

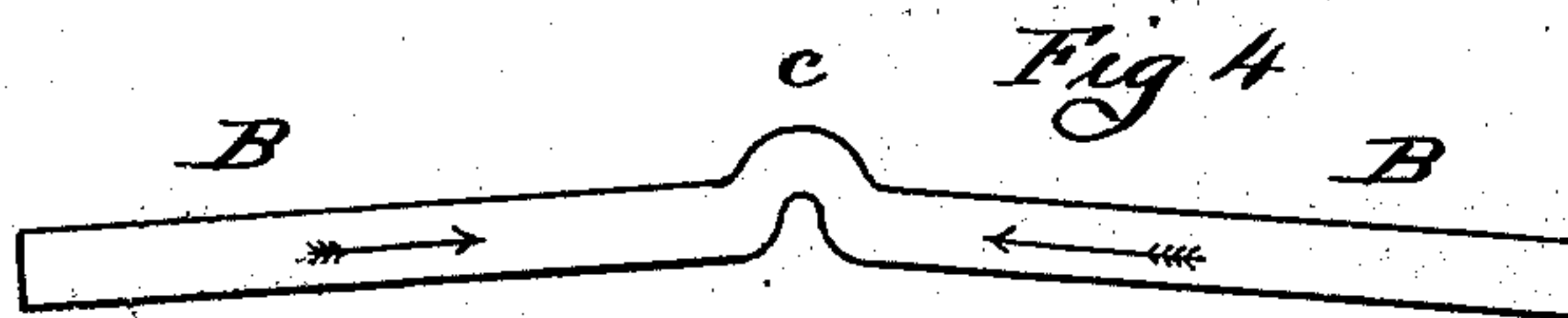
