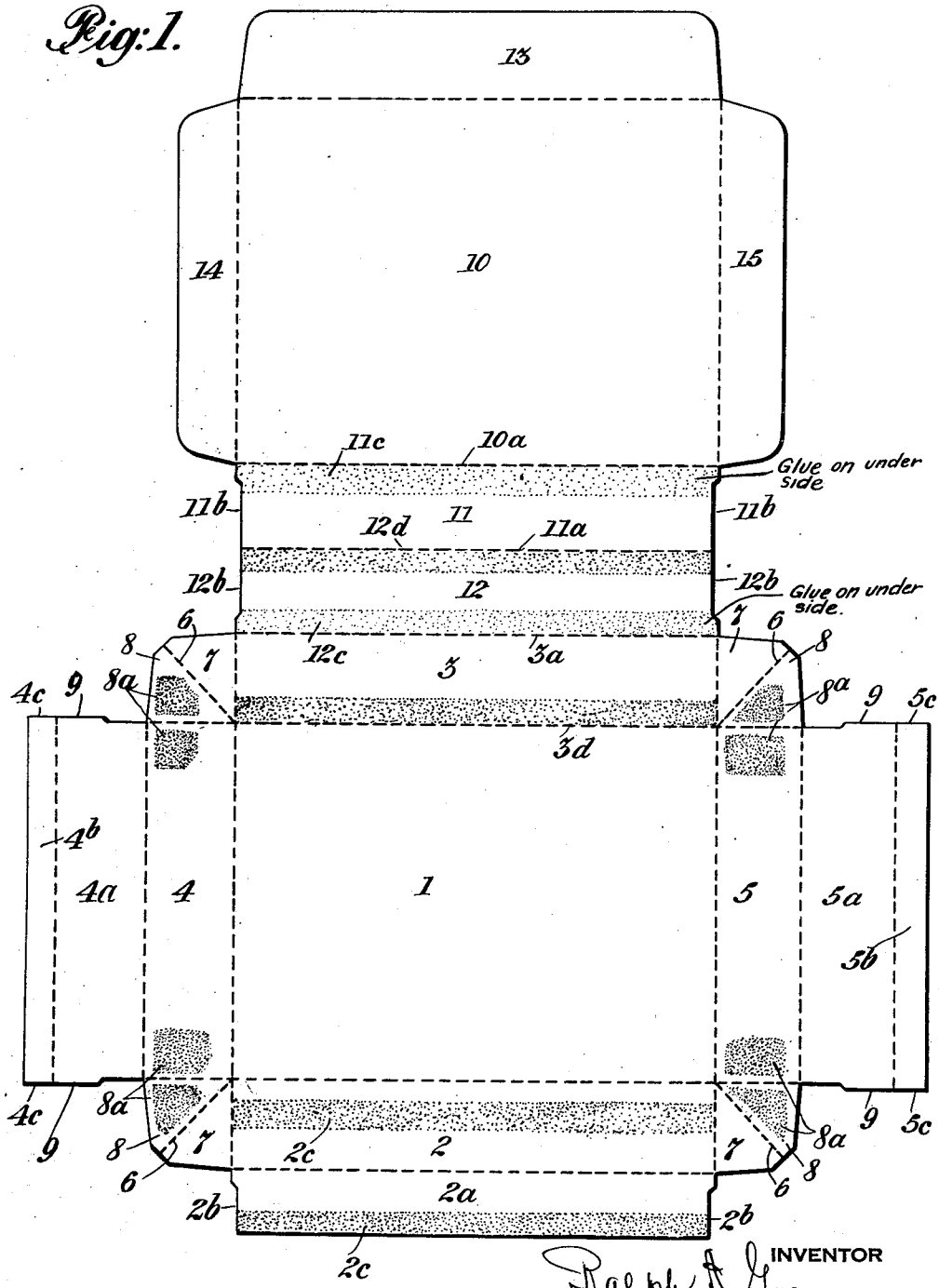
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Fig. 1.



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Fig. 2.

