

H. B. SMITH.

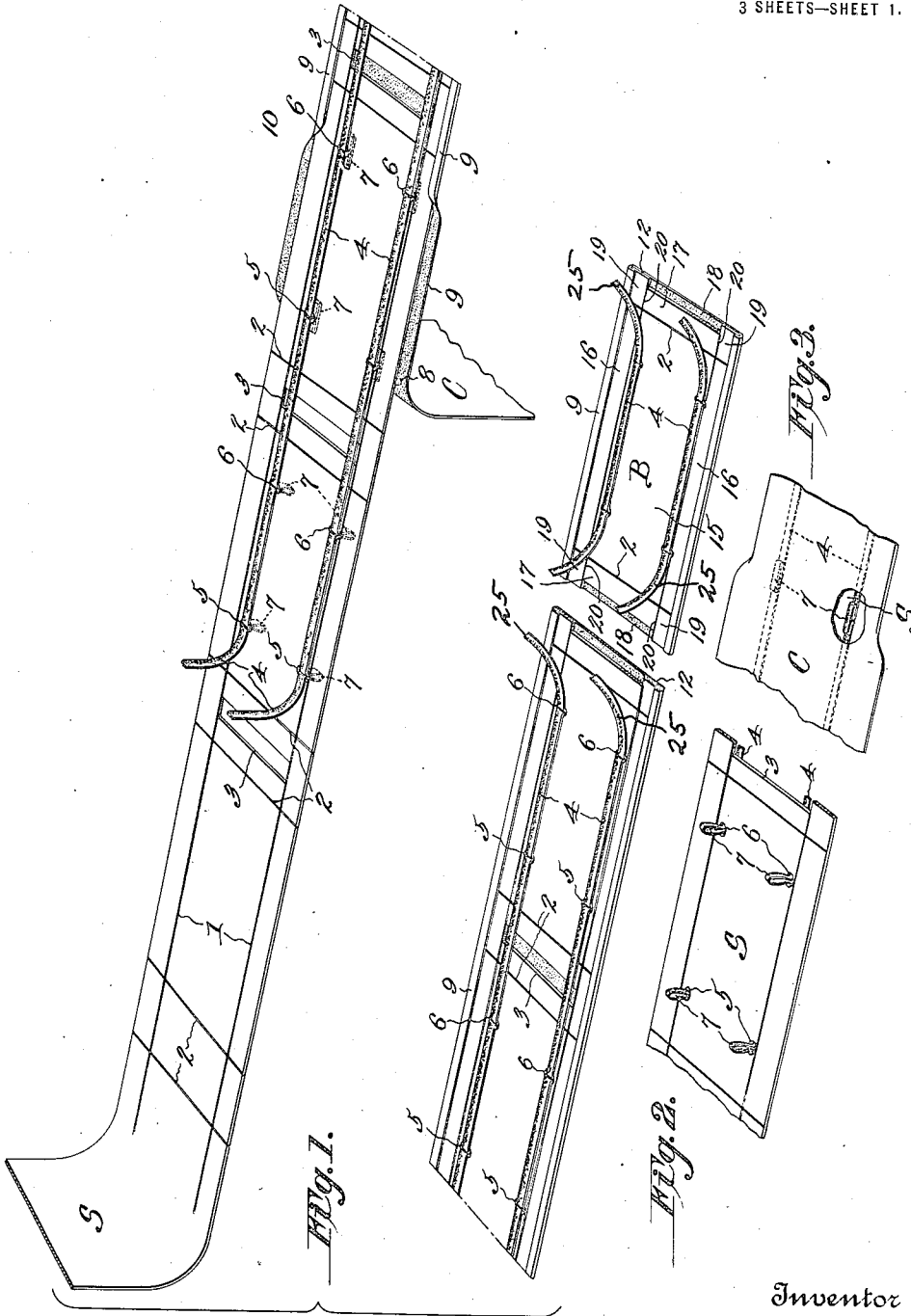
METHOD OF MAKING BOXES AND BOX BLANKS.

APPLICATION FILED MAR. 12, 1921.

1,402,261.

Patented Jan. 3, 1922.

