

(No Model.)

5 Sheets—Sheet 1.

D. APPEL.
SQUARE BOTTOM PAPER BAG.

No. 590,559.

Patented Sept. 28, 1897.

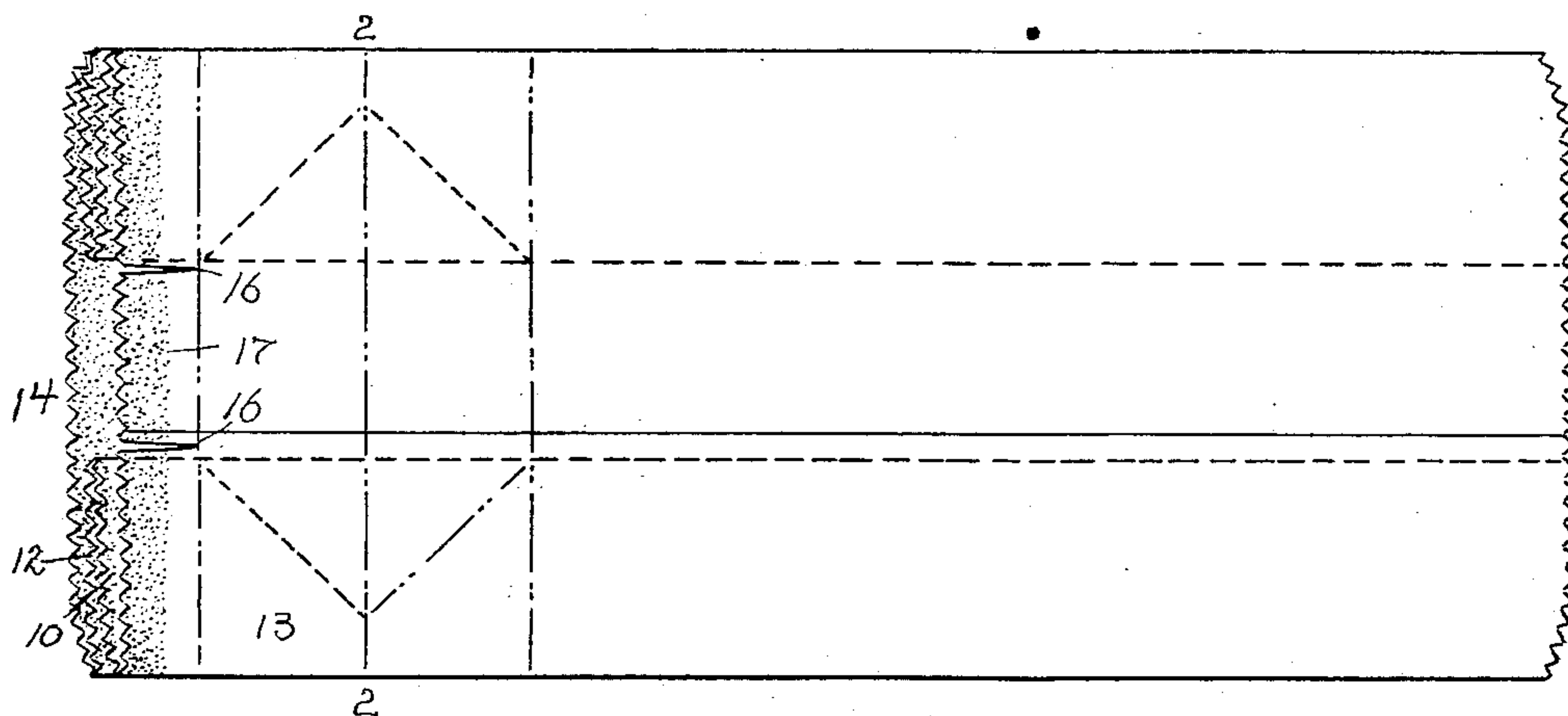


FIG. 1.

