

E. Waters. Sheet 1 of 2 Sheets.

Making Paper Boxes.

N^o 19270.

Patented Feb. 2, 1858.

Fig. 1.

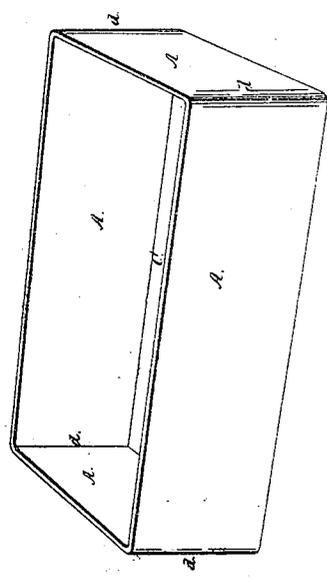


Fig. 2.

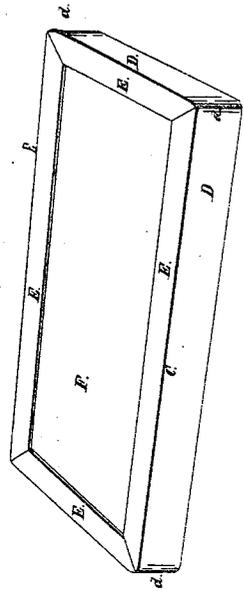


Fig. 3.

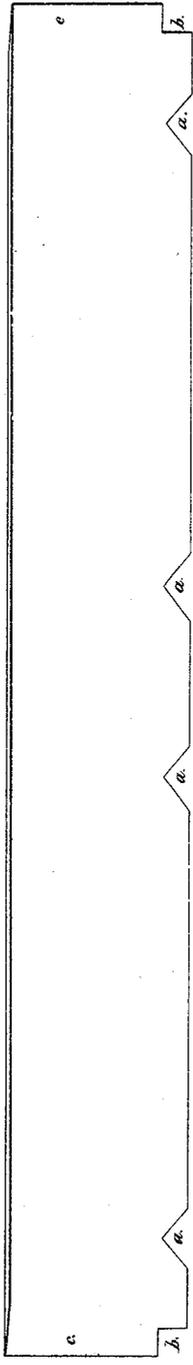


Fig. 4.

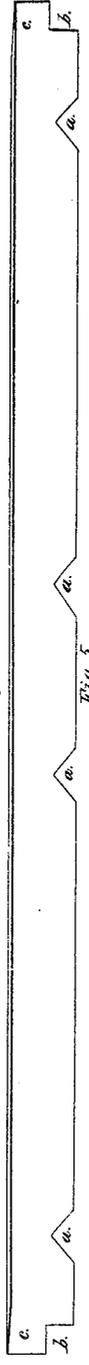


Fig. 5.

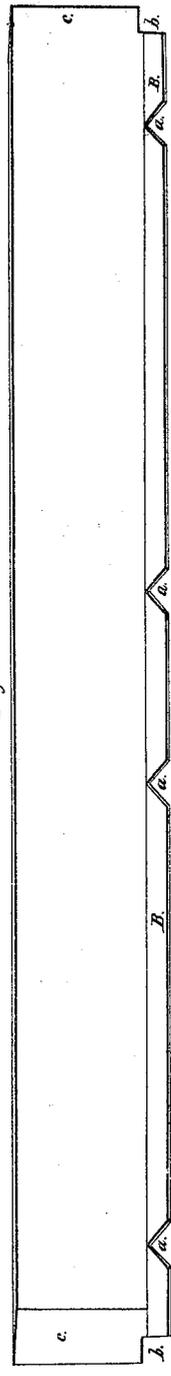
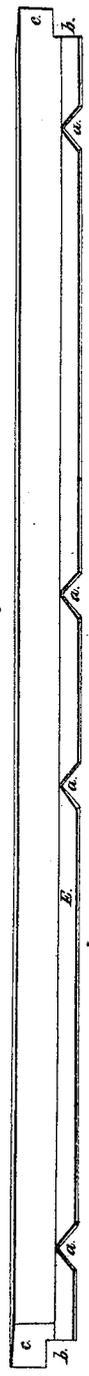


Fig. 6.

