to act at certain times in cooperation with the tongues which extend forward from the plate 122. Said stops 126 are carried by arms 127 of a rock shaft 128, the arms being preferably adjustable in length by means such as illustrated in Figure 14. As illustrated in Figure 2, one end of the rock shaft 128 has an arm 129 connected by a link 130 with an arm 131 pivotally supported at 132 and having a cam rider or toe 133 bearing on a cam 134 carried by a shaft 144. Said shaft carries other operating mechanism hereinafter described, and is rotated at such speed as to cause the stops 126 to be lowered and raised to arrest and release the folded blanks at the proper times. When the stops are down and a folded blank contacts therewith and stops, there is no liability of the blank being crumpled by the belts because the widely distributed light weight balls 123 do not at any point bear on the blank with sufficient pressure to cause the belts to frictionally force them along. The belts then simply slip along under the blank until the stops rise and release the blank.

As illustrated in Figures 2 and 12 slot 135 extends in from one side edge of the upper plate 121. A pusher 136 at the end of an arm 137 slides on the lower plate 122, guided by the edges of the slot 135, said pusher acting on any folded blank which may arrive between the plates in other than proper lateral position to push said blank to correct position of registration. The outer end of the arm 137 is loosely mounted on a small rod or pin 138 carried by the upper end of a lever 139 pivoted at 140 to a stud or block 141 on the inside of one of the frame members 20. The lower end of the lever 139 has a roll 142 which is acted upon at the proper times by a cam 143 carried by the shaft 144.

As the printing mechanism illustrated has nothing to do with the invention claimed herein, a brief reference thereto will be sufficient:—Referring to Figure 6 in connec-

tion with Figures 2 and 4, the cylinder 145 carries grippers 146 for taking the folded blanks delivered in registered positions by the mechanism previously described. A cylinder 147 carries the printing plates. A tripping finger 148 acts, through mechanism shown in Figure 2 but not necessary to describe herein, to control the printing, by throwing off the impression cylinder when no blank is going through.

Referring now to Figures 5 and 8, it is essential that the rolls 44 shall not continuously run in such close proximity as to grip the blank. Each blank, in its flat or open condition must reach the stop plate 48 loosely, under the feeding influence of the belts 26, so that said blank will automatically square itself against the stop plate as it slides down between the inclined plates 46, 45. Only the forward or narrower section of the blank enters the pocket between the inclined plates. While this section is passing between the rolls 44, the lower roll 44 is lowered, and then, by mechanism now to be described, said lower roll is raised so that the action of the two rolls will be to bulge up the blank at its mid-length toward the strip 62 as hereinbefore explained.

The mechanism for raising and lowering the lower roll 44 is best shown in Figures 15 and 16. The shaft of said lower roll 44, at each end, is mounted in a bearing 149 carried by an arm 150 of a rock shaft 151. The rock shaft has another arm 152 to which is connected one end of a rod 153 the other end of which is mounted in a slide bearing 154. The rod has a roll 155 which is acted upon by a cam 156 carried by shaft 23. The reason why the rod 153 is shown in Figure 15 as leading in a direction different from its illustration in Figure 16 is that these two figures are perspectives taken from different points of view.

As the shafts and gearing which effect the proper timed operation of the various parts of the machine, although clearly illustrated, form no subject matter of the claims, detailed description thereof will not be necessary. It is desirable however to explain that a shaft 158 (Fig. 4) has ordinary fast and loose pulleys 157, and said shaft, through the gearing illustrated in said figure, drives the shaft 78 which latter has pinions 159 (see also Figure 2) meshing with the pinions 160 which, as hereinbefore stated, are, each of them, carried by an elbow lever 89.