3 SHEETS—SHEET 1.



Inventor
Harry B. Smith,
By his Attorneys
Meyers, Caraway & Hyde

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Fig. 6.

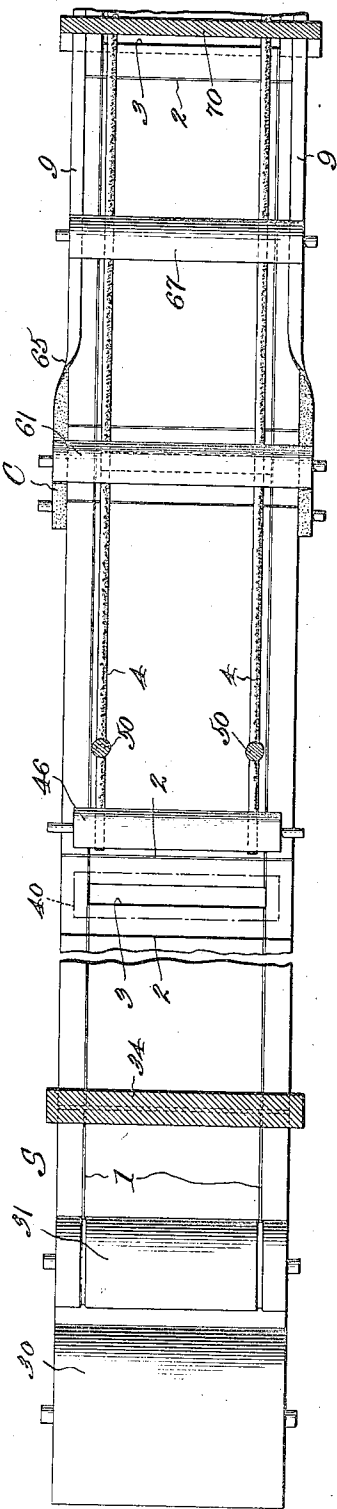
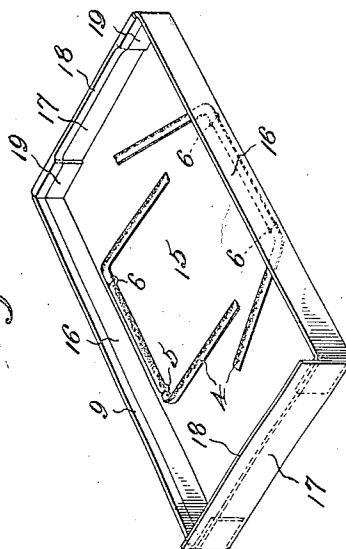


Fig. 4.



