Aug. 22, 1961 J. POLAYES 2,996,961

APPARATUS FOR AND METHOD OF MAKING FOLDING BLANKS

Filed Oct. 30, 1959

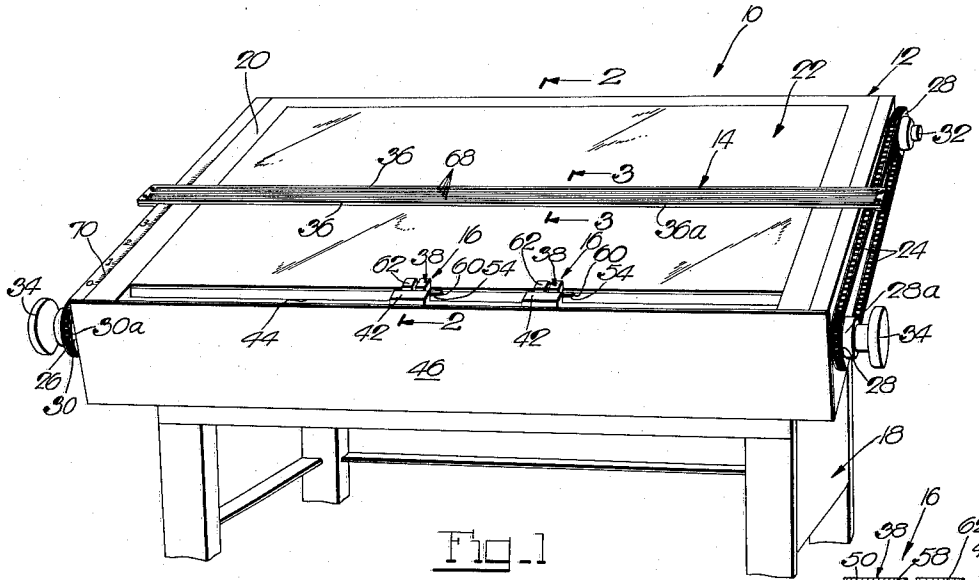


Fig. 1

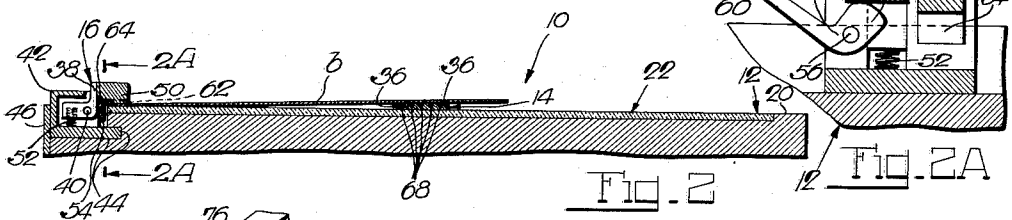


Fig. 2



Fig. 2A

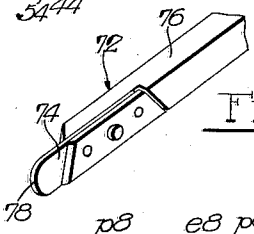


Fig. 4

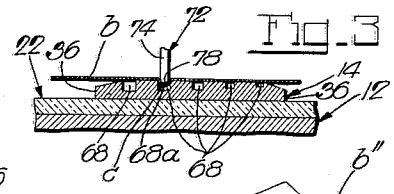


Fig. 3

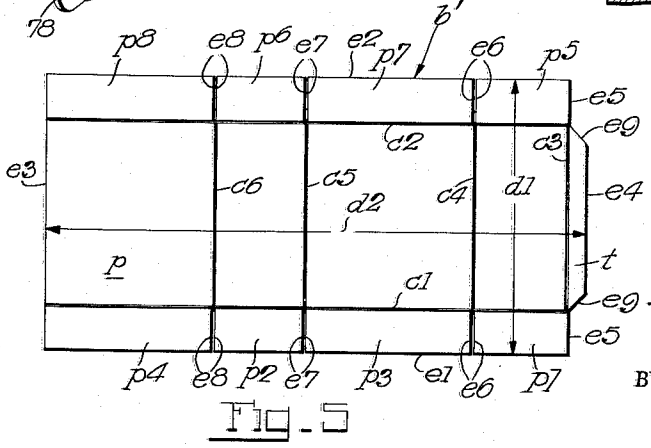


Fig. 5

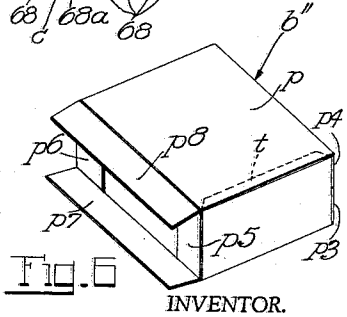


Fig. 6

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# APPARATUS FOR AND METHOD OF MAKING FOLDING BLANKS

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4 Claims. (Cl. 93—58)

This invention relates to apparatus and a method for making boxes in general and for laying-out and forming sample boxes in particular.

