Dec. 15, 1931. M. B. CLAFF 1,836,837

METHOD OF MAKING PAPER BOXES

Filed June 20, 1929 3 Sheets-Sheet 1

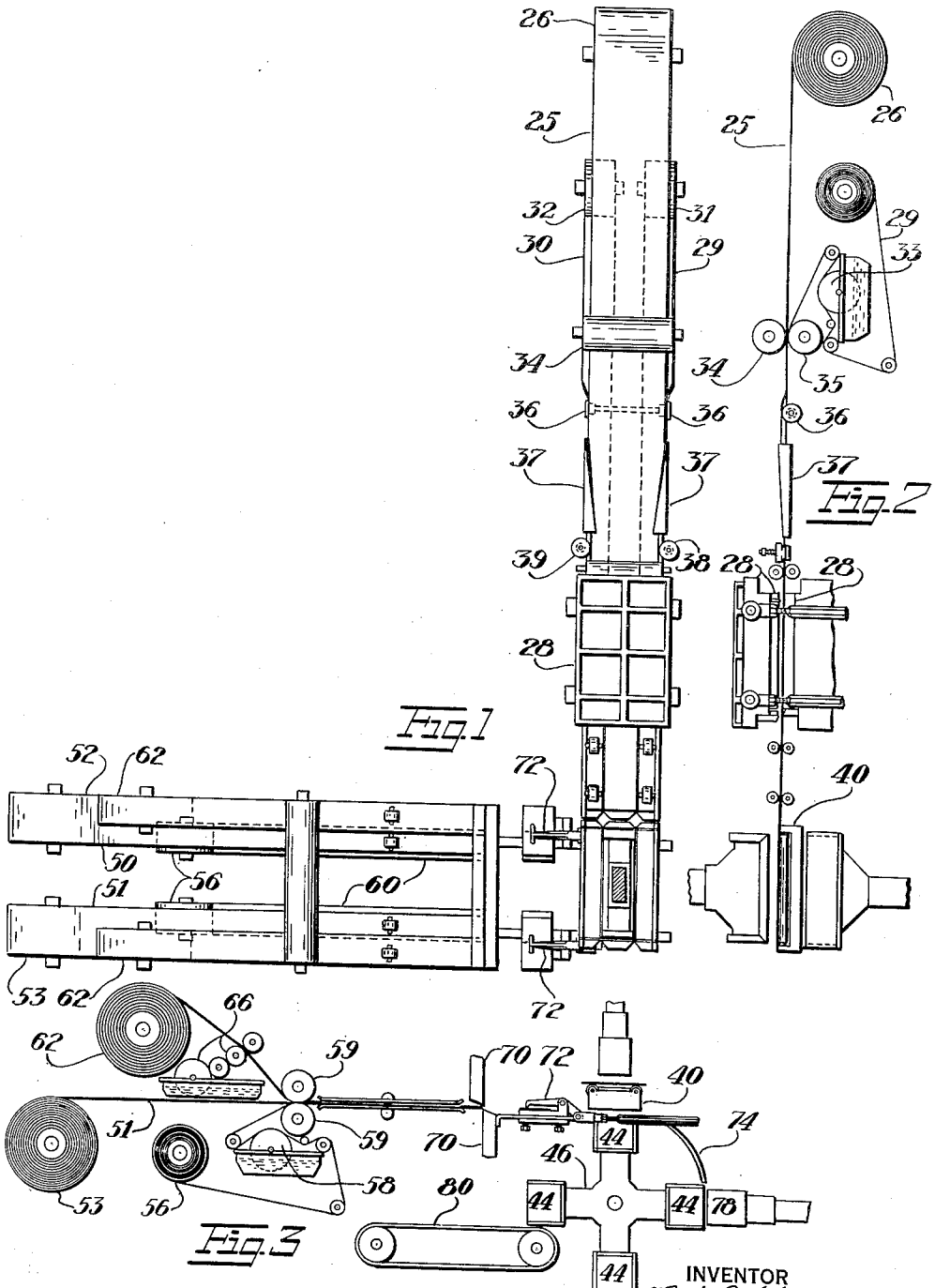


Fig. 1

Fig. 2

Fig. 3

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Filed June 20, 1929 3 Sheets-Sheet 2