Inventor

Harry B. Smith,

By Meyer, Cavanaugh & Hyde

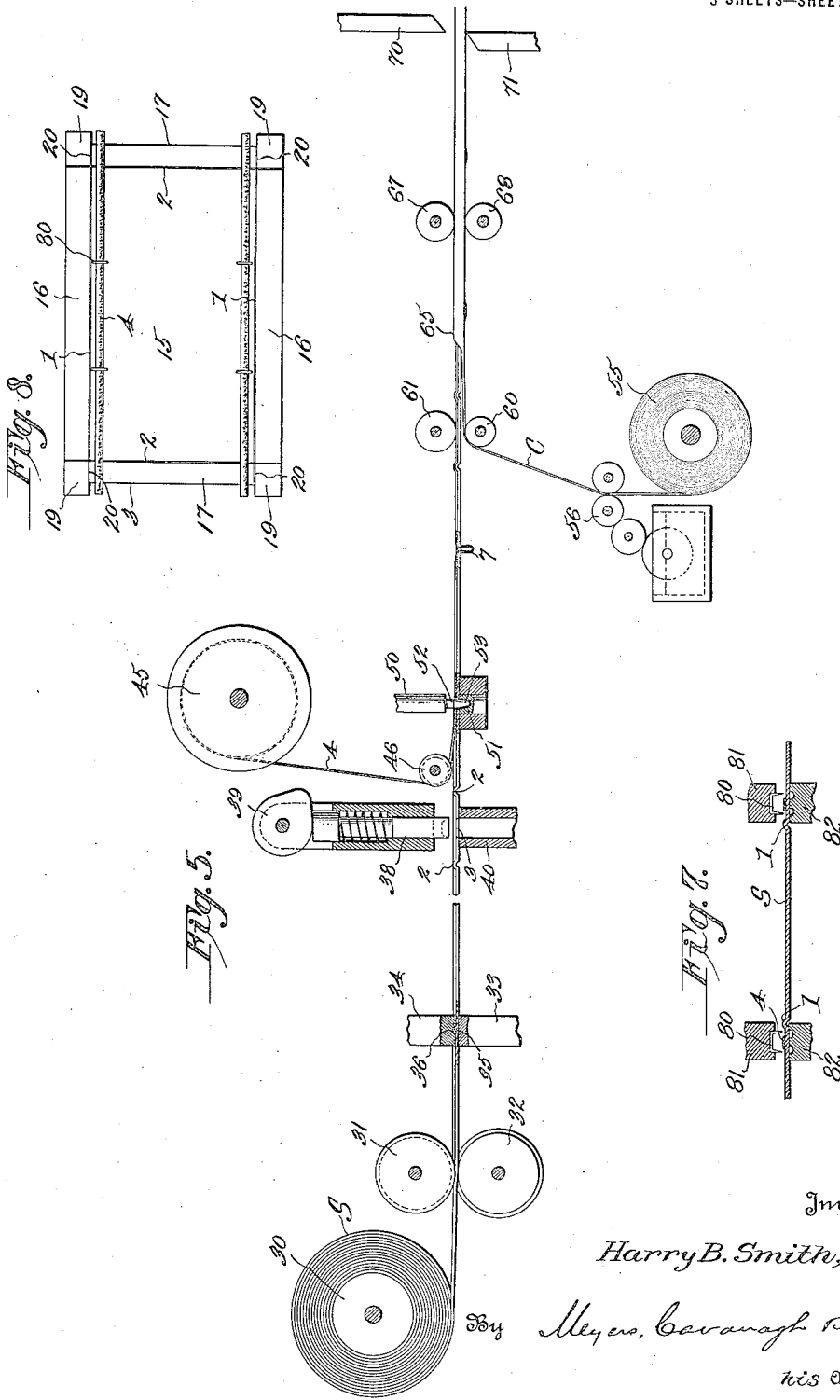
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UNITED STATES PATENT OFFICE.

HARRY BRIDGMAN SMITH, OF NEW YORK, N. Y.

METHOD OF MAKING BOXES AND BOX BLANKS.

1,402,261.

Specification of Letters Patent.

Patented Jan. 3, 1922.

Application filed March 12, 1921. Serial No. 451,887.

To all whom it may concern:

Be it known that I, HARRY BRIDGMAN SMITH, a citizen of the United States, and resident of New York city, in the county of Kings and State of New York, have invented certain new and useful Improvements in Methods of Making Boxes and Box Blanks, of which the following is a specification.

My invention relates to methods of applying or inserting strings or tapes in boxes or box-blanks.

The general object of the invention is to provide process steps which may be performed by hand, but which are well adapted for performance by machine operations, for the economical production of "strung" boxes or blanks on a high output basis.

It is desirable in certain classes of boxes made of paper or like materials, to provide tying strings or tapes, which are usually attached within the lower box section, for tying in the box contents. One example of the class is shirt-waist boxes, in which such tapes are desirably provided for securing one or more of the waists in proper condition in the box bottom.

Previous to the present invention, box structures and manufacturing methods have not been suitable for rapid and economical attachment of these tying cords, or for machine methods of production of corded or "strung" boxes.

For convenience, the word "cords" will be used hereafter as a broad designation of strings, tapes or other suitable box-contents tying materials.

In one of its variations the invention is well adapted for application of cords to covered blanks or boxes, and especially to covered box structures and methods of my own invention; but the invention is by no means limited in this respect, and an example is given of a method well adapted for uncovered boxes.

The characteristics of the invention are best understood by considering certain exemplifying performances of the method, described in detail hereafter, with reference to the accompanying drawings. It will be understood that the principles thus exemplified include many possible variations, and I contemplate any process steps, or combinations of them, that are properly within the scope of the appended claims.