The most common method followed to this day in making up sample boxes after their design is to make a form-fitting core or cores around which cardboard is wrapped into the desired box shape, with the creases for the folding edges of the contemplated box struck into the cardboard at most any convenient stage of the box formation. This method of making sample boxes not only involves a lengthy operation and requires for all but the simplest box constructions prior design of the creased and cut blank of a contemplated box, but a sample box thus formed is almost invariably a poor reproduction of its design in the respects of form-fit, dimensions and finished appearance.

It is the primary aim and object of the present invention to provide apparatus for use not only in laying-out an accurate cardboard blank for a box of any form and construction and even without its prior design so long as its desired specific or approximate form is conceived in the mind, but also in creasing and cutting the blank with such accuracy that on completing its box formation the ensuing box corresponds in every respect and within exceptionally close tolerances to its lay-out and has a truly finished appearance.

It is another object of the present invention to provide apparatus of this type for use not only in laying-out creasing and cutting a cardboard blank for a box of any form and construction as aforementioned, but further in laying-out the same blank either accurately according to preselected dimensions of a contemplated box or according to dimensions readily gauged from the blank itself in the process of its lay-out to meet the dimensional requirements of the box for a given purpose, yet give it proportional dimensions which satisfy the boxmaker's taste in this respect.

It is a further object of the present invention to provide apparatus of this type which is essentially a lay-out table with a linear groove at the top and provisions for releasably holding thereon a cardboard piece or blank for relative sliding movement between it and the groove. This arrangement will permit accurate creasing of a laid-out box blank according to a method of the present invention which involves aligning successive laid-out crease lines on the blank with the groove and passing with a dull tool edge over the aligned crease lines with sufficient impression force to displace the blank thereat into the groove for the crease formation as well as to receive positive guidance for the tool edge from the groove itself in its passage thereover. Alternatively, this arrangement and method will permit lay-out of a cardboard blank for a box of any form or construction and even without its prior design, as aforementioned, on simply starting with a crease on the blank and forming additional creases therein according to a desired specific or approximate box shape and size in mind and gauged from the blank itself in the process of its creasing.

Another object of the present invention is to provide apparatus of this type in which the aforementioned groove at the top of the table is provided on top of a straightedge which is slidable on the table top relative to the releasably held cardboard blank thereon, with the straightedge being placed underneath the blank and both being differently positioned relative to each other for the formation on the blank of all creases requisite for its box formation, and with the straightedge further serving to guide a knife blade in cutting the blank on the table top wherever required for its box formation.



A further object of the present invention is to provide apparatus of this type in which the aforementioned straightedge is guided on the table top for sliding movement at right angles to its edges and the releasable blank-holding provisions on the table additionally provide for accurate location of a cardboard blank with either of two adjacent rectangular straight edges thereof parallel to the straightedge, thereby greatly facilitating the formation of creases and cuts on the blank in truly parallel as well as rectangular relation to each other wherever required for its box formation.

It is another object of the present invention to provide apparatus of this type with a scale on the table top on which to measure linear dimensions with the slidable straightedge, thereby also facilitating accurate lay-out, dimensionwise, of a box blank directly on a cardboard piece on the table top.

Other objects and advantages will appear to those skilled in the art from the following, considered in conjunction with the accompanying drawings.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

FIG. 1 is a fragmentary perspective view of apparatus embodying the present invention;

FIG. 2 is a fragmentary section through the apparatus substantially as taken on the lines 2—2 of FIG. 1;

FIG. 2A is an enlarged fragmentary section through the apparatus substantially along the line 2A—2A of FIG. 2;

FIG. 3 is an enlarged fragmentary section through the apparatus taken on the line 3—3 of FIG. 1;

FIG. 4 is a fragmentary perspective view of a tool used in conjunction with the apparatus;

FIG. 5 is a view of an exemplary box blank made on the apparatus of FIG. 1; and

FIG. 6 is a perspective view of the blank after its formation into a box.

Referring to the drawings, and more particularly to FIGS. 1 and 2 thereof, the reference numeral 10 designates apparatus for use in creasing blanks of cardboard or the like in particular, and for broader use in making boxes, and especially sample boxes. The present apparatus is essentially in the form of a table 12 with a sliding straightedge 14 and a blank-holding device 16.