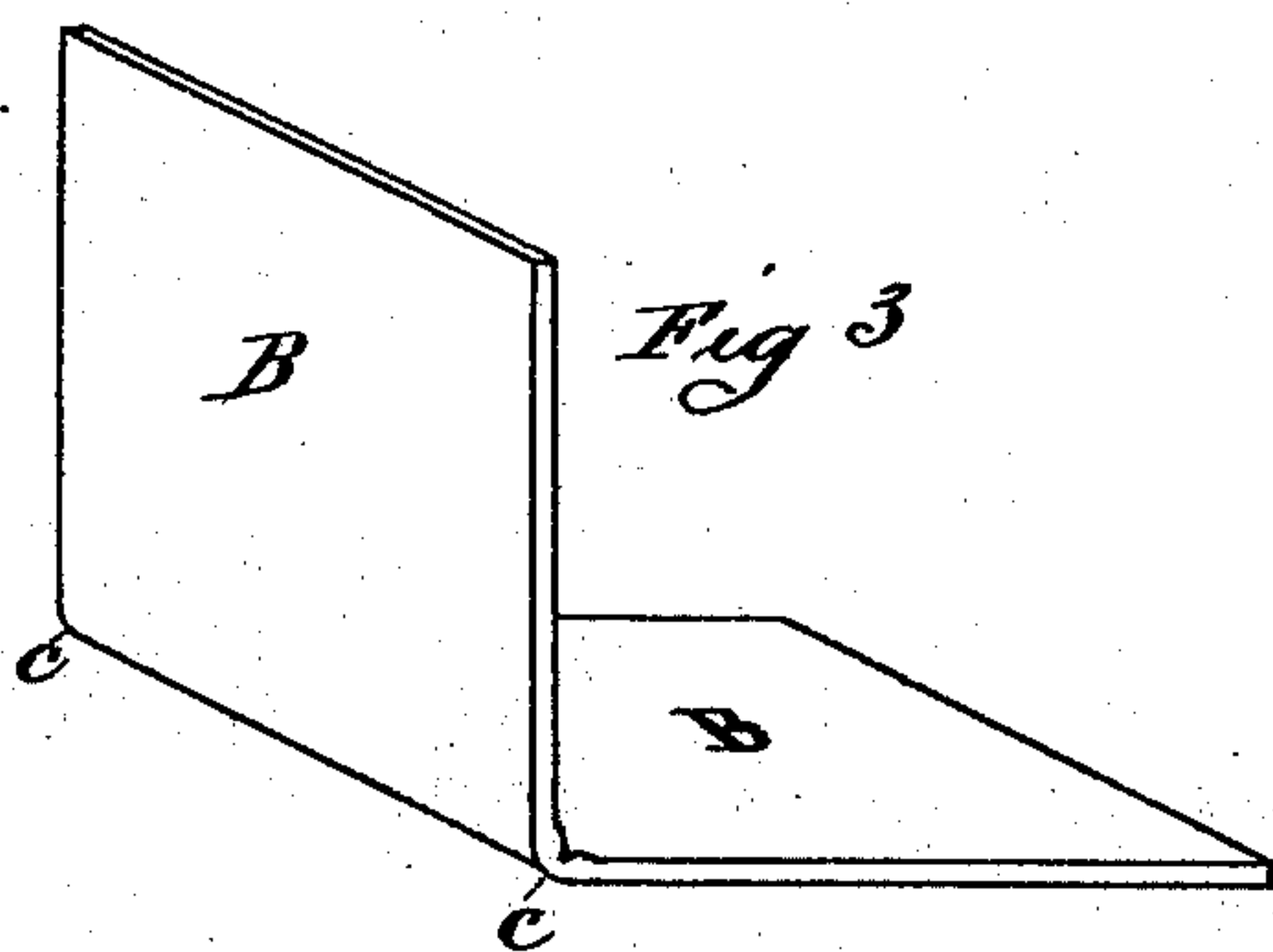
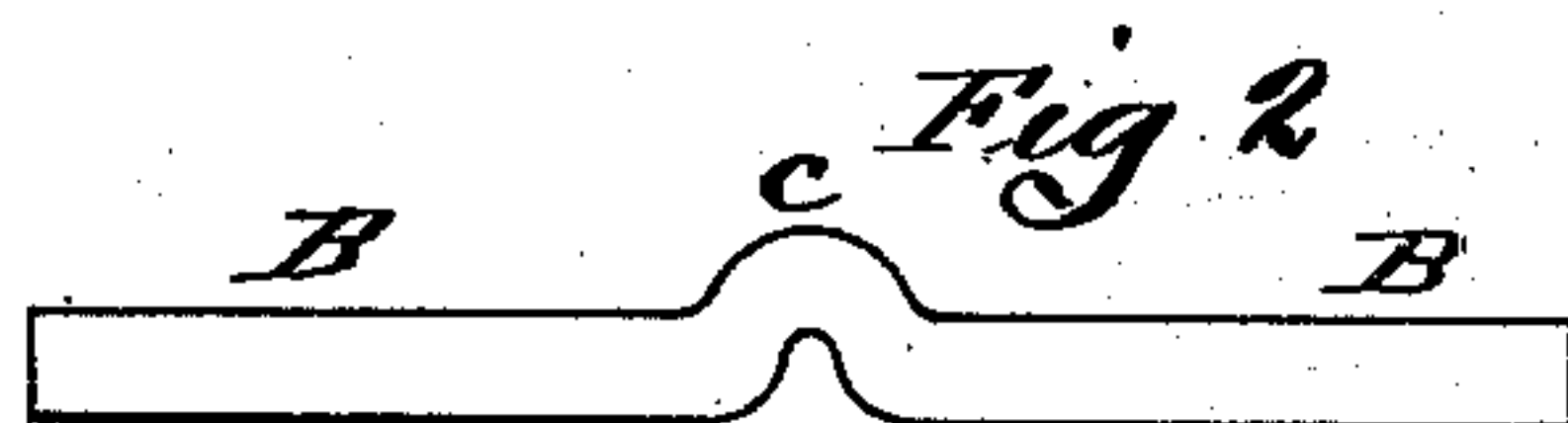