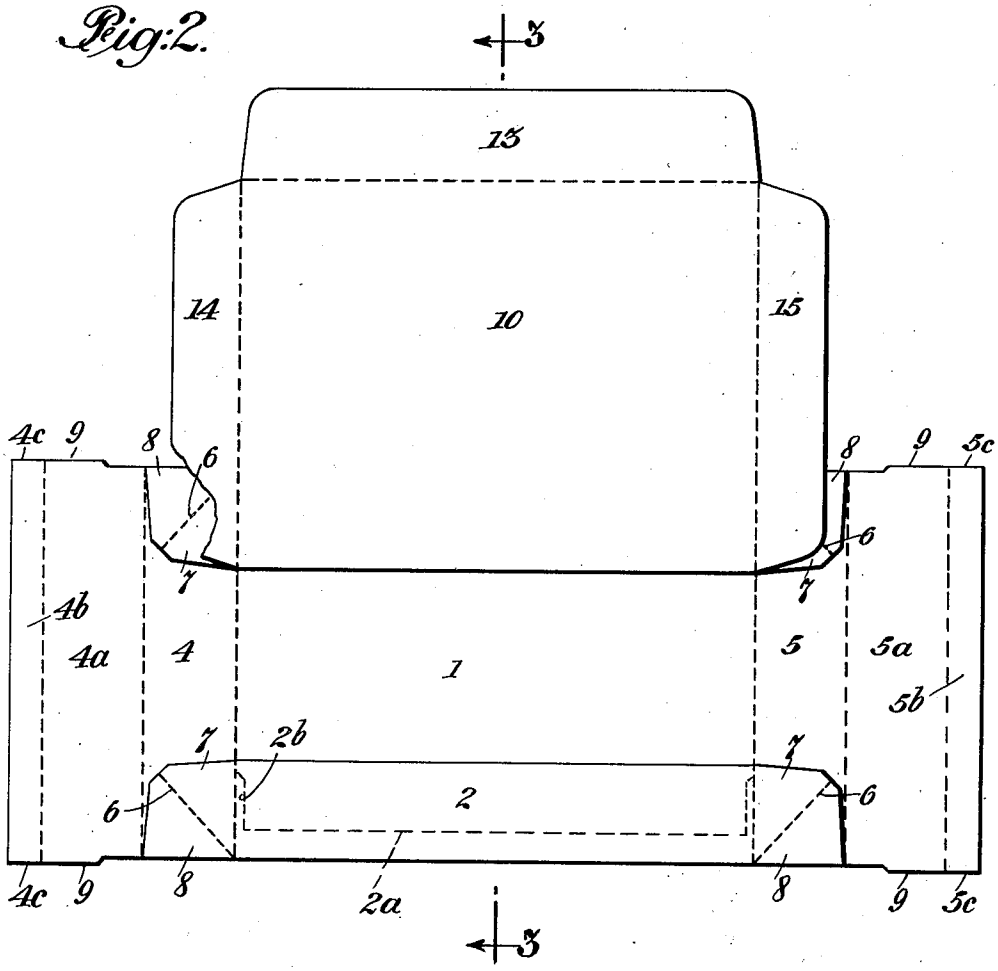


Fig. 3.

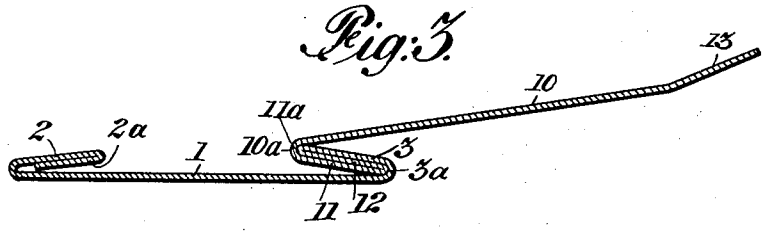
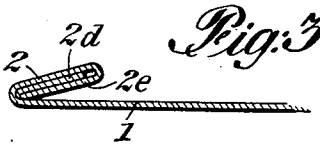


Fig. 3a.



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Fig. 4.

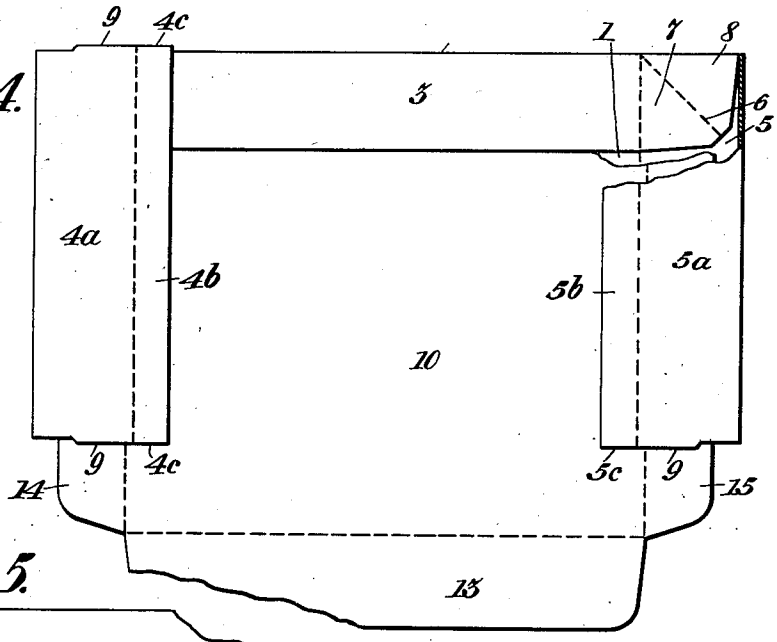


Fig. 5.

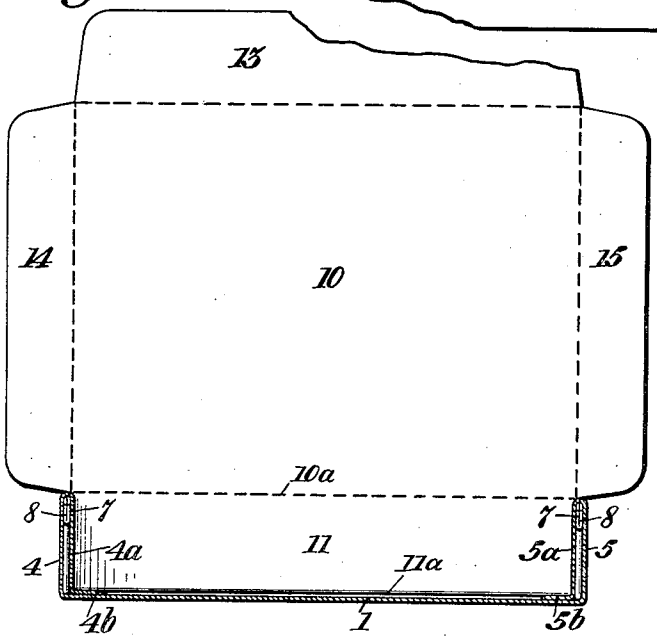


Fig. 6.

