2 Sheets—Sheet 1.

E. De F. SHELTON.

PAPER-BOX.

No. 183,423. Patented Oct. 17, 1876.

Fig. 3

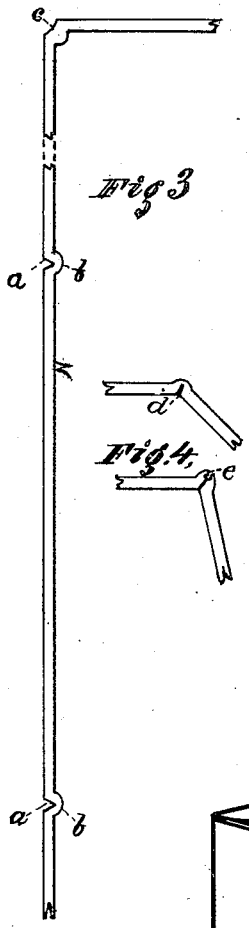

Fig. 4.

Fig. 1.

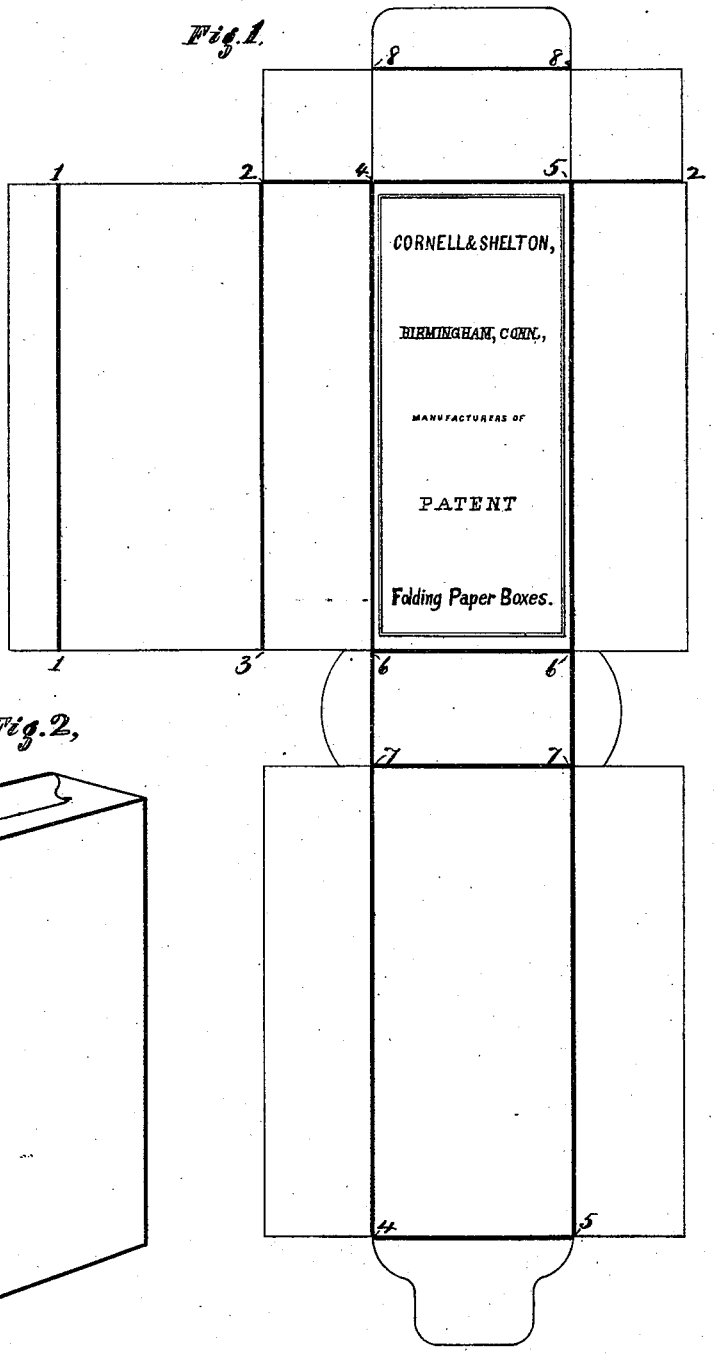

Fig. 2.

Witnesses,

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John Robey Jr.

Inventor,

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by John J. Halsted

his Atty.

2 Sheets—Sheet 2.

E. De F. SHELTON.

PAPER-BOX.