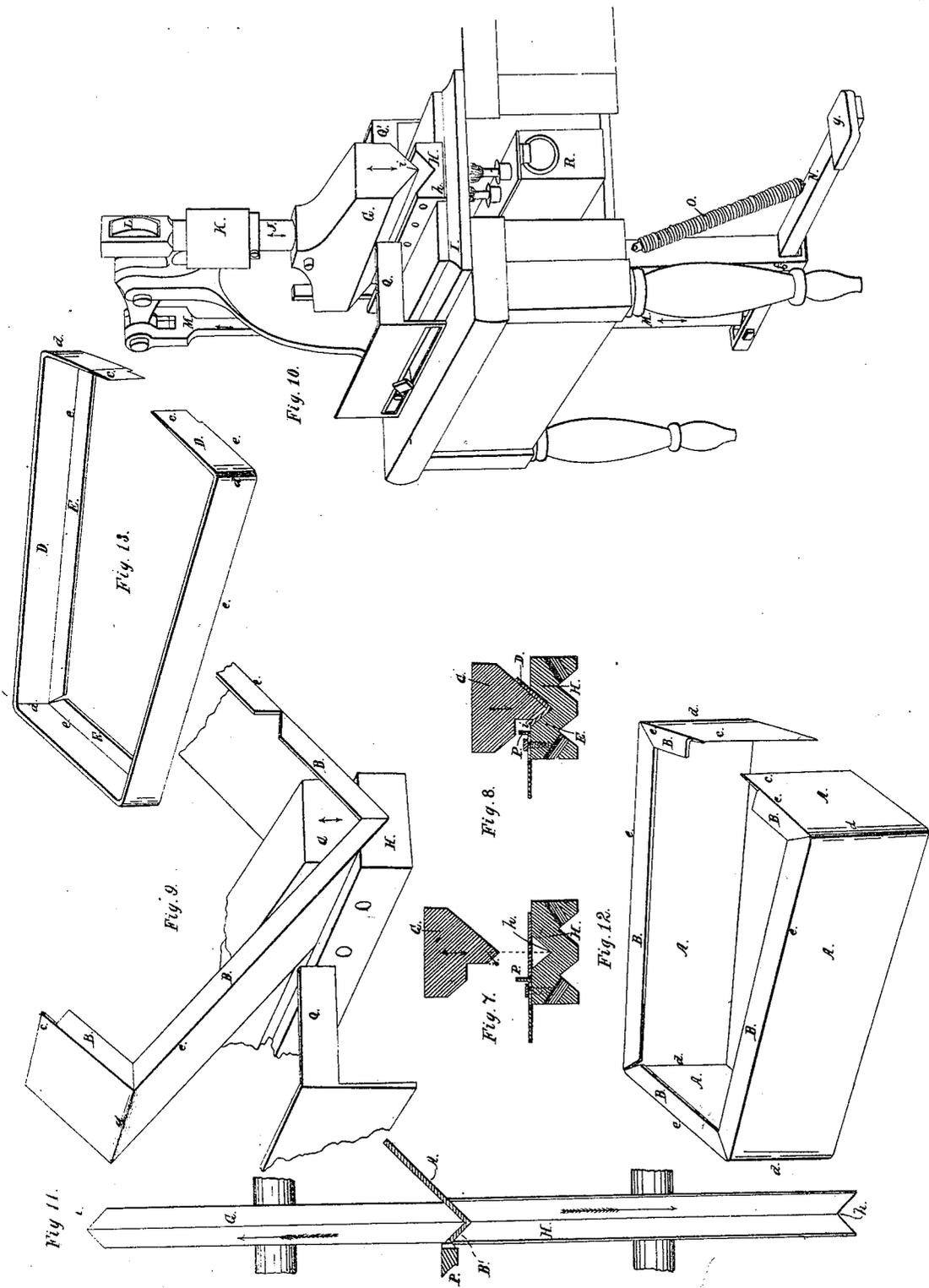


E. Waters, Sheet 2. of 2 Sheets.

Making Paper Boxes.