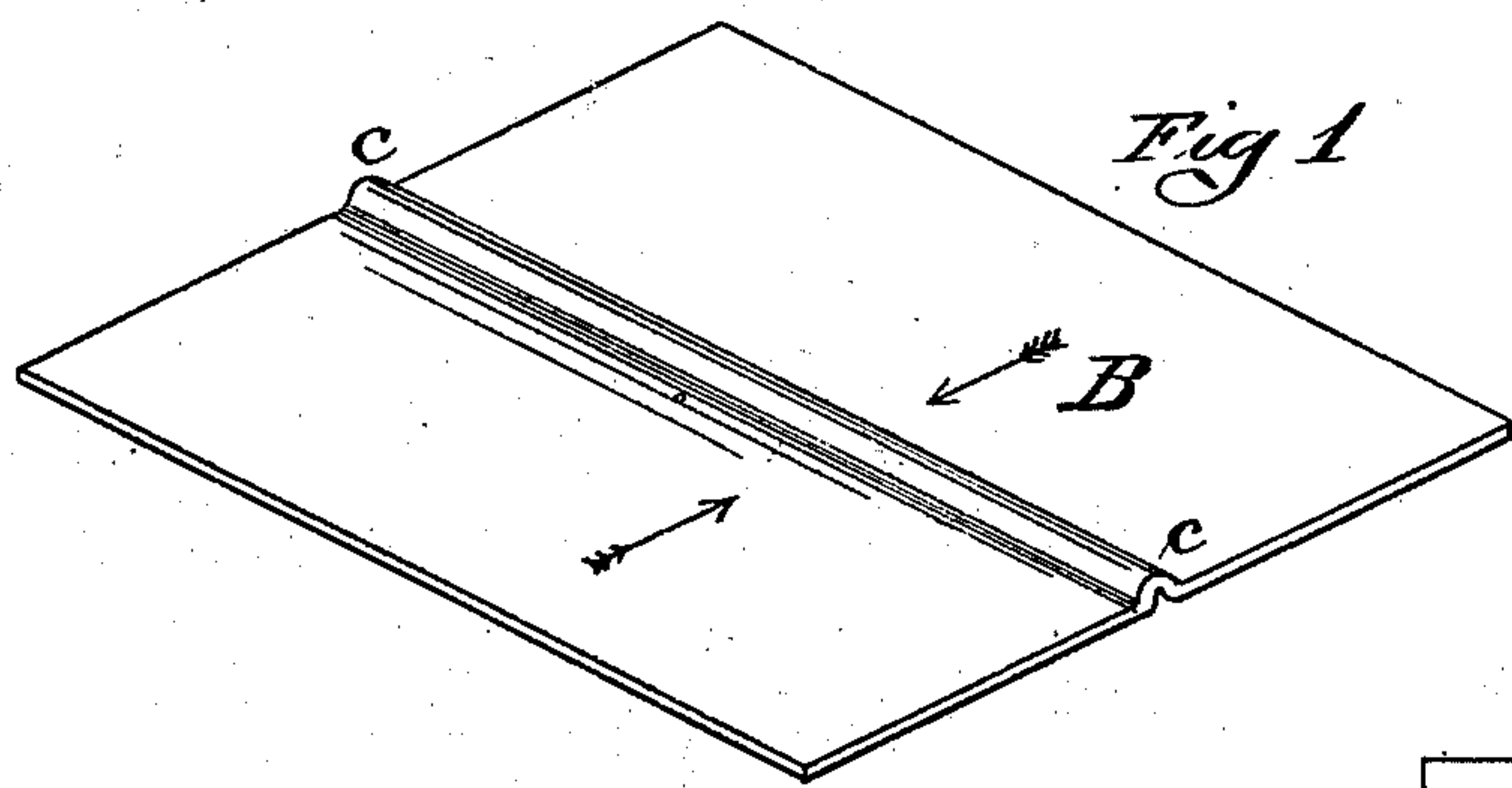
(No Model.)