The table 12, which is presently of rectangular outline, is mounted, and may even be tilted into different positions, on a suitable base frame 18. The table 12 has a flat top surface 20 which, in the present instance, is recessed over the greater part thereof to receive a top plate 22 that is preferably flush with the table surface 20, and is of glass or a like hard material that will not be scratched by a sharp knife blade.

The straightedge 14, which is preferably of steel and extends longitudinally of the table or "horizontally," is with its opposite ends suitably secured to drive chains 24 and 26 which pass over pairs of sprockets 28 and 30, respectively. The front sprockets 28*a* and 30*a* are suitably journalled in the opposite ends of the table 12, while the rear sprockets (only one shown) are mounted on a shaft 32 which is suitably journalled in the table 12 at the rear thereof. Both front sprockets 28*a* and 30*a* are presently provided with handwheels 34 so that on manipulation of either handwheel the straightedge 14 will be shifted on the table at right angles to its parallel side edges 36.

The blank-holding device **16** comprises, in the present instance, clamping members **38** which are pivotally mounted at **40** in spaced blocks **42** that are slidable in a longitudinal guideway **44** at the front of the table **12**. The blocks **42** are retained in the guideway **44** by a front plate **46** on the table, and they are in any suitable manner locked therein in longitudinally adjusted positions. Each clamping member **38** has a projecting finger **50** (FIG. 2) which extends over the front part of the top plate **22** and is normally urged thereagainst by a compression spring **52** acting on the clamping member. Associated with each clamping member **38** is an operating lever **54** (see also FIG. 2A) which is pivoted at **56** on the respective block **42** and has a short arm **58** projecting underneath the finger **50** of the clamping member. Each clamping member **38** may be retracted from clamping position into a release position against the urgency of its spring **52**, on turning the associated operating lever **54** at its handle **60** counterclockwise as viewed in FIG. 2A. In thus turning the operating lever **54** sufficiently, its short arm **58** will lock the clamping member in release position, requiring subsequent clockwise turning of the operating lever to some extent before the clamping member is released for spring-return to clamping position. Associated with each clamping member **38** is a stop **62** which is mounted on the respective block **42** and has a locating surface **64** for a blank *b* of cardboard or the like. The locating surfaces **64** of the stops **62** on the spaced blocks **42** are so coordinated that a straightedge of the blank *b* placed thereagainst is thereby located in parallelism with the straightedge **14**.

The straightedge **14** has in its top surface **66** a groove, and in the present instance several grooves **68**, each of which may serve for creasing the blank *b*. These grooves **68**, which extend parallel to each other and to the edges **36** of the straightedge **14**, are of different widths and may also be of different depths (FIG. 3), and they are used selectively for creasing cardboard or a like material of different thickness or different hardness to the end of obtaining a crease that will permit ready folding of the material thereat.

Provided at the table top **20** is a scale **70** on which to measure linear dimensions with the straightedge **14**. The zero graduation of the scale **70** is preferably in line with the locating surfaces **64** of the stops **62** so that the linear dimension of a located blank to either edge of the straightedge **14** in any position of the latter is indicated on the scale at the traverse thereat of the same edge of the straightedge.

Used with the apparatus **10** is a depressor tool **72** (FIG. 4) which presently is in the form of a replaceable depressor blade **74** on a suitable handle **76**. The depressor blade **74** has in this instance a smoothly rounded operating end **78** of a width somewhat less than that of the particular groove **68** in the straightedge with which it is to be used (FIG. 3). In this particular use, the operator handling the tool **72** passes the depressor blade **74** with its end **78** lengthwise over the portion of the blank *b* on the straightedge which overlies the grooves **68***a*, applying at the same time sufficient impression force to displace the blank material thereat into the groove **68***a* to form the crease *c*. In thus depressing the blank material into the groove **68***a*, the depressor blade **74** is throughout its pass over the blank positively guided by this groove, thus not only permitting its rapid pass over the blank but also obtaining a truly linear crease in the blank.