No. 19270.

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UNITED STATES PATENT OFFICE.

ELISHA WATERS, OF TROY, NEW YORK.

IMPROVEMENT IN MANUFACTURING ANGULAR PAPER BOXES.

Specification forming part of Letters Patent No. 19,270, dated February 2, 1858.

To all whom it may concern:

Be it known that I, ELISHA WATERS, of the city of Troy, in the county of Rensselaer and State of New York, have invented a new and useful Improvement in the Art or Process of Manufacturing Angular Boxes from Thick Paper-Board; and I do hereby declare that the following is a full and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which the same letters refer to like parts in all the figures.

My improved process consists in constructing angular band, "shelf," and other similar boxes of thick paper-board, such as they are commonly made of, by cutting the board into strips for the sides and pieces for the top and bottom, successively, forming the upright angles or corners by pressing the strips between heated angular dies without cutting, creasing, or scoring the board, and cementing the ends of the strips together and the bottom and top pieces to the sides, all substantially as hereinafter fully set forth. By this practice I produce from the smallest amount of paper-board with the least labor, and by the use of only a single pair of dies, whole nests of the boxes with solid or uncut upright angles or corners of the same thickness and material as the sides, and with no raw edges to need covering with thin paper to make the boxes merchantable.

To enable other paper-box makers to practice my improved process, I will particularly describe my mode of constructing a rectangular box such as is represented by Figs. 1 and 2.

In making such a box a rectangular strip, Fig. 3, is first cut, of suitable length and width to form the four sides A of the body, and its four flanges B, to the inner side of which flanges the bottom C is cemented, and another rectangular strip, Fig. 4, is cut, of proper length and width to form the four sides D of the cover and its four flanges E within which flanges the top F is cemented. Then rectangular notches *a* are cut out of that side of the strips which is to constitute the flanges, so that the flanges shall meet on a miter at the corners of the box, and other rectangular notches, *b*, are cut out at the ends on the same side, so that the ends of the flange shall meet without lapping,

where the chamfered ends *c* of that part of the strips which is to form the side are lapped and cemented together.

In the manufacture of angular boxes from thick paper-board, I use together a male die, G, and a female one, H, of the character shown in the drawings, for successively forming the angles or corners; and in making such a box as is shown by Figs. 1 and 2, after preparing the strips, as shown in Figs. 3 and 4, I next turn the flanges B and E at right angles to the strips, as shown in Figs. 5 and 6, 8 and 11, using therefor the straight block-dies shown in Figs. 7, 8, 9, and 10, or the rotary circular ones shown in Fig. 11.

In using the block-dies I mount them in a press, as shown in Fig. 10, in such manner that the operative can freely separate them to insert the board between, as seen in Figs. 7 and 10, and quickly bring them together under a pressure of several hundred pounds to form the angles. (See Figs. 8 and 9.) In Fig. 10 the female die H is seen bedded in the table I, and the male one G is carried truly up and down by the rod J, which is slid within the socket K by the lever L, which is connected by the rod M to the treadle N, hung at *f*. By bearing down the end *g* of the treadle the die G is forced into the female one H, and the spring O raises the die G when the treadle is released by the operative. Any other suitable press or similar mode of working the dies may be adopted without altering the result or departing from the practice of my improved process.

In using the circular dies I mount them in respect to each other, as shown by Fig. 11, with their journals turning in fixed or slightly-yielding boxes, which can be adjusted so as to allow various thicknesses of paper-board to be run through between the dies, one or both the dies being separately turned or geared together, so that their surfaces shall positively run with the same speed.