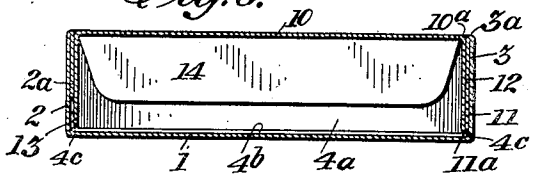
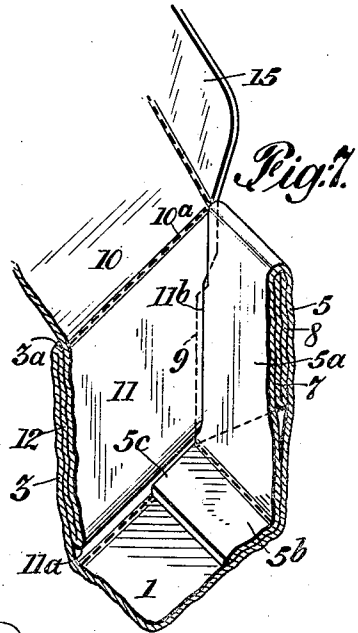


Fig. 7.



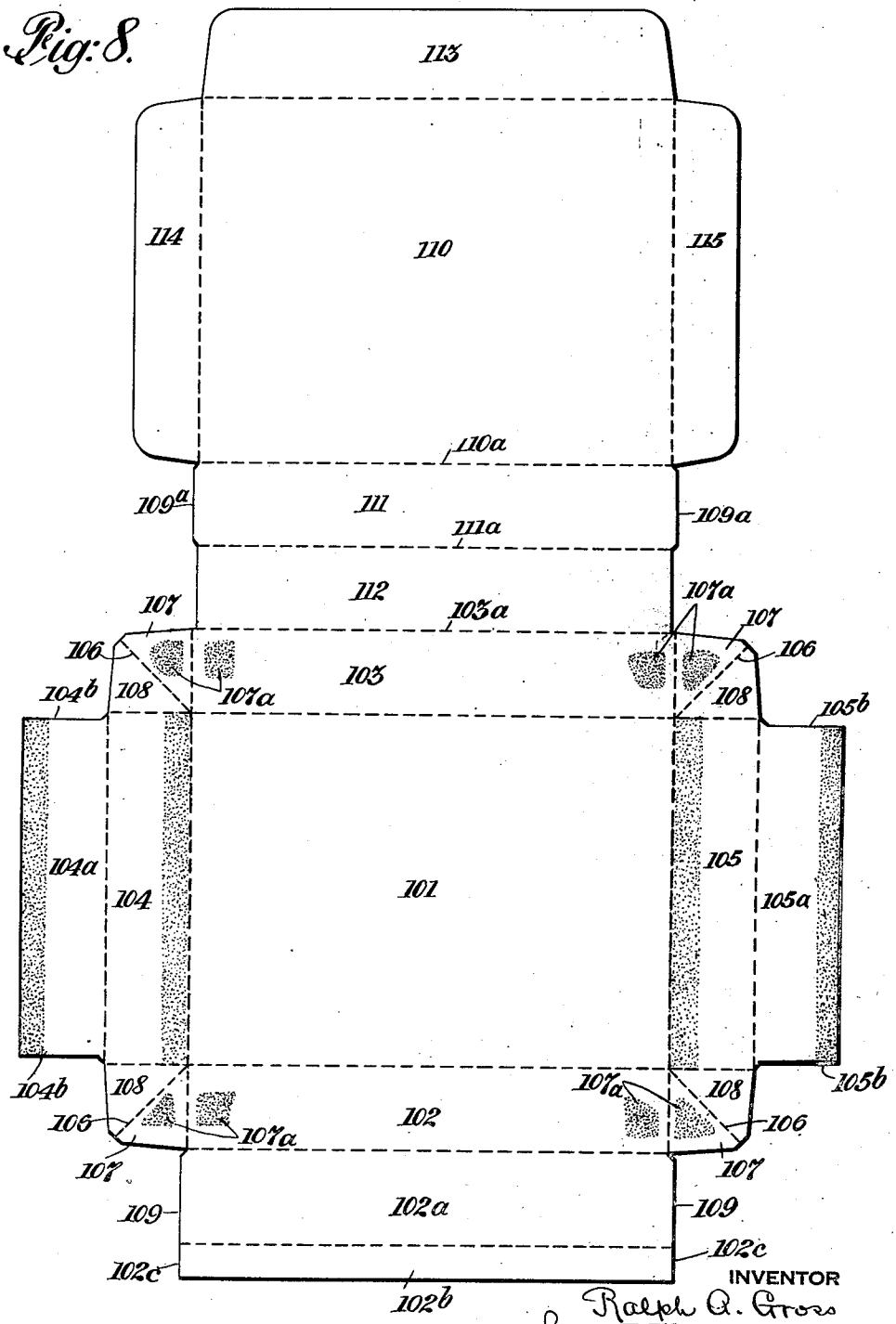
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Fig. 8.