It is sometimes desirable to send the folded articles through the machine a second time, without having them again doubled by the mechanism chiefly shown in Figure 8. For instance, if the machine which does the folding delivers the articles to printing mechanism which operates on but one surface of the delivered articles, it may then be desired to use the same entire mechanism for printing the other surface of the articles. In that case, by making a slight adjustment presently described the previously folded blanks can be placed on the table or hopper 21, other side up, and sent or fed through the machine to the printing mechanism without receiving any folding treatment on the way. By referring first to Figure 3, it will be seen that the bed plate 29 is formed with ears 161. Said ears are pivotally mounted on the ends of the driven shaft 27 so that said bed plate and all parts connected therewith can be swung up as indicated by dotted line in Figure 5. The forward portion of the bed plate, at about its mid-width, rests on the upper end of a vertical screw 162 (Fig. 5) extending through a threaded hole in a transverse bar or tie rod 163. The roll shaft 28 is not driven except as it is rotated by the belts 26 mounted on the shafts 27, 28. When the bed plate, the shaft 28, and the belts are in the position indicated by the full lines, Fig. 5, the flat blanks are forwarded or directed between the rolls 44 for folding as hereinbefore described. When said parts are adjusted by the screw 162 up to the position indicated by dotted lines in said figure, such adjustment also causes the bars 30 and their rows of ball weights to swing up, the mounting of the rod 37 in open socket bearings 38 (Fig. 1) permitting the necessary slight rising of the rear portions of said bars. When the parts are adjusted as just described, the blanks, which are supposed to have been previously folded, are forwarded or directed above the upper roll instead of below it so that, upon removal of the guide strip 62, or sufficient elevation thereof, the folded blanks will be fed directly to the carrier belts 69, 70, and be delivered by the latter to the printing mechanism. The parts just described constitute a secondary feeder which takes flat material from the primary feeder comprising the disks 22 and cooperating members, and delivers said material in either one of a plurality of planes according to the treatment which is to be given to the material by other parts of the machine. In other words, the secondary feeder is adjustable to direct blanks either to or past the folding mechanism.

The plates 121, 122, form a vertically narrow throat which receives the folded blanks and directs them to the printing or other mechanism for further treatment, and the folded blanks are temporarily arrested in said throat by the stops 126 while the pusher 136 acts to shift into correct lateral position any folded blank which may have arrived in the throat in other than squared up position or in correct lateral position.

It is to be understood that the blanks are, in practice, of much thinner material than indicated in the drawings, especially Figures 17 to 20, which, for the sake of clearness of illustration, employ double lines for the material of the blanks. The material is, as a matter of fact, so thin, and the blanks are so large when the envelopes made are to be used for containing phonograph records, as to require quite different treatment from what would be the case if the material was such as that employed for making boxes and cartons. Two particular features of our present invention which enable the machine to correctly fold blanks of large area and of very thin material, are the multiplicity of small spherical weights which maintain frictional contact of the blanks with the carrier belts, and the features which provide for correct registration or positioning of the blanks at various portions of the machine, as hereinbefore described.

Having now described our invention, we claim:

1. A machine for making bag-shaped containers from blanks having relatively wide and narrow portions, comprising means for causing a blank to travel, laterally registering guides for opposite edges of both the wide and narrow portions of the blank, mechanism for transversely folding the blank in registered position, and means for securing the side edges of the wide and narrow portions together.

2. A machine for making bag-shaped containers from blanks having relatively wide and narrow portions, comprising a stop in the path of a blank, means for delivering a blank endwise against said stop, means for laterally guiding both the narrow and wider portions of the blank while approaching the stop, folding mechanism for doubling the blank on a transverse line, and means for uniting the side edges of the doubled blank.

3. A machine for making bag-shaped containers from blanks having relatively wide and narrow portions, comprising a stop in the path of a blank, means for delivering a blank endwise against said stop, adjustable guides for both edges of the wide and narrow portions of the blank, folding mechanism for doubling the blank on a transverse line, and means for uniting the side edges of the doubled blank.