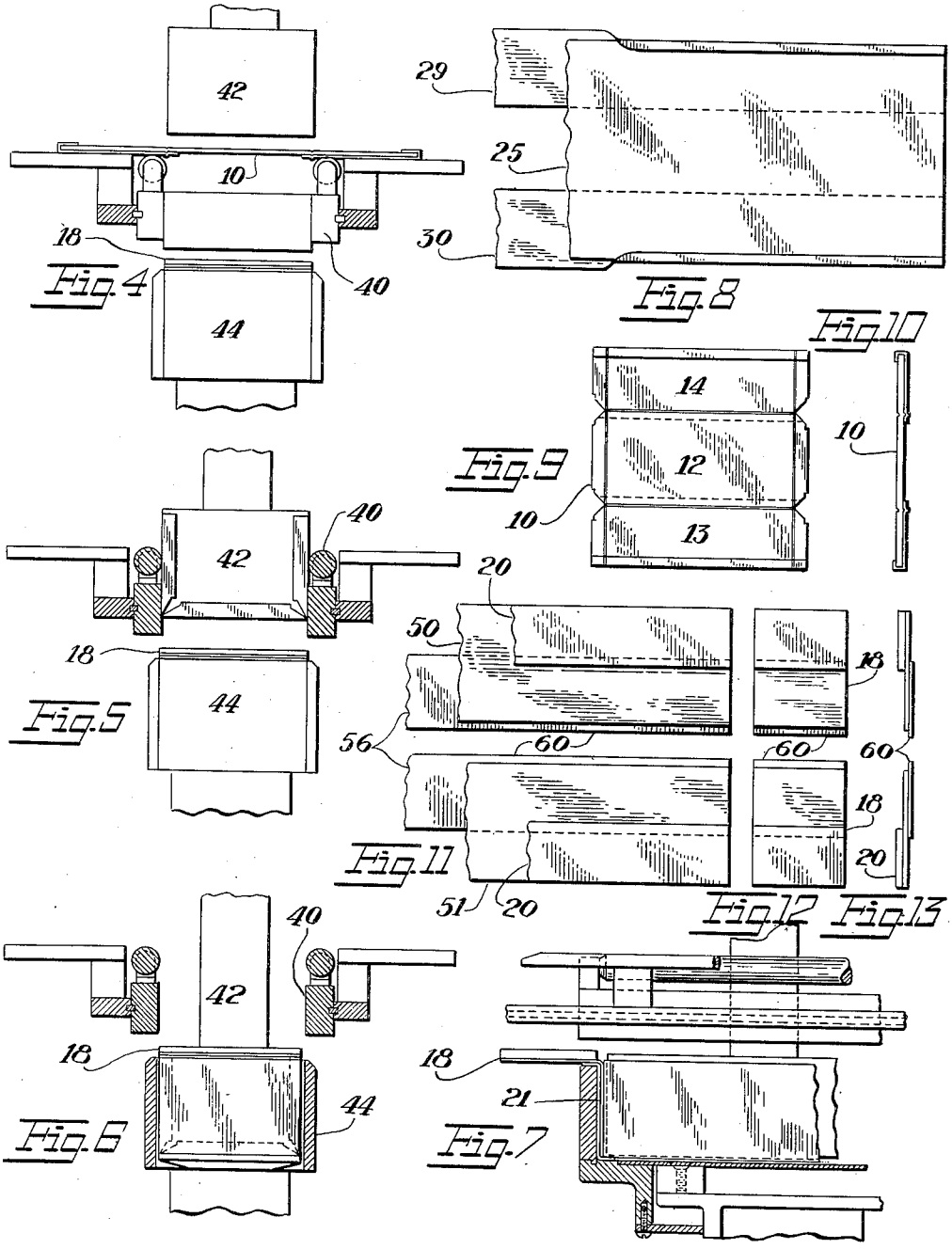


Fig. 4 Fig. 8 Fig. 10 Fig. 9 Fig. 5 Fig. 11 Fig. 12 Fig. 13 Fig. 6 Fig. 7

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Filed June 20, 1929 3 Sheets-Sheet 3