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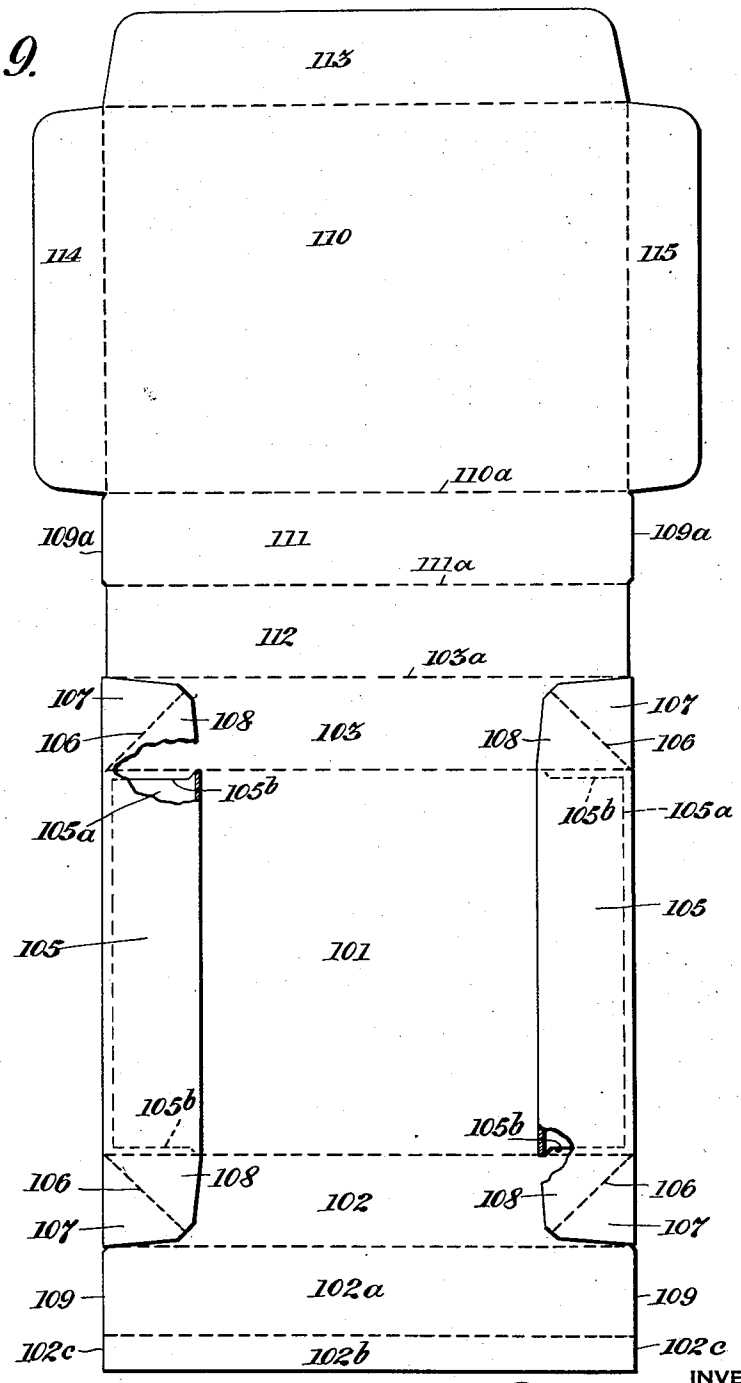
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Fig. 9.



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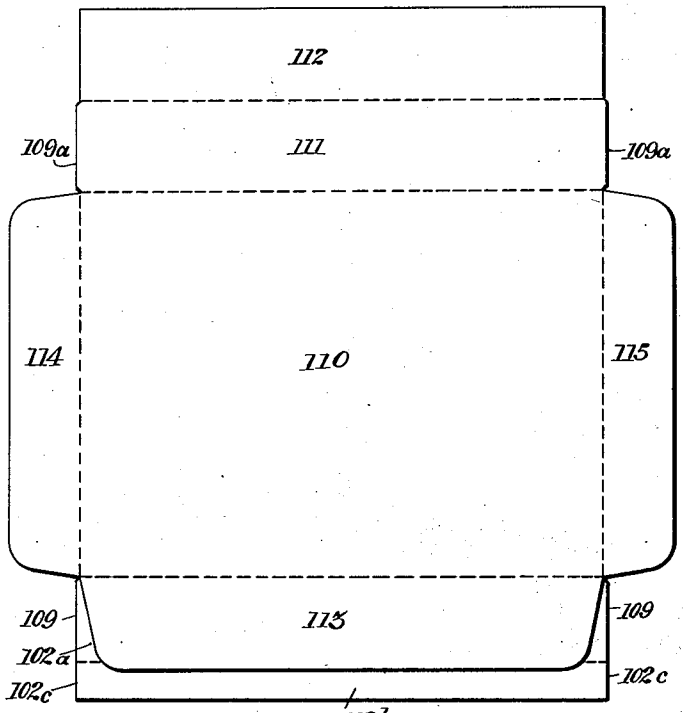


Fig:10.

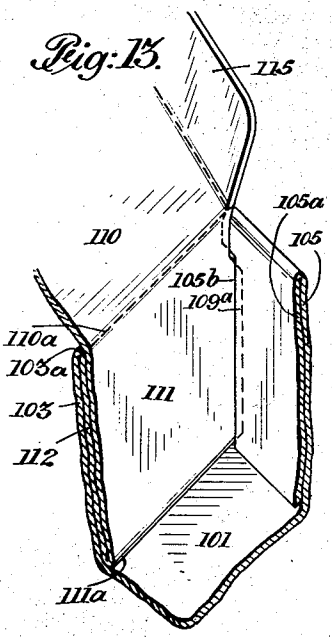


Fig:13.