In the drawings:

Fig. 1 is a perspective view of progressive

steps of producing complete "corded" box blanks.

Figs. 2 and 3 are bottom views of different portions of the blank assembly.

Fig. 4 is a perspective view of a box part (bottom section) produced from the severed blank B of Fig. 1.

Fig. 5 is a diagrammatic view, mainly in side elevation and partly in longitudinal section, of representative apparatus for performing the operations indicated in Fig. 1.

Fig. 6 is a top plan of the same.

Fig. 7 is a transverse diagrammatic section of apparatus for performing a modified cord-attaching operation.

Fig. 8 is a top plan of a box-blank having cords attached by the method indicated in Fig. 8.

In the method exemplified in Figs. 1, 2 and 3, a continuous strip S of box-shell material, usually cardboard of suitable quality and thickness, is moved forward and is creased or scored along the longitudinal lines 1 and transverse lines 2 to facilitate subsequent folding. At a suitable point in the advance of the shell material, holes 3, of suitable outline, in the present case rectangular, are punched midway between each two adjacent folding lines 2. The order in which the holes are punched and the folding lines are creased or scored is not material in the broader aspect of the invention.

At a suitable point in the advance of the shell material, tying cords 4 are brought in proximity to the strip of shell material, and are fed along with it, one of these cords being laid, desirably, substantially along each of the longitudinal folding lines 1. The cords may be of any suitable material, but in this particular case they are desirably in the form of tapes of more or less loosely woven material, of the kind frequently employed for tying articles and packages where a somewhat decorative appearance is desirable. These cords are now attached to the shell material at intervals, and in the present exemplification of the method, this is accomplished by forcing the cords through the shell material at suitable places, such as the points 5 and 6. This forcing of the cords through the shell material is accompanied by a perforation of the shell strip, and short bends or loops 7 (Fig. 2) are formed in the cords at the under side of the shell strip. The number and location of the points of attachment of each cord may be varied

greatly, but desirably, as in the present instance, the two points of attachment are located at such a distance from adjacent apertures 3 as to provide free cord portions of the desired length for tying when the blank or box is completed, as will later appear.

When the perforating and looping method of attaching the cords is employed as above described, it is usually necessary to provide some further means for securing the cords at the attachment points, and this may be done in various ways. In the present instance, a sheet of cover paper is desirably applied to the advancing continuous shell blank, for the production of covered boxes, and in the application of this covering material, the cord loops are incidentally secured.

A continuous strip C of covering material, usually paper of suitable thickness and quality for boxes of the grade desired, is advanced in proximity to the shell material, and at a suitable point the surface of the cover strip which is to be engaged with the shell material, is rendered adhesive in any suitable way, for instance by applying adhesive 8 to the upper surface of the cover strip. The cover strip is then brought into contact with the under surface of the shell strip as the two are advanced together, and properly pressed or rolled into position; and in this operation the cord loops 7 are pressed down against the shell material and adhesively secured by the cover strip, as sufficiently shown in Fig. 3, in which a portion of the cover material about one of the loops 7 is torn away for illustrative purposes.

At a suitable point in the advance of the assembled continuous blank strip consisting of shell and body material and attached cords, the outwardly extending margins 9 of the cover material are turned over and adhesively secured upon upper marginal surfaces of the shell strip.

There is thus produced at about the point 10 in the advance of the blank assembly, a composite continuous box blank comprising shell material covered on one surface and having its edges covered by the overturned portions of the cover strip, creased, and apertured at intervals corresponding to the length of each completed blank, the shell material covering the apertures having upwardly presented adhesive surfaces, and provided with continuous tying cords or tapes secured at intervals.

Individual blanks B, Fig. 4, are now produced from the continuous assembly by severing the assembly strip on transverse lines 12 intersecting the longitudinal centers of apertures 3. The box-blanks so produced have each a central or body portion 15, side wings 16, end wings 17 with projecting, adhesively coated marginal portions 18 of the cover material, and end or corner laps 19. The corner laps are desirably

separated from either the adjacent end wings or side wings, in the present instance from the end wings, by cutting along the lines 20. In the act of severing individual blanks from the continuous assembly strip, cords 4 are also severed, providing a free portion 25 of each cord near each end of the blank, these portions being long enough to be brought together over an article, such as a shirt-waist, to be packed in the box section produced from the blank, and tied to hold the article properly in position. The desired length of the tying portions of the cords is obtained by properly locating the connection points 5 and 6 in relation to the ends of the individual blank.