4. In a machine of the character described, a conveyor for blanks, a plurality of loosely mounted spherical weights in position to maintain frictional contact of the blanks with the conveyor, means for effecting correct lateral positioning of the blanks while between the conveyor and the weights, and folding mechanism to which the blanks are supplied by the conveyor.

5. In a machine of the character described, a plurality of carrier belts, bars provided with holes having contracted lower ends above said belts, balls loosely mounted in said holes and projecting below the under surfaces of the bars to bear on blanks being forwarded by said belts, and folding mechanism to which the blanks are supplied by the coaction of the belts and balls.

6. In a machine of the character described, a plurality of carrier belts, a loosely mounted rod having a plurality of bars extending over the belts, said bars having spherical weights mounted therein, means for normally maintaining the rod and its weight-carrying bars in predetermined positions relatively to the carrier belts, and folding mechanism to which blanks forwarded by said belts are supplied.

7. In a machine having mechanism for folding blanks transversely, a conveyor for supplying flat blanks thereto, and means for directing the blanks in a straight line to the transverse folding mechanism, said means comprising guide plates having horizontal channels for the lateral margins of the blanks.

8. In a machine having mechanism for folding blanks transversely, a bed plate, means for conveying flat blanks over the bed plate to the transverse folding mechanism, and guide plates connected with the bed plate and adjustable relatively to the mid-width of the bed plate, said guide plates having channels for the lateral margins of the blanks.

9. In a machine of the character described, an inclined pocket, rolls and means for pushing a flat blank partially into the pocket against the bottom thereof, means for coacting with one of said rolls for continuing the movement of the blank in transversely folded condition, and means located in a plane above said inclined pocket for uniting the side edges of the doubled blank.

10. In a machine of the character described, an inclined pocket having an adjustable stop at its bottom, rolls and means for pushing a flat blank into the pocket until it contacts with said stop, means coacting with one of said rolls for continuing the movement of the blank in transversely folded condition, and means located in a plane above said inclined pocket for uniting the side edges of the doubled blank.

11. In a machine of the character described, a pocket for the reception of a flat blank, and means cooperating therewith for transversely folding the blank, said pocket comprising two plates having a hinged connection.

12. In a machine of the character described, a pocket for the reception of a flat blank, and means cooperating therewith for transversely folding the blank, said pocket

having adjustable guides for the side edges of a blank entering the pocket.

13. In a machine of the character described, a pocket for the reception of a flat blank, and means cooperating therewith for transversely folding the blank, said pocket having guides for the side edges of a blank entering the pocket, and means for simultaneously adjusting the guides toward and from each other.

14. In a machine of the character described, a pocket for the reception of a flat blank, and means cooperating therewith for transversely folding the blank, said pocket comprising two plates one of which has transverse slots, guides movable in said slots and having recesses for the side edges of the blank, and a rod having right and left hand screw threads engaging said guides to enable the latter to be simultaneously adjusted.

15. In a machine of the character described, a pocket, a pair of driven rolls for pushing a flat blank into the pocket, a guide having a concave face above said rolls, and a second pair of driven rolls beyond said guide.

16. In a machine of the character described, a pocket, a pair of driven rolls for pushing a flat blank into the pocket, a guide having a concave face above said rolls, and a second pair of driven rolls beyond said guide, the lower roll of the second pair being adjacent to the upper roll of the first mentioned pair to cooperate therewith in transversely folding the blank and pushing it against and past the concave face of the guide.

17. In a machine for folding blanks, a guide for a pair of cooperating belts, said guide having a straight web for one belt of the pair and a twist web for the other belt of the pair, and blank carrying and folding belts mounted to travel in contact with said straight and twist webs.

18. A machine of the character described, comprising means for first folding a blank transversely, and means for then folding side portions of one part of the blank over the side edges of the other part of the blank, the side folding means comprising two bars each having a straight web and a twist web, and belts guided by said webs.