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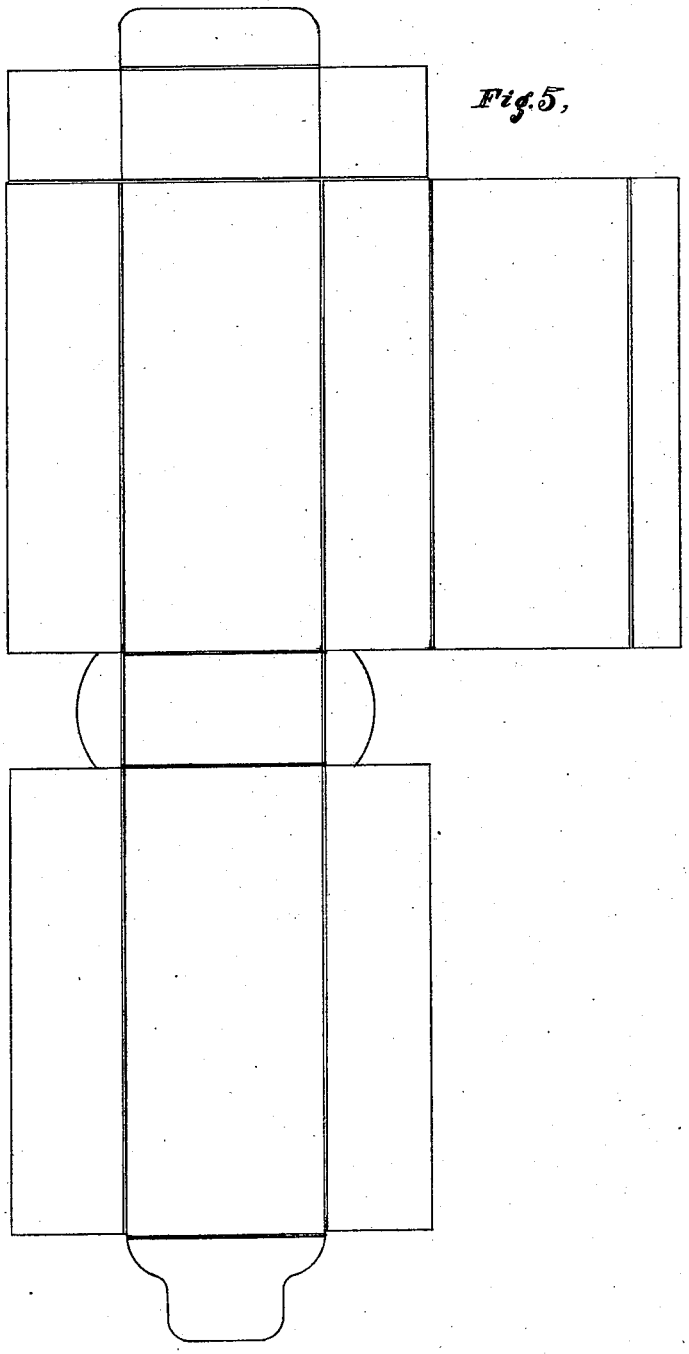
Fig. 5,



Witnesses
W. R. Edelen.
John Robey, Jr.

Inventor
Edward de F. Shelton
by John J. Halsted.
their Attorney.

UNITED STATES PATENT OFFICE.

EDWARD DE F. SHELTON, OF BIRMINGHAM, CONNECTICUT, ASSIGNOR OF ONE-HALF HIS RIGHT TO THOMAS L. CORNELL, OF SAME PLACE.

IMPROVEMENT IN PAPER BOXES.

Specification forming part of Letters Patent No. **183,423**, dated October 17, 1876; application filed February 3, 1876.

To all whom it may concern:

Be it known that I, EDWARD DE F. SHELTON, of Birmingham, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in the Manufacture of Paper Boxes; and I do hereby declare that the following is a full, clear, and exact description thereof, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, and in which—

Figure 1, Sheet I, shows a blank printed and grooved in accordance with my invention; Fig. 2, a perspective of the completed box; and Figs. 3 and 4, details showing the character of the grooves, and illustrating different ways of bending; Sheet II, the unprinted and ridged side of the blank.

My invention relates to the manufacture of Manila-paper boxes; and has, primarily, for its object the saving of one, and that one of the most expensive operations in their manufacture, and the production on one machine, and by one act, of results which have hitherto in this branch of art required two operations and two separate machines, while at the same time I make a more finished, artistic, and sightly article, and at less cost, than those made by the old mode.

Hitherto, in making paper boxes from Manila paper, such as is now demanded for neat, strong boxes, adapted to hold articles frequently of considerable weight, such as tacks, &c., it has been customary to print that side of the paper which becomes the outer or exposed side of the box with business-cards, labels, &c.; but it has not been customary in and by the act of printing to indicate, in any way, the lines at which the paper is subsequently to be folded in order to form the box. When it has been desired to indicate such lines or to facilitate the folding, the paper or blank has been removed from the press, carried to another machine specially provided for the purpose, and laid thereon reversed—that is, with its printed side downward—and then, the machine being put in operation, the linear depressions or creases were made on the unprinted surface, causing corresponding ridges or elevations on the opposite or printed surface. This method necessarily involved several serious disadvantages, which my invention avoids, among which may be named the following: the cost and use of two machines; the loss of time in transferring every blank from the printing-press to the creasing-machine; the need of accurately registering every blank similarly in both machines, in order to have the creases in the correct position and lines; the turning over of every blank before creasing it; the liability of soiling its already printed surface, both by the handling and by its contact with the bed of the creaser; the impossibility of printing in black or other color the creasing-line, so that it would appear on the previously-printed surface, and where only it is needed; the production of the swell or ridge on the wrong side of the paper for affording the best condition for the subsequent bending.