The blank of Figure 4 is then bent up into box form as shown in Figure 5, that is, side and end wings are bent up at right angles to the body portion 15 with the corner laps 19 bent inward against the inner faces of the end wings, and cover margins 18 are then turned in and pressed against inner faces of the corner laps and end wings, as shown at the right in Fig. 5, to secure the blank in box form. At the left in Figure 5 the cover margin 18 is shown projecting upward, ready to be turned in in the manner described. There is thus produced a complete box section provided with tying cords ready to receive commodities of the class described.

Figures 6 and 7 show in a diagrammatic way, representative mechanical devices for performing the described operations, up to the point of severing individual blanks from the continuous assembly, in one desirable sequence. In this exemplification of the method, the shell material S is supplied on a roll 30, and is advanced between rolls 31 and 32, which are suitably flanged and grooved to press the longitudinal creases 1. Thereafter the shell strip passes between pressers 33 and 34, provided with a cooperating rib or blade 35 and groove 36, to press the transverse folding creases 2. The shell strip then passes under a punch 38 operated by suitable means, such as a cam 39, and cooperating with a punch die 40, for punching the apertures 3. Just beyond the punch, rolls or spools 45 are arranged in convenient positions above the shell strip, supporting the cords or tapes 4, and these cords are guided into engagement with the shell strip by rolls or pulleys 46. Any suitable tensioning devices may be applied to the cords or the cord spools or rolls, and suitable devices may be also supplied for insuring the alinement of the cords with the shell strip, and for the proper feeding of the cords along with the shell strip, such devices being sufficiently exemplified in the present case by the loop punching, cover strip applying, and pressing rolls, hereafter described.

At a suitable point or points beyond pulleys 46, the cords 4 are forced through the shell material by suitable devices, exemplified in the present instance by a reciprocating plunger 50 and stationary support 51, provided with cooperating male and female punch members 52 and 53, by which the shell material is perforated and the cords pushed through and formed into loops at the proper points, as previously explained. At a point beyond the punching mechanism 50 and 51, the cover strip C is supplied from roll 55 and is glued, or if it has been previously glued, the adhesive is moistened, by any suitable gluing or moistening device 56. The cover strip then passes over a roll 60 and its adhesive surface is pressed against the under side of the shell strip by a roll 61 cooperating with roll 60. In this application of the covering strip, the cord loops are secured in the manner previously described. At a suitable point, such as point 65, beyond the initial application of the cover strip, its margins are turned over upon upper side margins of the cover strip by any suitable mechanism, particular mechanism for this purpose not being shown in the drawing. The cover margin may be further pressed and secured in position by cooperating rolls 67 and 68. The continuous blank assembly then advances to a point where individual blanks are severed by cooperating cutting devices 70 and 71.

The individual blanks may be folded and secured in box form by suitable mechanisms which have been devised for the purpose.

I have so far described only one exemplification of the method for producing corded boxes, this method being what I designate as a "continuous" method, and also involving at the same time production of covered boxes, these continuous and covered box production methods conforming generally to previous methods of my invention, adapted however, as explained above, to the application of tying cords or tapes. In its broader aspect the present invention is not limited to the continuous method or to the covered box production method. Up to the point where the individual blanks are severed from a continuous strip assembly, the process steps described are, broadly considered, an exemplification of suitable steps for the production of the individual corded blanks of Figure 4. It is also evident that if the cover strip is omitted and other suitable means are provided for securing the cords at the attachment points, suitable uncovered, corded box blanks will be produced. An example of this is shown in Figures 8 and 9, in which the cords are attached at suitable points by staples 80, applied by any suitable stapling devices represented in rudimentary form by cooperat-

ing staple holding or applying members 81 and dies 82. The staples are applied so that they straddle the cords 4 and the points are punched through the shell material and clinched on the under side by the dies 82. Evidently, uncovered box sections may be produced from the blanks of Figure 9 by folding the parts, as shown in Figure 5, and securing the outer surfaces of the corner laps to inner surfaces of the end wings, by adhesive suitably supplied.