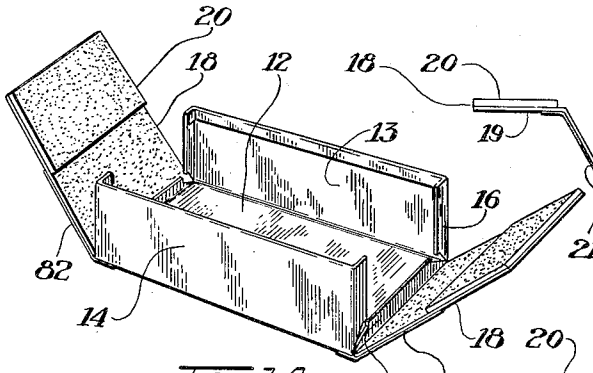


Fig. 14

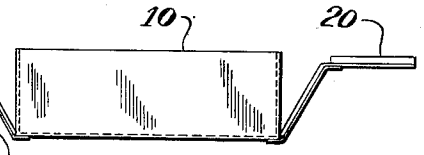


Fig. 16

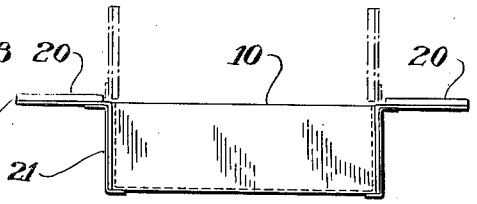


Fig. 17

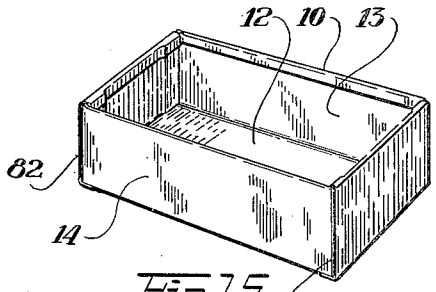


Fig. 15



Fig. 18

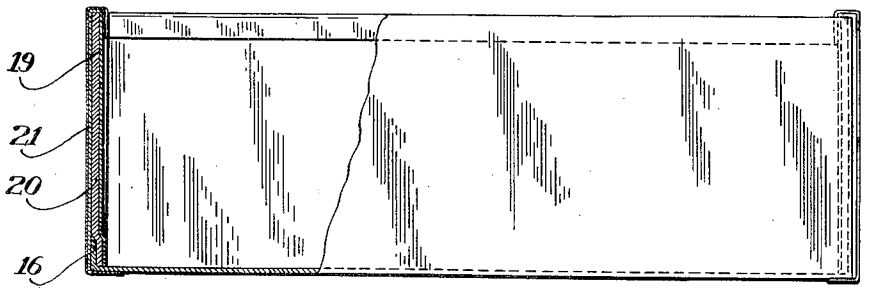


Fig. 19

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UNITED STATES PATENT OFFICE

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METHOD OF MAKING PAPER BOXES

Application filed June 20, 1929. Serial No. 372,251.

This invention relates to a paper box and to the method of making the same.

One object of the invention is to produce a novel and improved construction of paper box having ends of maximum strength and stiffness with a minimum thickness of stock.

A further and more specific object of the invention is to produce a novel and improved construction of paper box of the type forming the subject matter of inventor's United States Patent No. 1,579,646, April 6, 1926, having ends of maximum strength and stiffness with a minimum thickness of stock.

A still further object of the invention is to provide a novel and improved paper box of the general type in which the ends of the box are formed by separate end pieces, possessing a superior appearance and increased strength and stiffness with respect to the ends of the box as compared with other prior constructions of paper boxes of this type.

Another object of the invention is to provide a novel and improved method of making a paper box embodying the present invention.