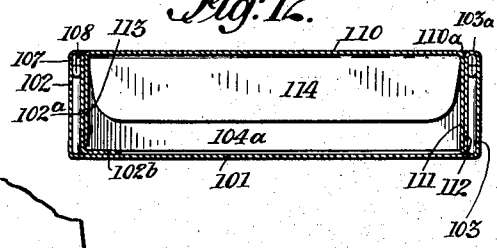


Fig:12.

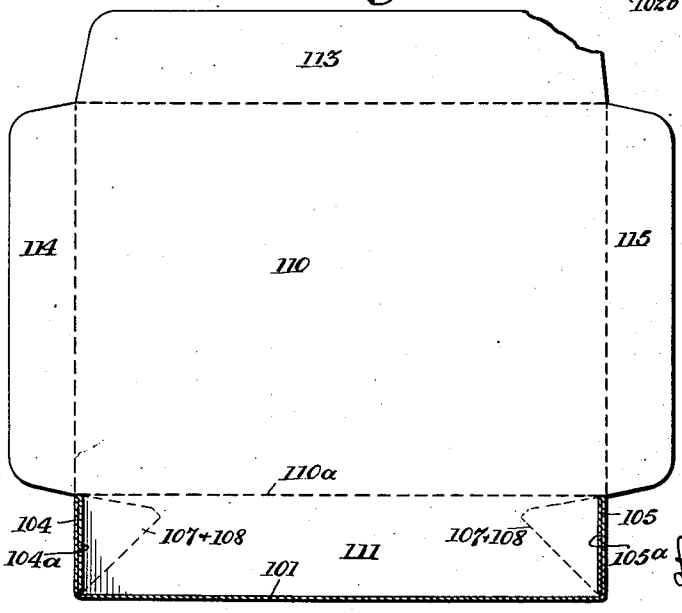


Fig:11.

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UNITED STATES PATENT OFFICE

1,947,711

PAPER BOX

Ralph A. Gross, Lititz, Pa., assignor to Simplex Paper Box Corporation, Lititz, Pa., a corporation of Pennsylvania

Application August 10, 1932. Serial No. 628,136

3 Claims. (Cl. 229—34)

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings, which show two forms or embodiments of my invention, selected by me for purposes of illustration, and said invention is fully disclosed in the following description and claims.

The object of my invention is to provide an instantly erectable knockdown paper box of the one-piece type in which the cover is formed integrally with the box proper, as distinguished from the telescope or two piece boxes, in which the cover member is formed separately from and telescopes with respect to the box member. The one piece type of box is usually called for by those desiring an extremely cheap box, and such boxes are usually made of comparatively thin stock. The cover is usually formed as an integral part of the box blank, the cover hinge being formed by bending the sheet material on a scored line between the cover and the adjacent wall, usually a side wall of the box. An integral cover is practically imposed by the economic production of the box, the cost of accurately positioning and gluing or otherwise securing a separately formed cover, or any other separately formed part, being prohibitive in this type of box. It is possible to reinforce the ends of one piece cover boxes and to reinforce the side opposite the cover, by providing the ends and said side wall with infolding integral flaps glued or otherwise secured on their interior faces, but the side wall to which the cover is hinged remains as a single ply wall. It is not possible, therefore, to use as thin bendable stocks for this type of boxes of given size as might otherwise be used if the wall adjacent to the cover were suitably reinforced, and the size of such one piece cover boxes, which must always be made of very thin material on account of cheapness, is also limited. Obviously the coarser grades of cheap paper or card board stocks which will not bend without cracking are inapplicable to this type of box.

The object of my invention is to provide a novel construction of one piece cover box and blank therefor, in which the cover is an integral part of the blank in its preferred form and is separated from the adjacent side wall by two folds or flaps, integral with said wall and with the cover, extending the full length of the said wall and preferably being each of approximately the same width as the side wall, and adapted to fold upon each other and upon the said wall, and to be secured in place with respect thereto by gluing or otherwise, so that the wall adjacent to the hinge edge of the cover is not only reinforced, but preferably formed of three plies, so that said wall is actually stiffer than the opposite wall, which is preferably reinforced with a single infolded flap. This novel construction permits the use of lighter stock for boxes of this kind of a given size, and also makes practical the manufacture of boxes of this type in larger sizes than have been possible heretofore. It also makes it possible to increase the thickness of the wall opposite the hinge portion of the cover to three plies, if desirable, to further strengthen and stiffen the box, which was not advantageous while the single ply wall adjacent to the cover hinge was the weakest portion of the box, and the limiting feature in its production.

My improved box and blank also provides infolding diagonal corner sections between the main side and end walls, and adapted to be permanently connected to opposite walls, as the end walls, in making up the box in knockdown form, the said walls, as the end walls, being provided with infolding locking flaps to enclose the corner sections, and having locking projections to interlock with the innermost reinforcing flaps of the side walls. According to a modification of my invention, the end flaps are provided with infolding reinforcing flaps, the corner sections are connected to the side walls, while the innermost fold, integral with the cover, and the innermost fold of the opposite side wall are provided with locking projections to interlock with the ends of the infolded end sections. In either case the box can be instantly erected and locked in contents receiving position in a manner somewhat similar to the box disclosed in my former Letters Patent of the United States No. 1,690,109, patented November 6th, 1928.

My invention also includes certain novel features of construction and combination of parts hereinafter fully described and particularly pointed out in the claims.