Certain variations in the order of steps have been previously suggested, and other variations in this respect may be made. No attempt is made to explain all the possible variations of the method, but suitable variations are included in the scope of the appended claims.

The form or structure of the box-blank and correspondingly the structure of the completed box part may vary greatly, in the broader aspect of the invention, and the production method may be varied in accordance with variations in the desired blank form. For instance, the present invention is adaptable to covered or uncovered boxes in which the end wing and corner lap arrangement or form may vary greatly. Certain end formations of the blank make the cutting of apertures 3 in the continuous shell blank unnecessary, and other end formations of the individual blanks require other forms of apertures to be cut; and in some cases require pieces to be cut out of the sides of the continuous strip or of the individual blanks. The present method is therefore adaptable to many forms of boxes other than the particular form here shown.

I claim:

1. A method of making corded boxes comprising applying a tying cord to a succession of box-blanks and shaping the blanks into box form.

2. A method of making corded boxes comprising applying a continuous tying cord to a succession of box-blanks, severing the cord at blank intervals, and shaping the blanks into box form.

3. A method of making corded boxes comprising applying a tying cord to a connected series of box-blanks, severing the blanks and cord, and shaping the individual blanks into box form.

4. A method of making corded boxes comprising applying two continuous tying cords to a connected series of box-blanks, severing the blanks and cords, and shaping the individual blanks into box form.

5. A method of making corded boxes comprising applying continuous tying cords to a succession of box-blanks, severing the cord at intervals corresponding to blank intervals, and shaping the individual blanks into box form.

6. A method of making corded boxes com-

- prising applying continuous tying cords to a connected series of box-blanks, severing individual blanks each with its applied cords, from the series, and shaping the individual blanks into box form.
- 5 7. A method of making corded boxes comprising applying continuous tying cords to a connected series of box-blanks, severing individual blanks from the series, and simultaneously severing the cords, and shaping the individual blanks into box form.
- 10 8. A method of making corded boxes comprising applying a continuous tying cord to a series of box-blanks, attaching the cord at two points to each blank, and severing the cord at intervals corresponding to the blank intervals.
- 15 9. A method of making corded boxes comprising applying a continuous tying cord to a connected series of box-blanks, attaching the cord to each blank at two points removed considerably from the ends of the blank, and severing the blank and cord to form an individual corded blank.
- 20 10. A method of making corded boxes comprising advancing a continuous strip of box-blank material, applying two parallel continuous tying cords to one side of the blank material, connecting each cord at two points within the limits of each individual blank area, and cutting the blank and cords transversely to produce individual corded blanks.
- 25 30 11. A method of making corded boxes comprising advancing a continuous strip of box-blank material, creasing the material in longitudinal lines for subsequent folding, applying two continuous tying cords one lying along each of the folding lines, attaching each cord at two points within each blank area, and severing the blank material and cords on lateral lines to produce individual blanks, each provided with tying cords having free ends for tying articles within the box.
- 35 40 45 12. A method of making corded boxes comprising advancing a continuous strip of box-blank material, creasing the blank along longitudinal and lateral lines for subsequent folding, cutting out portions of the material at blank length intervals to contribute to the end formation of the completed individual blanks, applying continuous tying cords to one surface of the blank strip, attaching each cord at two points to the blank within the limits of each completed blank, and severing the blank and cords transversely to produce individual corded blanks.
- 50 55 60 65 13. In a method of producing individual box-blanks each having a body portion, side and end wings and corner laps, and a pair of tying strings at each end capable of being brought together and tied over an article placed within the box formed from the blank, the steps of advancing blank sheet material to form a series of individual blanks, applying tying cords to successive blank sections, and attaching each cord at two points to each section.
14. In a method of producing individual box-blanks each having a body portion, side and end wings and corner laps, and a pair of tying strings at each end capable of being brought together and tied over an article placed within the box formed from the blank, the steps of advancing a continuous strip of box-blank material, cutting out portions of the strip at intervals to contribute to the end formation of the individual blanks, applying two parallel tying cords along lines adjacent to the sides of the blank body portions, attaching each cord at two points to the blank strip within the limits of each blank section, and severing the strip and cords on transverse lines to produce the individual blanks.
- 70 75 80 85 15. A method of making corded boxes comprising associating a tying cord with a box-blank, and connecting the two by forcing a portion of the cord through the blank material.
- 90 16. A method of making corded boxes comprising associating a tying cord with a box-blank, and connecting the two by forcing two spaced portions of the cord through the blank material.
- 95 17. A method of making corded boxes comprising associating a tying cord with a box-blank, and connecting the two by forcing a portion of the cord through the blank material, producing a loop, and securing the loop to the adjacent surface of the blank.
- 100 18. A method of making corded boxes comprising associating a tying cord with a box-blank, and connecting the two by forcing two spaced portions of the cord through the blank material, producing loops, and securing the loops to the adjacent surface of the blank.
- 105 19. A method of making corded boxes comprising applying a pair of tying cords to a surface of a box-blank, and attaching the cords to the blank by passing portions of the cords through the blank material.
- 110 20. A method of making corded boxes comprising applying a pair of tying cords to a surface of a box-blank, and attaching each cord at two points to the blank by passing portions of the cord through the blank material.
- 115 120 21. A method of making corded boxes comprising applying a pair of tying cords to a surface of a box-blank, and attaching the cords to the blank by passing portions of the cords through the blank material, forming loops in such portions of the cords, and securing the loops to the adjacent blank surface.
- 125 22. A method of making corded boxes comprising applying a pair of tying cords
- 130