With these objects in view and such others as may hereinafter appear, the invention consists in the paper box and in the method hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings there is illustrated more or less diagrammatically sufficient portions of a machine for making the present box to enable the present method of manufacturing the same to be understood, and there is also therein illustrated the preferred construction of paper box embodying the present invention, and in the drawings Fig. 1 is a plan of a portion of the machine above referred to; Fig. 2 is a side elevation of the right-hand portion of the machine illustrated in Fig. 1; Fig. 3 is a side elevation of the left-hand side of the machine shown in Fig. 1; Figs. 4, 5 and 6 are details of the box forming plunger and associated parts in different positions of operattion, as will be described; Fig. 7 is a side elevation of the parts shown in Fig. 6, viewed from the right of Fig. 6; Fig. 8 is a view of a portion of the web from which the body blanks are formed; Figs. 9 and 10 are views in plan and end elevation respectively of a complete blank for forming the body portion of the box; Fig. 11 is a plan view illustrative of the end webs just prior to the formation of the individual end pieces therefrom; Figs. 12 and 13 are plans and end elevations respectively of the individual end pieces in their flat form prior to their application to the body portion of the box; Fig. 14 is a perspective of the box in a partially formed condition; Fig. 15 is a similar view of the completed box; Figs. 16, 17 and 18 are end elevations illustrating the box in different stages in its formation; and Fig. 19 is a side elevation partly in section of the completed box.

In general in a paper box constructed in accordance with the present invention, the end portions of the box are constructed to possess greater strength and stiffness for given total thickness of stock from which they are formed than other prior paper boxes and in which the ends are of comparable total thickness of stock. In accordance with the present invention each end of the box is formed of a laminated structure comprising at least three separate pieces of the box board, an outer, an inner, and an intermediate piece. These pieces are adhesively affixed together and also adhesively affixed to the ends of the body portion of the box. It has been found that this laminated construction of ends possesses more strength and stiffness for given total thickness of material than other constructions of ends which have heretofore been proposed in which comparable total thickness

of material has been used in a structure of less than three laminations. In addition this laminated construction of end enables the outer piece to be formed of relatively thin stock thus reducing to a minimum the visibility of the raw edges of the outer piece and enhancing the appearance of the box in this respect. In the preferred embodiment of the invention a box of the general type forming the subject matter of inventor's United States Patent No. 1,579,646, April 6, 1926, is constructed in which the ends are formed of separate end pieces folded to form an outer and an inner piece and in accordance with the present invention such end pieces are formed of relatively thin stock and an intermediate reenforcing member of relatively thick stock is interposed between the folded portions of said end member and adhesively affixed to each.

The invention also contemplates the provision of a novel and economical method for the production of the improved box.

Referring to the drawings which illustrate a paper box embodying the present invention of the general type illustrated in inventor's Patent No. 1,579,646 above referred to, and which also illustrate sufficient portions of a box making machine to enable the preferred method of making the present box to be understood, and as illustrated in Figs. 12 to 17 inclusive, the preferred box comprises a body portion 10 preferably formed by the bottom 12 of the box, and sides 13, 14 integral therewith and folded up at substantially right angles thereto. Each of the sides 13, 14 and also the bottom 12 are provided with inwardly folded end gluing tabs 16 to which the laminated end pieces 18 are secured to form the ends of the box, as will be described. Each end piece 18 preferably comprises an elongated strip of relatively thin box board adhesively affixed to the outer surfaces of the end gluing tabs 16 and the upper portion 19 of each end piece is folded inwardly into the interior of the box and adhesively secured to the inner faces of the end gluing tabs 16. In accordance with the present invention a reenforcing piece 20 preferably of relatively thick box board is interposed between the inner and outer sections 19, 21 of the end piece and is adhesively affixed to the adjacent faces of each and also to the inner faces of the end gluing tabs 16.

Paper boxes of the type illustrated find particular use as shoe boxes and it is desirable that the external visible surface of the box be covered with finishing paper to enhance the appearance of the box and accordingly in the preferred box the lateral surfaces of the sides are covered with finishing sheets adhesively affixed thereto and the finishing sheets are wrapped over the upper side edges of the sides to finish the same. In addition the outer surfaces of the end pieces are preferably covered with finishing paper and the latter is extended over the folded upper edges of the end pieces and down into the box to impart a finished appearance thereto and to match the corresponding parts on the sides.