Referring to the drawings,

Fig. 1 is a plan of the blank.

Fig. 2 shows the blank partially folded and glued.

Fig. 3 represents a section on the line 3—3 of Fig. 2, the folded side sections and their reinforcing sections being slightly raised from the bottom section for greater clearness.

Fig. 3a is a detail section of a slight modification.

Fig. 4 represents the completed box in knockdown condition ready for shipment.

Fig. 5 represents a longitudinal sectional view of the box in erected position with the cover in raised position.

Fig. 6 is a transverse sectional view of the box in erected position, with the cover in closed position.

Fig. 7 is a perspective view showing the interlocking engagement of the inturned end sections, with the lateral reinforcing sections.

Fig. 8 shows a slightly modified form of the blank.

Fig. 9 shows the modified blank partly folded and glued.

Fig. 10 shows the modified form of box in the folded knockdown position.

Fig. 11 is a longitudinal sectional view of the modified form of box in set-up position, a portion of the cover, which is in raised position, being broken away.

Fig. 12 is a transverse section of the set-up box with the cover closed.

Fig. 13 is a detail prespective view similar to Fig. 7, of the corresponding portions of the modified form of box.

Referring to the embodiment of my invention illustrated in Figs. 1 to 7, inclusive, which is the preferred form, Fig. 1 illustrates the died out and scored blank from which the box is made. This blank is preferably formed in one piece from suitable sheet paper or cardboard stock, although it is within the scope of my invention to form the blank of separate pieces, glued or otherwise secured together. For the reasons previously stated, however, the formation of the blank from one piece of sheet material effects economy of manufacture.

The blank comprises the following portions, which are delimited from each other by lines of fold indicated by scoring to facilitate the folding of the blank. 1 represents the bottom section of rectangular form provided with lateral wall sections comprising the side wall sections, 2 and 3, and end wall sections, 4, 5. The blank is preferably provided with corner sections integral with the adjacent side and end sections and divided by a diagonal score, indicated at 6, into substantially triangular portions, 7, 8, of which the portions indicated at 8 are directly connected with the adjacent end section, 4 or 5. Each end section is provided with a substantially co-extensive infolding locking section, indicated at 4*a*, 5*a*, respectively, and preferably provided on its opposite lateral edges with outwardly extending locking projections, indicated at 9. Each of sections, 4*a* and 5*a* may also be provided at its outer edge, as shown, with a narrow auxiliary locking strip, 4*b*, 5*b*, preferably of the same lateral width as the adjacent portion of the locking section, which is provided with the locking projections, 9, so that the outer edges, 4*c*, 5*c*, of these auxiliary locking strips are in alignment with the outer edges of the locking projections, 9.

One of the side sections, as 2, is provided with a reinforcing section, 2*a*, adapted to be folded over upon the side section, 2, and having its outer edge permanently secured thereto by means of gluing or other adhesive, or other suitable means. The reinforcing section, 2*a*, is also preferably recessed at each end, as indicated at 2*b*, to provide locking portions to interlock with the adjacent locking projections, 9, on the end flaps, and the section, 2*a*, is preferably made of slightly less width transversely of the box than the side section, 2, to permit the adjacent ends, 5*c*, of the locking strips to extend beneath the reinforcing section, 2*a*, and engage the side section, 2, when the box is in erected position.

10 is the cover section, which is substantially co-extensive with the bottom section, 1, and has its inner edge, indicated at 10*a*, connected with the outer edge, 3*a*, of the side section, 3, by two parallel reinforcing sections, 11 and 12, of approximately the same size as the side section, 3, and extending the entire length of the cover and side section, 3, but being preferably provided at their ends with recessed portions, indicated at 11*b* and 12*b*, to facilitate interlocking engagement with the adjacent locking projections, 9, on the locking flaps, 4*a* and 5*a*. These reinforcing sections, 11 and 12, are interposed between the cover section, 10, and the side section, 3, (and preferably integral with both) and are delimited from each other by a folding line or score, indicated at 11*a*, so that they can be folded upon each other on the line, 11*a*, bringing their outer faces into contact, and then folded bodily on the line, 3*a*, to bring the inner face of the section, 12, into contact with the inner face of the side section, 3, as clearly indicated, for example, in Fig. 3. In other words, the reinforcing sections, 11 and 12, are foldable upon each other and upon the inner face of the side section, 3. The cover section, 10, is also preferably provided with lateral flaps, 13, 14 and 15, adapted to be folded perpendicularly with respect to the cover flap, and to extend inside of the side walls of the box in closing the erected box, as hereinafter described.

After the box blank is died out and scored, in the manner indicated in Fig. 1, and as previously described, it is folded into the knockdown position and glued, or otherwise permanently secured at certain points, so that it is in condition for shipment and can be instantly erected and locked in the erected position, when desired. The particular means of securing certain portions of the blank permanently together is preferably glue, or other suitable adhesive, but I do not limit myself to this particular means, nor to any particular manner of applying the securing means. However, as gluing is the most economical means available at the present time, I shall refer to it as the preferred means, and I have indicated on the blank by parallel dotted lines the portions of the blank at which a permanent connection takes place. I wish it to be understood, however, that the glue may be applied to either or both of the contacting surfaces, and either before or during the folding operation, as may be found most desirable.