2 Sheets—Sheet 1.

J. E. STANNARD.  
Method for Forming the Bending Lines in Paper Boxes.

No. 235,821.

Patented Dec. 21, 1880.



Witnesses  
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(No Model.)

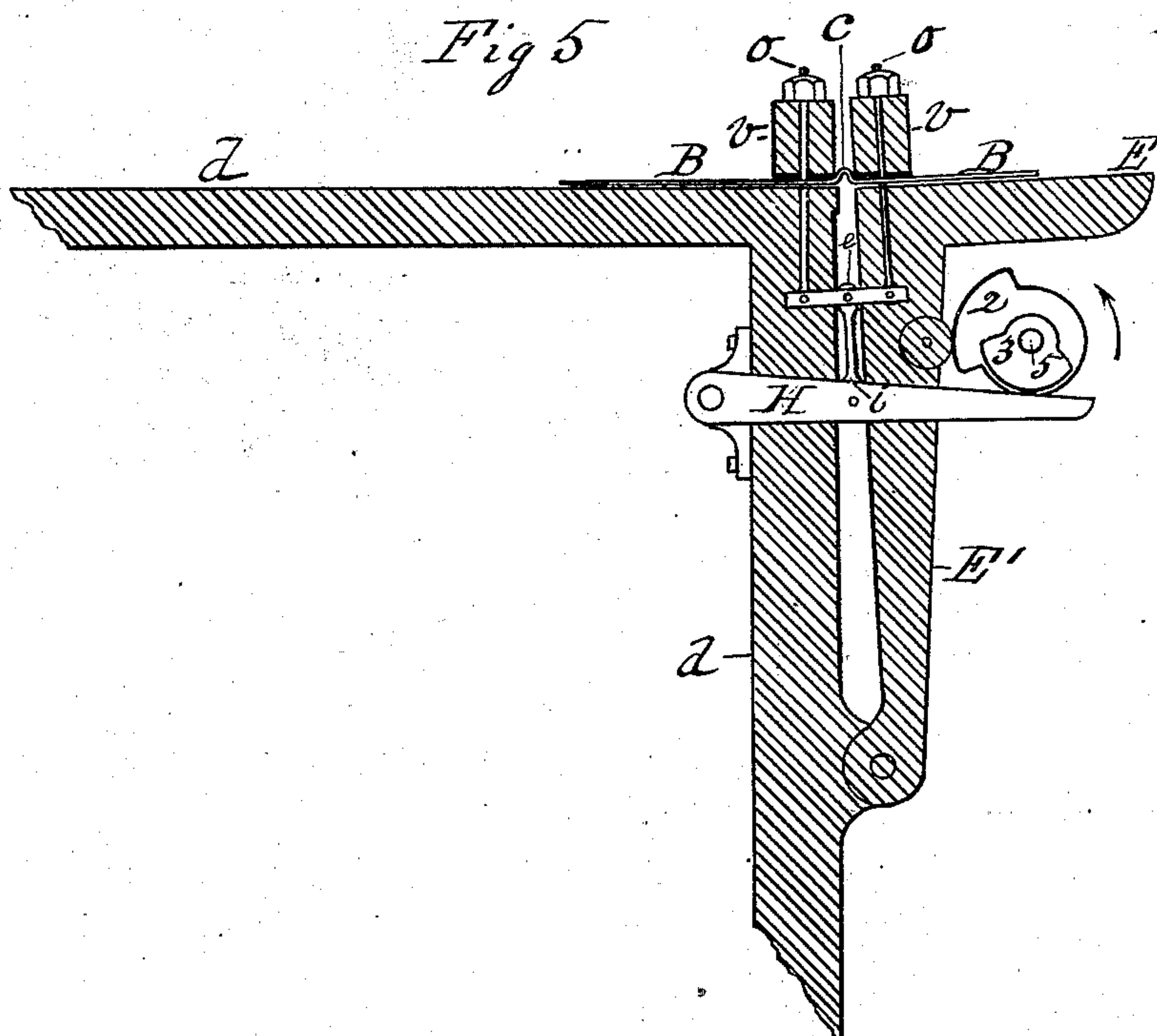
2 Sheets—Sheet 2.

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Method for Forming the Bending Lines in Paper Boxes.

No. 235,821.

Patented Dec. 21, 1880.



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# UNITED STATES PATENT OFFICE.

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## METHOD FOR FORMING THE BENDING-LINES IN PAPER BOXES.

SPECIFICATION forming part of Letters Patent No. 235,821, dated December 21, 1880.

Application filed July 12, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. STANNARD, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in the Manufacture of Paper Boxes, of which the following is a specification.

My invention relates to paper boxes and other analogous articles made from paper-board by bending the latter upon certain lines formed therein or thereon, so as to bring certain parts of a sheet into proper position to form the various sides of the box; and the object of my invention is to provide such an improved method for forming the folding or bending lines of such sheets, lined or otherwise, so as to obviate all danger of fracture by bending, and to leave the whole strength of the sheet at such line by forming it without cutting out any of the stock or indenting the folding-line. I attain the above-named object by the method of forming the said bending-lines illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a piece of card-board having the bending-line formed longitudinally therein according to my invention. Fig. 2 is an end view of the sheet, Fig. 1, but enlarged in thickness. Fig. 3 is a view of a portion of sheet, Fig. 1, having one part bent up at right angles to the other upon said folding-line. Fig. 4 illustrates the position in which a sheet is held when its folding-line is formed.