In accordance with the preferred method of making the present box, the finishing paper is adhesively affixed to a web 25 of box board of a width sufficient to form the bottom and sides of the box, as illustrated in Fig. 8. The finishing paper is preferably applied as illustrated in Fig. 8 to the side forming portions of the web and then folded over the side edges of the web as shown. In practice the present box is preferably made upon an automatic machine, sufficient portions of which have been herein illustrated and particularly in Figs. 1, 2 and 3, to enable the present method of making the box to be understood. As shown in Figs. 1 and 2, in the illustrated machine the web 25 is drawn from a supply roll 26 and conducted between cooperating die members 28 where the body blank is cut from the web and where the creases are made to define the bottom, side walls and end gluing tabs of the body blank. During the movement of the web 25 from the supply roll 26 to the die 28, provision is made for applying strips of the finishing paper to the side forming portions of the body blank, and as herein shown the two strips 29, 30 of finishing paper are drawn from supply rolls 31, 32 over a glue roll 33 and thence between presser rolls 34, 35 where they are adhesively affixed to the side forming portions of the web 25 in a manner such as to leave a narrow margin of the finishing paper extending beyond the side edges of the web. After the web has passed through the presser rolls 34, 35, provision is made for folding the marginal portions of the finishing paper over each side edge of the web as by stationary folding members 36, 37, and for pressing the same upon the surface of the web by presser rolls 38, 39. From an inspection of Figs. 1 and 2 and from the description thus far it will be apparent that during the operation of the machine successive body blanks of the type and construction illustrated in Fig. 9 are produced by successive operations of the die members 28. After leaving the die, the body blank thus formed is guided between rollers to a position over a forming die 40 preparatory to the shaping of the body blank to form up the sides and to fold in the end gluing tabs.

During the period in the operation of the machine that a body blank is being formed and conveyed into the position illustrated in Figs. 2 and 4 in the manner above described, provision is made for forming a pair of the end pieces 18 and for conveying each end piece into a position beneath the forming die 40, so that after the body blank has been forced downwardly through the die to fold

up the sides and turn in the end tabs by a plunger 42, the outer sections 21 of the end pieces will be forced downwardly into the receiving pocket 44 of a rotatable spider 46 and thereby adhesively affixed to the external surfaces of the end gluing tabs 16 upon the body portion of the box. As herein shown, provision is made in the illustrated machine for forming the end pieces 18, applying the finishing paper to the same, and for adhesively affixing the reenforcing piece 20 in the proper position upon each end piece as a continuous operation of the machine, so that when a pair of end pieces have been formed and fed into the described position with relation to the forming die 40, the end pieces will be arranged with respect to the forming die and the descent of the plunger through the die and into the box receiving pocket, so as to permit the inner section 19 and the reenforcing piece 20 to be subsequently folded over into the interior of the box and adhesively affixed to the inner faces of the end gluing tabs 16.

Referring now to Figs. 1 and 3, the end members 18 are formed from two webs 50, 51 drawn from supply rolls 52, 53. Finishing paper is drawn from supply rolls 56 over a glue roll 58 and between presser rollers 59 to be applied to the adjacent sections of the under surface of the two webs in the manner illustrated in Fig. 1, leaving a marginal portion 60 of the finishing paper projecting beyond the inner edges of the web. The reenforcing strips 20 are formed from rolls 62 of the box board and adhesive is applied to each by a glue roll 66. The web is conducted from the glue roll through the presser rolls in such a manner that the reenforcing strip is applied to the outer sections of the upper surfaces of the web. By reference to Figs. 11, 12 and 13 it will be observed that the webs of box board for forming the outer and inner sections 19, 21 of the opposite end pieces 18 are conducted into the machine at right angles to the line of travel of the web from which the body blanks are formed and that the finishing strips and reenforcing strips are applied to the opposite surfaces of the webs, so that when each pair of end pieces is formed by the shear 70, the individual end pieces 18 thus formed are arranged to be conveyed by reciprocatory fingers 72 into the previously described position immediately below the forming die 40 and with the portion of each end piece which is to constitute the outer section 21 of the end piece projecting over the box receiving pocket in a position to be carried down by the plunger into the pocket and adhesively affixed to the outer surfaces of the end gluing tabs 16 in the manner above described.