Following is a description of an exemplary operation to obtain the box blank *b'* of FIG. 5 which is adapted for formation into the box *b''* of FIG. 6. Thus, assuming that the dimensions of the blank *b'* are known, it is merely necessary to locate on the stops **62** on the table **12** a straight edge of a cardboard or like blank of larger overall dimensions than those of the planned blank *b'* and then clamp the larger blank to the top plate **22**. Assuming that the thus located edge of the larger blank is the longitudinal edge *e***1** of the planned blank *b'* (FIG. 5), the straight edge **14** may be slid on top of the clamped blank into a position in which its forward edge **36***a*, for example, measures off the dimension *d***1** of the blank *b'* on the scale **70**, whereupon a knife blade may be passed along the edge **36***a* of the straightedge to cut the clamped blank for the formation of the other longitudinal edge *e***2** of the planned blank. The straightedge may then be used with reference to the scale **70** to outline in pencil on the clamped blank the longitudinal creases *c***2** and *c***1** to-be-formed. The straightedge **14** is then slid underneath the clamped blank and the outline of the crease *c***2** aligned with the appropriate groove **68** in the straightedge, which may be the groove **68***a* (FIG. 3), whereupon the depressor blade **74** is passed over the blank lengthwise of the groove **68***a* to form the crease *c***2**, the blank being meanwhile hand-depressed against the straightedge to prevent buckling of the blank on passing the depressor blade thereover with the necessary pressure to form the offset crease *c***2**. The crease *c***1** is next formed in the same manner on sliding the straightedge with its groove **68***a* into alignment with the outline of this crease. The blank may then be released from the top plate **22** and reclamped thereagainst with its other straightedge *e***3** located on the stops **62**. Assuming that the straightedges *e***1** and *e***3** of the original blank are rectangular to each other, it follows that any crease or cut formed in the reclamped blank at the straightedge will extend perpendicularly to the longitudinal creases *c***1** and *c***2**. The straightedge may now be slid into position on top of the blank for cutting the same at the other end edge *e***4** with refernce to the scale **70** to obtain the lengthwise overall dimension *d***2** of the planned blank. The successive creases *c***3** to *c***6** may next be outline in pencil on the blank with the aid of the straightedge **14** and with reference to the scale **70** to maintain proper dimensions. The straightedge may then be slid underneath the clamped blank and the creases *c***3** to *c***6** formed in the same manner as the longitudinal creases *c***1** and *c***2**. The straightedge may then be shifted on top of the clamped blank for the cutting of the blank edges *e***5** to *e***8** with a knife blade under guidance by the straightedge **14**. The blank may then be released from the top plate **22** and the inclined blank edge *e***9** cut to complete the formation of the planned blank *b'*. The blank *b'* has thus been formed from a larger blank without any previous lay-out, the same having in fact been laid-out completely on the top plate **22** with the aid of the straightedge **14** and scale **70**. The finished blank *b'* may in self-evident manner be folded about the various creases into the box *b''* of FIG. 6 in which the end tab *t* is tucked underneath and cemented to the box end panel *p*, the box side panels *p***1** to *p***4** having been folded inwardly with the panels *p***3** and *p***4** being outermost and cemented to the panels *p***1** and *p***2**, and the opposite box side panels *p***5** and *p***6** having been folded inwardly, with the other side panels *p***7** and *p***8** being as yet unfolded.

While the exemplary box blank *b'* and box *b''* are of the simplest possible kind, the described formation of this blank nevertheless suffices to indicate the numerous potential uses of the apparatus **10** and depressor tool **72**. Thus, this equipment may be used with great advantage for laying-out and finishing blanks of any form and dimensions. This equipment is even ideally suited for creating box designs by visually gauging desirable dimensions and shapes of individual box panels from progressively formed creases in a blank.

While in the exemplary apparatus **10** the creasing groove or grooves are advantageously provided in the sliding straightedge, it is fully within the purview of the present invention to provide the creasing groove or grooves in the table top and provide for guided movement of a clamped blank relative to the groove or grooves, for example, by locating a blank on and releasably clamping it to the sliding straightedge.

The invention may be carried out in other specific ways then those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

What is claimed is:

1. Apparatus for use in creasing a blank of cardboard or the like, comprising a table with a flat top; a straightedge with parallel side edges slidable on the table top at right angles to said edges and having a plane top surface with a groove therein of the width of a crease and extending parallel to said edges; and a device on said table for releasably clamping a blank against a margin of said table top substantially parallel to said straightedge to permit sliding of the latter underneath the non-clamped remainder of the blank on the table top.

2. Apparatus as set forth in claim 1, in which said device includes a surface on which to abut a straightedge of a blank for locating the latter with said straight edge thereof parallel to said groove.



3. Apparatus as set forth in claim 1, in which said top surface of the straightedge has a plurality of spaced grooves therein extending parallel to said edges and being of different cross-sectional areas.

4. Apparatus as set forth in claim 1, further comprising a straight scale on said table top extending at right angles to and traversed by said straightedge for measuring linear dimensions on said scale with said straightedge.

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