In the drawings, B indicates the flat portions of the card-board sheets, and *c* the folding-line thereof. The arrows shown in Figs. 1 and 4 indicate the direction in which the portions B of the sheet are moved to form the bending-line *c*.

Fig. 5 is a side elevation, partly in section, of one device for forming the bending-line in paper according to my invention. In said figure, *d* is the frame of the machine, adapted to be fixed permanently in the position there shown. E is a swinging table, having a vertical leg, E', which is hinged to the vertical part of frame E, as shown. H is a lever hinged to

frame *d*. *i* is a connecting-rod pivoted to lever H. *e* is a cross-bar, to which the upper end of rod *i* is pivoted. *o o* are vertical rods pivoted to bar *e*, and provided with nuts on their upper ends, which screw down against two clamp-bars, *v v*, through which rods *o o* pass. Two cams, 2 3, are fixed on a shaft, 5, which runs at right angles to lever H, and cam 2 is arranged to bear against the leg E' of table E and cam 3 to bear against the top side of lever H. B is the sheet of card-board, clamped upon frame *d* and table E.

Heretofore it has been the practice in making bending or folding lines in card-board in preparing it for the manufacture of paper boxes to either score out lines on its surface or indent them by pressing the edge of a suitable metallic or other strip against the face of the paper. Forming said bending-lines by scoring very much weakens the bent portion or corner, for a part of the stock is removed on that line, rendering it comparatively thin and weak, and such corners are liable to fracture when the board is bent. Indented lines cause the sheet to bend thereon, but the indentation so hardens and solidifies the stock under the line as to make it brittle and more likely to break than otherwise.

In carrying out my invention I cause the portions B of the sheets to be moved transversely by any suitable means toward the bending-line *c* with such force as to "full up" the stock on said line and drive it into the form shown in Figs. 1 and 2, thus causing the stock along the line to assume the form shown. Said line-form may be also produced by holding one side of the sheet firmly and moving the opposite side, as just indicated. One means of forming said folding-line is illustrated in the device shown in Fig. 5, the operation of which is as follows: The cams 2 and 3 are turned so as not to bear against leg E' and lever H, thus permitting a sheet of card-board to be inserted between bars *v v* and the surface of frame *d* and table E, and by causing shaft 5 to be turned cam 3 first strikes lever H, causing the latter to be depressed and draw bars *v v* against the paper B, clamping the latter solidly between the frame and table



and said bars. Cam 2 next operates against leg E', driving it and table E toward frame d and throwing up the folding-line c there shown.

The bars v v are made of sufficient length to reach beyond the opposite edges of a sheet of paper, and in practice a lever and proper connections between it and said bars are arranged at each end of said bars, the paper lying between the two pairs of vertical rods o o.

10 In forming the folding-line c, as just described, the stock on that line is, in a sense, softened and rendered very flexible, and prepared for bending easily and with no liability to fracture. It will also be seen that the full-  
15 ness given to the outer side of the bending-line c by its upward throw results in gathering at that point and along that line such a surplus of stock as is demanded by the length of the curve around the corner of the bent portion, and thus in bending there is no tensile  
20 strain around said corner which can cause the paper to break; but it is left smooth and intact, as seen in Fig. 3, and the inner face of the line is so softened that it folds together  
25 when the board is bent, as seen in Fig. 3, and

does not operate to strain upon the outer surface and break it.

Great advantages are gained in the manufacture of certain classes of paper boxes from covered, or, as it is termed, "lined" board, in the employment of my invention in forming lines on such stock, for the board can be covered with white or colored paper in the sheet and be made up into boxes without breaking its surface to prepare it for bending, and the covering of such boxes after folding is dispensed with. 30 35

What I claim as my invention is—

The within-described improvement in preparing card-board for the manufacture of paper boxes and analogous articles, which consists in softening and rendering flexible the folding-line portion of the card-board by the forcible reduction of the width of the sheet transverse to the direction of said folding-line, substantially as and for the purpose set forth. 40 45

JOHN E. STANNARD.

Witnesses:

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