In forming the knockdown box from the blank, the reinforcing wall, 2*a*, is first permanently secured to the side wall, 2, preferably by adhesively connecting the contacting surface portions, indicated at 2*c*, 2*c*. The parallel reinforcing sections, 11, 12, are folded upon each other so as to bring their outer faces into contact and are permanently united, for example, by gluing the outer marginal portions of their faces together, the contacting parts being indicated at 11*c* and 12*c*, and the said united reinforcing sections are folded over upon the adjacent side section, 3, and united thereto, for example, by gluing together the contacting portions of the outer marginal inner surface of the section, 12, and the inner marginal portion of the section, 3, the contacting portions being indicated at 12*d* and 3*d*. The reinforced side sections, 2 and 3, will then be folded over

upon the bottom section 1, carrying the connected corner sections, over upon the adjacent end sections, 4 and 5, respectively, as clearly shown in Fig. 2, and the corner portions, 8, of the corner sections, will be likewise permanently connected to the adjacent end sections, 4 and 5, respectively, preferably by spot gluing the contacting faces of the said portions, as indicated at 8*a*, 8*a*, in Fig. 2.

As shown in Fig. 3, in which the reinforced side portions are slightly raised from the bottom portion for greater clearness, it will be seen that the folding of the reinforcing sections, 11 and 12, upon each other and upon the side wall, 3, brings the hinge portion of the cover normally adjacent to the outer edge of the side wall, 3, and that the side wall of the box adjacent to the cover hinge, indicated by the score, 10*a*, is reinforced so as to contain three plies or thicknesses of the material. This construction makes this portion of the box exceedingly strong, not only to stiffen the box, but to withstand the strain on this side wall which necessarily follows the manipulation of the cover. The opposite side wall of the box comprises two plies ordinarily, but it is obvious that the reinforcing section, 2*a*, could be provided with a further reinforcing section, so as to supply a three-ply side wall for the side opposite the cover, if this were found to be necessary or desirable, as indicated in the detail section shown in Fig. 3*a*, in which the third ply or additional reinforcing section is indicated at 2*d*.

In Fig. 2 the cover section is shown as folded back away from the other portions of the blank, to facilitate the understanding of the applicant's invention, but in practice it will ordinarily be folded over upon the other portions of the blank in the manner indicated in Fig. 4, and the locking sections, 4*a*, 4*b*, and 5*a*, 5*b*, can be conveniently folded over upon the cover, thus enabling the box to be shipped flat in a knockdown position, in which it is very compact, and a great number of such knockdown boxes can be stored in an extremely small space.

To erect the box into contents receiving position, it is only necessary to throw the cover over backward, holding the ends of the box in the hands with the fingers beneath the bottom, the slight pressure of the hands toward each other causing the end sections, 4 and 5, to be raised to a position perpendicular with the bottom, and simultaneously erecting the reinforced side walls, the corner sections folding upon their diagonal scores, as will be readily understood, and at the same time the locking flaps, 4*a*, 5*a*, will be moved downwardly into the box by the thumbs of the operator, to effect substantially automatically the interlocking of the locking projections, 9, with the end faces of the adjacent reinforcing sections of the side walls, while the auxiliary locking flaps, which may or may not be employed as preferred, have their ends carried below the lower edges of the reinforcing sections of the respective side walls and brought into frictional engagement with the inner faces of the side sections, 2 and 3, respectively. This interlocking engagement is very clearly illustrated in detail in Fig. 7, which shows an interior view of one corner of the box adjacent to the cover. After the contents is inserted, the cover is folded down in the usual manner, with its lateral sections, 13, 14 and 15, passing inside of the side and end walls of the box.

It will be readily understood that the folding of the parallel reinforcing sections, 11 and 12, upon each other, and upon the side section, 3, to form a three ply side wall, produces a box structure immensely stiffer and stronger than is produced with a single side wall adjacent to the cover, and especially where the opposite side wall is formed with either two or three plies, as hereinbefore described, it enables me to produce this box commercially from much thinner material than would be required with a single side wall adjacent to the cover and to manufacture this box in sizes which would not be practical with a single side wall adjacent to the cover.

In the modification of my invention illustrated in Figs. 8 to 13 inclusive, in which the corresponding parts are given, so far as possible, the same reference characters with the addition of 100 to avoid repetition, the blank is formed in a manner very similar to the blank illustrated in Fig. 1, except in the following particulars. The side section, 102, is provided with an infolding locking flap, indicated at 102*a*, which is provided at its opposite ends with locking projections, 109, and further has its outer edge (if desired) provided with a locking strip, 102*b*, the ends of which, indicated at 102*c*, are in substantial alignment with the outer edges of the projections, 109. The end sections, 104, 105, instead of carrying locking sections, are provided with reinforcing end sections, 104*a*, 105*a*, adapted to be folded over and glued or otherwise permanently secured to the adjacent end sections, 104, 105. The reinforcing strip, 111, connected with the cover, is provided at opposite ends with locking projections, 109*a*, projecting outwardly beyond the corresponding edges of the reinforcing section, 112. Otherwise the blank is constructed exactly as previously described with reference to Fig. 1.

As it is intended in this case that the locking projections, 109 and 109*a* of the locking strip, 102*a*, and the reinforcing strip, 111, respectively, shall interlock with the adjacent edges of the reinforcing end sections, 104*a* and 105*a*, it follows that in gluing up the blank, the reinforcing end sections, 104*a* and 105*a*, are folded over upon the adjacent end sections and glued thereto in the manner previously described with reference to the reinforcing section, 2*a*. The end sections are then folded over upon the contiguous portions of the bottom, 101, and the portions, 107, integral with the side walls, 102, 103, are permanently connected by gluing or otherwise to the adjacent side sections, the points of union being indicated at 107*a*, as clearly shown in Fig. 9.