P is an adjustable guide against which the edge of the board is set in turning the flanges. After turning the flanges or laps, I next form the vertical corners or angles *d* in succession, by means of the block-dies, in the manner shown by Fig. 9, so that the strips have the form shown in Figs. 12 and 13.

Q Q' are steps to set the back edge of the

board against in making the corners *d* take the right course to that edge. Then the chamfered ends *c* are cemented together, and the top and bottom pieces, F and C, cemented in their places, which completes the construction.

The dies G H had best be of metal, as cast-iron, and kept about as hot as flat-irons are used in smoothing clothes. This heating may be done by an alcohol lamp, R, under the female die, as shown in Fig. 10, or by any other suitable means. If the paper-board is very thick or unusually dry, it should be moistened a little before the angles are made.

The description now given of my process as practiced in the manufacture of rectangular boxes of thick paper-board will enable paper-box makers to practice my improvement in manufacturing angular boxes having any desired number of sides by using dies with suitable angles. Thus for making a four-sided box with equal angles the angle *h* in the female die should be ninety degrees; for a box with five sides, one hundred and eight degrees; six sides, one hundred and twenty degrees; eight sides, one hundred and thirty-five degrees; ten sides, one hundred and forty-four degrees. The angle *i* of the male die should in each case be two or three degrees less than that of the female one, or so that nearly all the pressure will be exerted at the corner to unite and brace the paper material firmly together, and make it as stiff and strong at the corners as it is at any other part of the box.

Now, it is not new to emboss or bend paper-board by pressing it between hot dies. Nor is it new to make angular boxes by cutting the board into strips for the sides and pieces for the top and bottom, forming the upright corners by scoring and bending the board, or by winding or bending the uncut paper-board around angular mandrels, and finally cementing the parts together to complete the construction; but my invention does not consist in bending paper-board by the use of heated dies, nor in making angular boxes by the process just named, nor in "striking up" angular boxes from a single piece of paper-board by the use of male and female dies of the form of the exterior and inside of the box, nor in forming a box from a single flat piece of paper-board by notching or slitting its corners, and turning up the sides and forming the upright angles by means of heated angular dies. For although I am not aware that this latter mode has been heretofore practiced or known, yet it

would require too great a waste of the paper-board in making deep many-sided boxes. It is not essential to my improved mode that the sides should have flanges. The top and bottom pieces may be secured to the sides in any known substantial manner; but it is necessary that the sides of the boxes should be formed of separate strips of board from the bottom or top, as described, so that there shall be the least waste of paper-board in cutting out and forming deep many-sided boxes, and so that there need be no raw edges along the upright angles of the box, and so that those corners shall consist of a single full thickness of the board, the same as the sides, leaving the box straight from end to end, so that the sides of the cover will fit close to those of the lower portion or body of the box. It is also essential that the upright corners—those which are greatly more liable to be torn or broken down than the horizontal ones—should be formed, one by one, by pressing the side strips between angular dies G H, substantially in the manner hereinbefore described, without in any manner cutting, scoring, or creasing the board, so that any desired number of different sizes of the boxes can be made by the use of only one pair of the dies, and with the least labor or expense of machinery, and so that the corners shall be as smooth as the sides, and require no covering to fit the boxes for market, and so that the particles of the board shall be so condensed and set together at these corners that the box shall be greatly stiffer and stronger than any heretofore made with upright corners formed by scoring and bending the board, or by bending the uncut board once around a mold or a mandrel.

What I claim as my invention, and desire to secure by Letters Patent, is—

The construction of angular boxes of paper-board by cutting the board into strips for the sides and pieces for the tops and bottoms, forming the upright angles one by one by pressing the strips between angular dies without cutting, creasing, or scoring the board, and finally cementing the parts together, substantially as herein set forth, thus producing by the use of only a single set of the dies, and with the least waste of the paper-board, any required number of different sizes of many-sided boxes with smooth solid upright corners, as specified.

ELISHA WATERS.

Witnesses:

E. H. UNIAL,
AUSTIN F. PARK.