Now, in practicing my invention, I, by the same act and in the same press, give not only the required imprint of the business-card, &c., but also indicate and print, so that they shall be distinctly visible to the eye, the predetermined lines at which the blank is to be folded to form the angles or edges of the completed box, and also, by the same act and by the same press, make the desired grooves or creases on the printed side of the paper to facilitate the after-folding, the ridges or swells thus being, as they should be, on the under or non-printed side of the paper, so as to come upon the inside of the completed box.

A reason why the comparatively thick Manila paper should have its groove or crease on its outer or printed side, so that it may be bent against the ridge instead of against the groove, (aside from the advantages heretofore named,) is as follows: When bent against the groove—that is, so as to bring the groove at the inside of the right angle formed by two sides of the box—the inclined faces of the groove, forming, as they usually do, less than a right angle with each other, come into con-

tact and are forced against each other long before the paper becomes bent to the requisite right angle, and the consequence is a severe strain on the outer face of the paper at the ridge or angle; and if the paper be quite thick, or the bending be quickly or abruptly done, it is apt to be ruptured. When, on the other hand, the paper is bent against the ridge, and with the crease on the outside, the effect of the bending is simply to open the crease wider without any strain upon the fibers or texture of the paper, the action being very similar to the opening of the leaves of a book-cover toward its back.

The means by which I produce the above important and economical results are as follows: I arrange in the printer's "form" "rules" on all the lines where the bends are to be made to form the box, such rules being expressly made of sufficient breadth to project slightly above the face of the type, so as to insure a positive and predetermined groove or crease in the blank being printed, such creases or grooves indicating the lines where the angles or bends are to be afterward made, and serving to facilitate and make accurate the subsequent bending, and, being inked, these peculiar rules, at the same time that they form grooves, also print lines in these very grooves.

To illustrate: In printing and creasing a box-blank of the form shown in the drawing, I first construct a form in which the rules are arranged indicating all the lines on which the bends are to be made—say, lines 1 1, 2 2, 2 3, 4 4, 5 5, 6 6, 7 7, and 8 8—these lines being shown in the drawings in Fig. 1 in heavy lines; and I find it very convenient, though not absolutely necessary, to solder or connect together these rules, so that they may be permanent and always ready for use, simply requiring the setting up of the type or of the electrotype within them, the type, as above stated, not reaching quite as high as the rules; or an electrotype can be taken of the entire form of projecting rules and type, and the whole be always ready without any change whatever. Such form, so constructed, being locked up in the chase and set in the press and pressure applied, prints the folding lines, creases the same lines, and creases them on the printed side, all as will be self-evident, at one operation, requiring no subsequent machine or operation, and no skillful workman, no nice manipulation or careful adjustments, and no expense, to produce the printed and creased folding-lines. The operation is simple and the economy and result complete. The platen is provided with a semi-soft or compressible material, so that the rules may sink slightly into such material, and permit the type to do their proper duty of printing, notwithstanding their surface is slightly lower than the rules.

The character of the depressions or grooves formed by this operation in the Manila paper is illustrated on a large scale in Fig. 3, in which *a* shows the grooves on the printed or outer side of the blank, and *b* the corresponding ridges on that side, which becomes the inner side of the completed box. In this figure, *c* shows the position assumed by the groove and the ridge when the blank is bent to a right angle, as in forming the box, from which it will be seen that not only must the printed lines at the angles come on the outside of the box to ornament or finish it, but that the bend is made in the easiest and most fitting direction—viz., away from the open groove and toward the bulging ridge or swell. Fig. 4 shows the natural effect of bending a thick paper in the wrong direction—viz., against the groove—tending to strain and weaken or to rupture it; and such bending (with my prepared blanks) would hide within the box all the printed lines and other printed matter. In this figure, *d* shows how the sides of the groove tend to obstruct the bending to a right angle, and *e* indicates where and how the paper is apt to be strained beyond its capacity, and hence to be ruptured along the line of bending.

I am aware that paper has been indented with teeth, or perforated, to facilitate tearing it apart, and that coarse straw-board or pasteboard has been partially severed to facilitate its bending; these, therefore, I do not claim. Nor do I claim the printing of paper on one side and creasing it on its opposite side; nor the bending of paper in a direction against a crease or groove formed therein. I do not herein claim any improvement in the art of making coupon-tickets or similar articles, or in the manufacture of envelopes, intending to limit myself in this application to my improvement in thick-paper boxes, and to my new method of producing the same.

I claim—

A Manila or equivalent paper box-blank, printed and creased on the same side of the blank, and having printed lines in the depressions or creases, which indicate and facilitate the lines for bending, and also give a finish to the bended edges, all substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 2d day of February, 1876.

EDWARD DE F. SHELTON.

Witnesses:

THADDEUS G. BIRDSEYE,

THOS. S. BIRDSEYE.