In this construction the parallel reinforcing sections, 111 and 112, are adapted to be folded upon each other and upon the inner face of the side section, 103, in the manner previously described, but are not permanently united to each other, or to said side section. The cover section, 110, together with the sections 111 and 112, may be conveniently folded over upon the score or folding line, 103*a*, to place the box, when in the knockdown condition, in position for shipment flat.

In erecting this modified form of box, the cover will be thrown back and the hands of the operator will grasp the oppositely disposed locking sections, 111 and 102*a*, with the fingers extending beneath the bottom of the box and the side sections, 102, 103, will be raised into vertical position, thereby erecting the end sections, 104 and 105, and causing the parts, 107 and 108, of the corner sections to fold upon each other and

upon the adjacent side sections, 102, 103, to which they are connected. The operator will at the same time, by means of his thumbs, effect the infolding of the locking section, 102*a*, and bottom engaging locking strip 102*b* (if it is employed) and will also simultaneously fold the parallel reinforcing sections, 111 and 112, upon each other, and upon the inner face of the side section, 103. As the infolding locking section, 102*a*, is pressed down into operative position, the locking projections, 109, will interlock with the end edges of the adjacent inturned reinforcing end sections, 104*a*, 105*a*, of the end sections on one side of the box, while the locking projections, 109*a*, and the reinforcing section, 111, will interlock with the opposite ends of the reinforcing end sections, 104*a*, 105*a*, thus instantaneously and substantially automatically locking the box in its erected position.

It will be seen that in this construction the interlocking of the projections, 109*a*, with the edges of the end reinforcing sections, 104*a*, 105*a*, is relied upon to effect the holding of the parallel reinforcing sections, 111, 112, in folded position upon each other and in contact with the inner face of the side section, 103, so that it becomes unnecessary to permanently connect these three sections. It is to be understood, however, that they may be glued or otherwise permanently united in the manner indicated in connection with the form of the box illustrated in Figs. 1 to 7, if desired.

In Fig. 13 the interlocking engagement of one of the locking projections, 109*a*, with the adjacent reinforcing end section, 105*a*, is clearly illustrated. Where the reinforcing section, 102*a*, is provided at its outer edge with the bottom engaging locking strip, 102*b*, the outer ends, 102*c*, of the said strip will pass below the lower or outer edges of the end reinforcing strips, 104*a*, 105*a*, and frictionally engage the inner faces of the end sections, 104, 105, to form an auxiliary lock.

It will also be understood that the front side wall of the box may be formed of three plies, in a manner similar to that indicated in Fig. 3*a*, if this is deemed necessary or desirable.

What I claim and desire to secure by Letters Patent is:—

1. An instantly erectable knockdown box comprising a bottom section, integral exterior side wall sections, integral exterior end wall sections, corner sections, integral with both of the adjacent exterior side and end wall sections, and provided with diagonal scores permitting the portions of said corner sections to fold upon each other and upon the inner face of the adjacent exterior end wall section, a pair of auxiliary reinforcing sections separated by a line of fold connecting the outer edge of one of the exterior side wall sections with the inner edge of the cover section, and foldable upon each other and upon the inner face of said exterior side wall sections, the opposite exterior side wall section being provided with an infolding auxiliary side wall section, the exterior end wall sections being provided with infolding reinforcing sections, the lateral edges of which interlock with the last mentioned infolding auxiliary side wall section and said remote auxiliary reinforcing section, when the box is in erected position.

2. An instantly erectable knockdown box comprising a bottom section, integral exterior side wall sections, integral exterior end wall sections, corner sections, integral with both of the adjacent exterior side and end wall sections, and provided with diagonal scores permitting the portions of said corner sections to fold upon each other and upon the inner face of the adjacent exterior end wall section, a pair of auxiliary reinforcing sections separated by a line of fold connecting the outer edge of one of the exterior side wall sections with the inner edge of the cover section, and foldable upon each other and upon the inner face of said exterior side wall sections, the opposite exterior side wall section being provided with an infolding auxiliary side wall section, the exterior end wall sections being provided with infolding reinforcing sections, provided with bottom engaging locking strips the end portions of which frictionally engage the inner surfaces of the exterior side walls, below the last mentioned infolding auxiliary side wall section, and said remote auxiliary reinforcing section, when the box is in the erected position.

3. An instantly erectable knockdown box comprising a bottom section, integral exterior side wall sections, integral exterior end wall sections, corner sections, integral with both of the adjacent exterior side and end wall sections, and provided with diagonal scores permitting the portions of said corner sections to fold upon each other and upon the inner face of the adjacent exterior end wall section, the portion of each corner section integral with an adjacent exterior end section being permanently secured thereto, a pair of auxiliary reinforcing sections separated by a line of fold connecting the outer edge of one of the exterior side wall sections with the inner edge of the cover section, and foldable upon each other and upon the inner face of said exterior side wall sections, the opposite exterior side wall section being provided with an infolding auxiliary side wall section, the exterior end wall sections being provided with infolding reinforcing sections, the lateral edges of which interlock with the last mentioned infolding auxiliary side wall section and said remote auxiliary reinforcing section, when the box is in erected position, and having bottom engaging locking strips the lateral ends of which engage the inner faces of the exterior side wall sections with a friction wedging engagement, in the erected position of the box.

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