19. A machine of the character described, comprising means for first folding a blank transversely, means for then folding side portions of one part of the blank over the side edges of the other part of the blank, the side folding means comprising two bars each having a straight web and a twist web and belts guided by said webs, and means for laterally adjusting the bars and belts.

20. A machine of the character described, having means for folding opposite marginal portions of blanks, said means comprising two pairs of cooperating belts, one belt of each pair having a twisted stretch, and a bar for guiding each pair of belts, each bar having a twist web for the twisted stretch of its belt.

21. A machine of the character described, having means for folding opposite marginal portions of blanks, said means comprising two pairs of cooperating belts, one belt of each pair having a twisted stretch, and a bar for guiding each pair of belts, each bar having a twist web for the twisted stretch of its belt, the far ends of the bars being formed to direct the belts issuing therefrom in flat juxtaposition to press the folded portions of the blanks.

22. A machine having mechanism for folding blanks and having a vertically narrow throat to receive the folded blanks and permit their passage to mechanism for further treatment, and means for laterally registering the folded blanks in said throat.

23. A machine having mechanism for folding blanks and having a vertically narrow throat to receive the folded blanks and permit their passage to mechanism for further treatment, means for temporarily arresting the folded blanks in the throat, and means for laterally registering the folded blanks while arrested.

24. A machine having mechanism for folding blanks and having belts onto which the folded blanks are delivered by the folding mechanism, a pair of plates one above the other, the lower plate being slotted for the passage of said belts, and means for laterally registering the folded blanks while between said plates.

25. A machine having mechanism for folding blanks and having a vertically narrow throat to receive the folded blanks, carrier belts for effecting movement of the blanks through the throat, a plurality of loosely mounted spherical weights in position to maintain frictional contact of the blanks with the said belts, and means for laterally registering the blanks while in said throat.

26. The combination with blank folding mechanism and printing mechanism to which folded blanks are delivered by the folding mechanism, of means for intermittently arresting and releasing each folded blank, and registering mechanism in position to act on each blank while arrested to ensure correct delivery of the folded blanks to the printing mechanism.

27. The combination with blank folding mechanism and printing mechanism to which folded blanks are delivered by the folding mechanism, of means for intermittently arresting and releasing each folded blank, and registering mechanism in position to act on each blank while arrested to ensure correct delivery of the folded blanks to the printing mechanism, said registering mechanism including an intermittently

operating stop and a laterally movable pusher.

28. In a machine of the character described, a pocket for the reception of a flat blank, rolls and means for pushing the blank partially into the pocket against the bottom thereof, means for intermittently separating the rolls during insertion of the blank in the pocket and then causing the rolls to grip the blank and cause it to double up, and means coacting with one of said rolls for continuing the movement of the blank in transversely folded condition.

29. In a machine of the character described, a pocket for the reception of a flat blank, rolls and means for pushing the blank partially into the pocket against the bottom thereof, means for intermittently separating the rolls during insertion of the blank in the pocket and then causing the rolls to grip the blank and cause it to double up, means for ensuring lateral registration of the blank before the rolls grip it, and means coacting with one of said rolls for continuing the movement of the blank in transversely folded condition

30. A machine for folding flat articles, having a primary feeder and a secondary feeder, the secondary feeder being adjustable to deliver articles either to the mechanism for folding them or pass said mechanism.

31. A machine including mechanism for folding blanks and mechanism for further treating the blanks after they are folded, said machine having a blank carrier adjustable to different planes to direct blanks either to the folding mechanism or past and beyond it.

32. The combination with blank folding mechanism and printing mechanism to which folded blanks are delivered by the folding mechanism, of a feeder for flat blanks, and a carrier intermediate the feeder and the folding mechanism, said carrier being adjustable to different planes to direct blanks either to the folding mechanism or past the folding mechanism to the printing mechanism.

In testimony whereof we have affixed our signatures.

LEON E. LA BOMBARD.
MELVIN H. SIDEBOTHAM.