to a surface of a box-blank, and attaching each cord at two points to the blank by passing portions of the cord through the blank material, forming loops in such portions of the cords, and securing the loops to the adjacent blank surface.

23. A method of making corded boxes comprising applying a tying cord to box-blank material, passing a portion of the cord through the material and forming a loop in the cord at the opposite side of said material, and applying a cover sheet to the blank material and incidentally securing the cord loop.

24. A method of making corded boxes comprising applying a tying cord to box-blank material, passing two spaced-apart portions of the cord through the material and forming loops in said cord portions at the opposite side of said material, and applying a cover sheet to the blank material and incidentally securing the cord loops.

25. A method of making corded boxes comprising applying a tying cord to a sheet of box shell material, punching portions of the cord through the material and forming loops in the cord at the opposite side of the shell, and applying a covering sheet adhesively to the shell so as to secure the loops in position.

26. A method of making corded boxes comprising applying tying cords to a sheet of box shell material, punching portions of each cord through the material and forming loops in the cords at the opposite side of the shell, and applying a covering sheet adhesively to the shell so as to secure the loops in position.

27. A method of making corded boxes comprising applying a continuous tying cord to a succession of box shell blanks, punching portions of the cord through the blanks at intervals and forming loops on

the under side of the blanks, applying covering material to secure the loops, and severing the cord at intervals corresponding to box-blank intervals.

28. A method of making corded boxes comprising applying two continuous tying cords to a succession of box shell blanks, punching portions of each cord through the blanks at intervals and forming loops in such cord portions on the under side of the shells, applying covering material to secure the loops, and severing the cords at intervals corresponding to box-blank intervals.

29. A method of making corded boxes comprising applying continuous tying cords to a connected series of box shell blanks, punching portions of the cords through the shell material at at least two points on each cord corresponding to each completed box blank, forming loops in the cords in the punching operation, applying cover material to secure the loops in position, and severing individual blanks from the continuous succession and substantially simultaneously severing the cords to produce individual corded blanks for shaping into box form.

30. A method of making corded boxes comprising advancing a continuous strip of shell material, applying continuous tying cords to one side of the shell, forcing portions of the cords at intervals through the shell and forming loops in the cords at the opposite side of the shell, applying a continuous strip of cover material adhesively to the last named side of the shell and thereby securing the cord loops in position, and severing the continuous assembly to produce individual covered and corded box-blanks.

Signed at New York, in the county of New York and State of New York, this 10th day of March, A. D. 1921.

HARRY BRIDGMAN SMITH.