After the parts have reached this stage in the formation of the box, provision is then made for revolving the spider through a quarter turn and by suitable folding mechanism at 74 the inner sections 19 having the reenforcing piece 20 secured thereto are folded inwardly into a position in front of a reciprocatory horizontal plunger 78 which functions to force the inner sections 19 and reenforcing piece 20 inwardly against the internal faces of the end gluing tabs 16 and for adhesively affixing the same thereto completing the formation of the box.

After the box has thus been formed within a box receiving pocket, the spider is given two additional quarter turns and the box ejected from the pocket by suitable mechanism to be received upon an outgoing conveyor indicated at 80 in Fig. 3.

The present method of producing the present box is economical and enables boxes to be made by automatic machines from webs of the box board making up the body portion and end pieces of the box. The finishing sheets may be applied in the described manner to the end pieces and sides of the body portion with the result that in the completed box an appearance is obtained of a manually banded box with the exception of the vertical side edges 82 of the outer sections 21 of each end piece. As above described, and in accordance with the present invention the stock from which the outer and inner sections 21, 19 of the end pieces are formed is purposely made relatively thin so that in the completed box the width of the visible raw edges 82 is reduced to a minimum, and as a result in the completed box the raw edges 82 are practically unnoticeable. The present construction of box is particularly adapted for those types of boxes used for holding shoes. Such boxes are in practice usually stacked together on shelves in the retail stores and are withdrawn and replaced by the sales clerks who pull or push directly on the end portions of the boxes. It is therefore desirable that an exceedingly strong construction of end piece be provided and at the same time it is necessary that the end piece present a neat and finished appearance, a result which it is impossible to obtain utilizing thick board as the outer section of the end piece. The present box, however, provides the desired strength of end piece and at the same time presents an exceedingly neat and finished appearance in which the raw edges of the sides of the outer sections of the end piece are relatively thin so as to be practically invisible except upon close examination. In practice a satisfactory box constructed in accordance with inventor's Patent No. 1,579,646 has been produced utilizing board of a thickness of .023 of an inch which provides in the double end wall construction of the patent a total thickness of board of .046 of an inch. In producing the present box board of .018 of an inch thickness may be used to form the outer and inner sections of each end piece and the

intermediate reenforcing piece may be formed of board of .030 of an inch thickness. The total thickness of the end piece of the present box using such thicknesses of board amounts to .046 of an inch, and it has been found that the laminated effect together with the stiffness imparted by the glue between the laminations of the end piece increases the stiffness and strength of the end piece appreciably beyond the end piece of the ordinary box of comparable total thickness of end piece or of a box produced in accordance with inventor's Patent No. 1,579,646.

While the preferred construction of box has been herein illustrated and described and also the preferred method of producing the same, it is to be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention what is claimed is:—

1. In the method of making a covered paper box, the steps comprising forming a body blank from a web to which finishing paper has been applied to cover the outer surfaces of the side forming portions of the body blank, then forming two separate end pieces each from an individual web to which finishing paper is applied to the lower outer section thereof and to which a reenforcing strip has been adhesively affixed to the inner upper surface thereof, then adhesively affixing the lower inner sections of the end pieces thus formed to the ends of the body portion, and thereafter folding the upper section of the end pieces inwardly into the interior of the box and adhesively affixing the folded portions to the ends of the body portion.

2. The method of making a covered paper box which consists in applying finishing paper to a body portion forming web and two separate end piece forming webs and adhesively affixing a reenforcing web to the end piece forming webs, then forming a body blank and two separate end pieces from the aforesaid webs, and thereafter assembling the body blank and end forming pieces to form the box.

3. The method of making a covered paper box which consists in applying finishing paper to the outer side of the side forming portions of a body blank forming web, applying finishing paper to one of the sides of a pair of end piece forming webs, adhesively affixing reenforcing strips to the opposite surfaces of said end piece forming webs, then forming body blanks and end pieces from the webs thus treated, and thereafter assembling the body blank and end forming pieces to form the box.

4. The method of making a covered paper box which consists in conveying a body blank forming web to box assembly position, conveying a pair of end piece forming webs to box assembly position and at substantially right angles to the line of travel of the body blank forming web, applying finishing paper to all of said webs while being conducted to box assembly position, applying reenforcing strips to the end piece forming webs during such movement thereof, forming body blanks and end pieces from such webs, and thereafter assembling the body blank and end pieces to form the box.

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