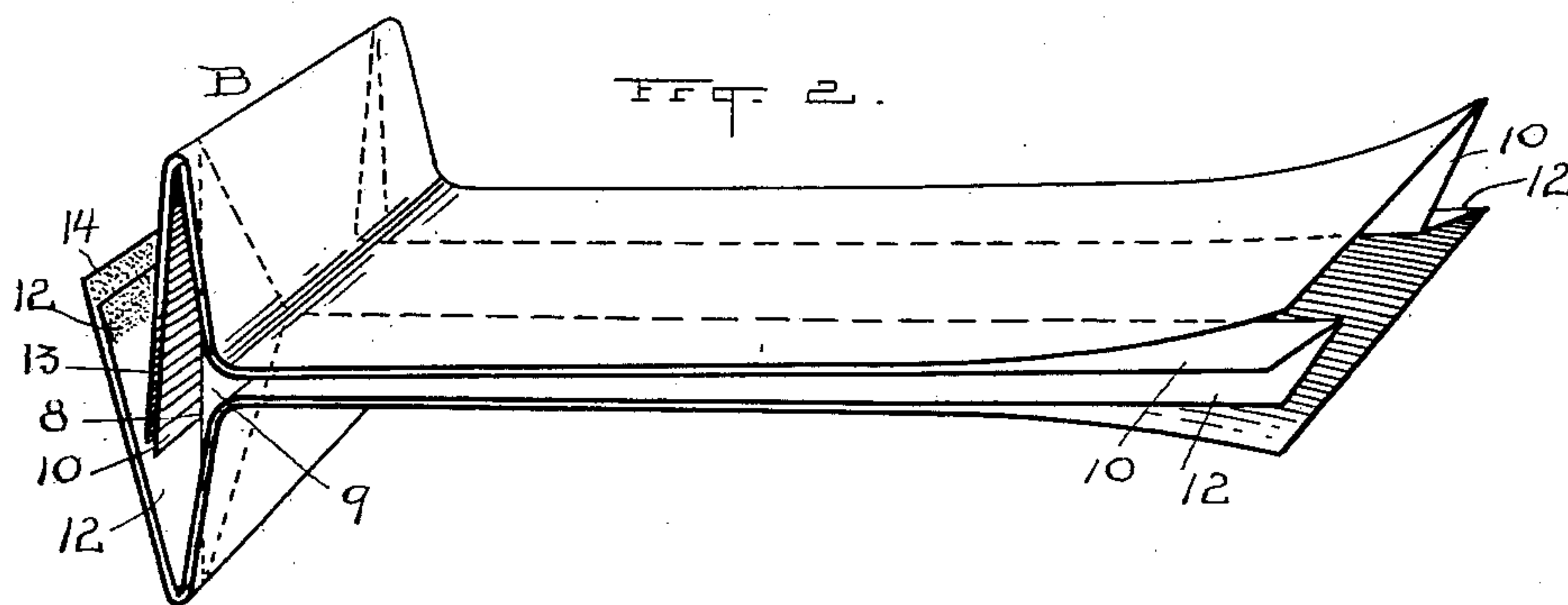


FIG. 2.

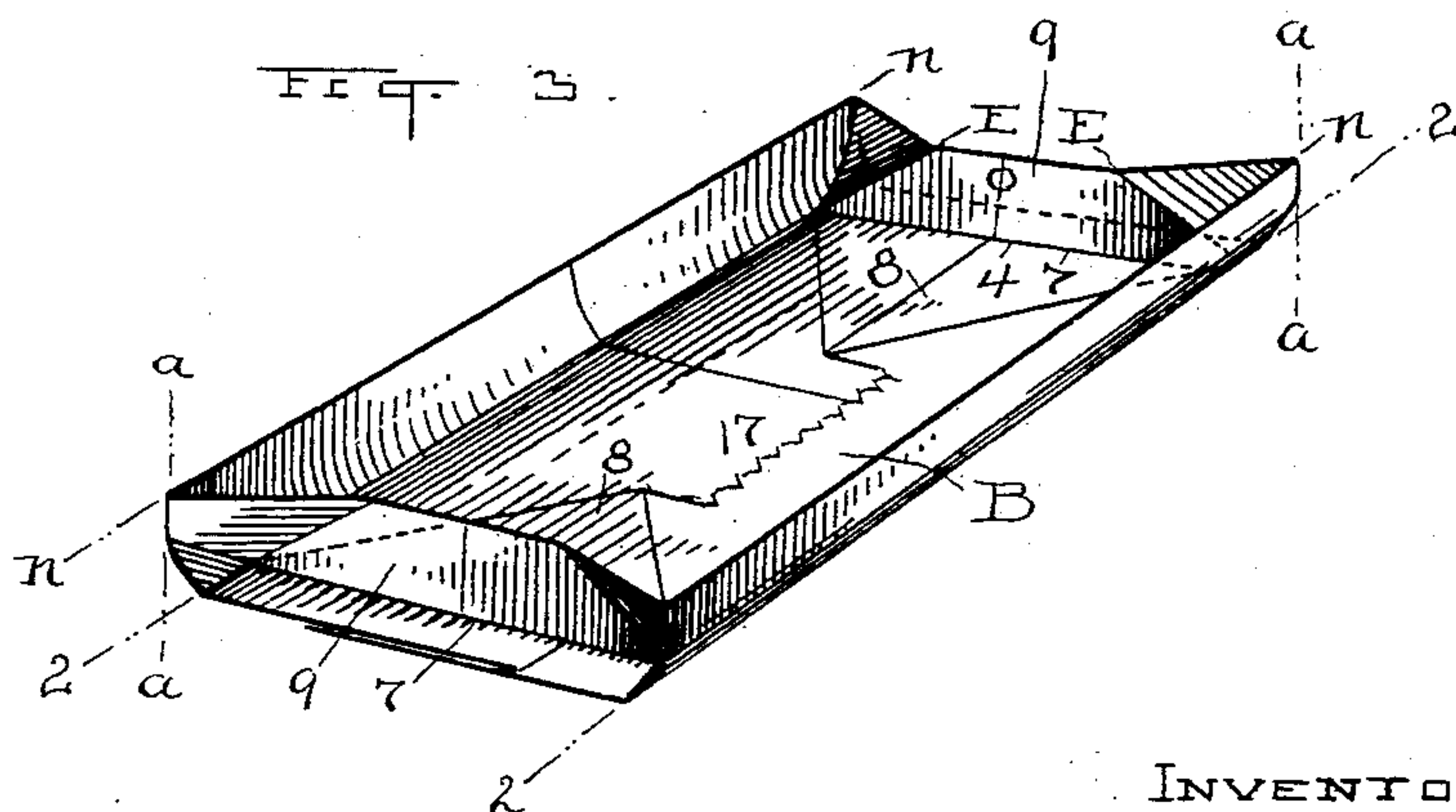


FIG. 3.

ATTEST

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FIG. 4.

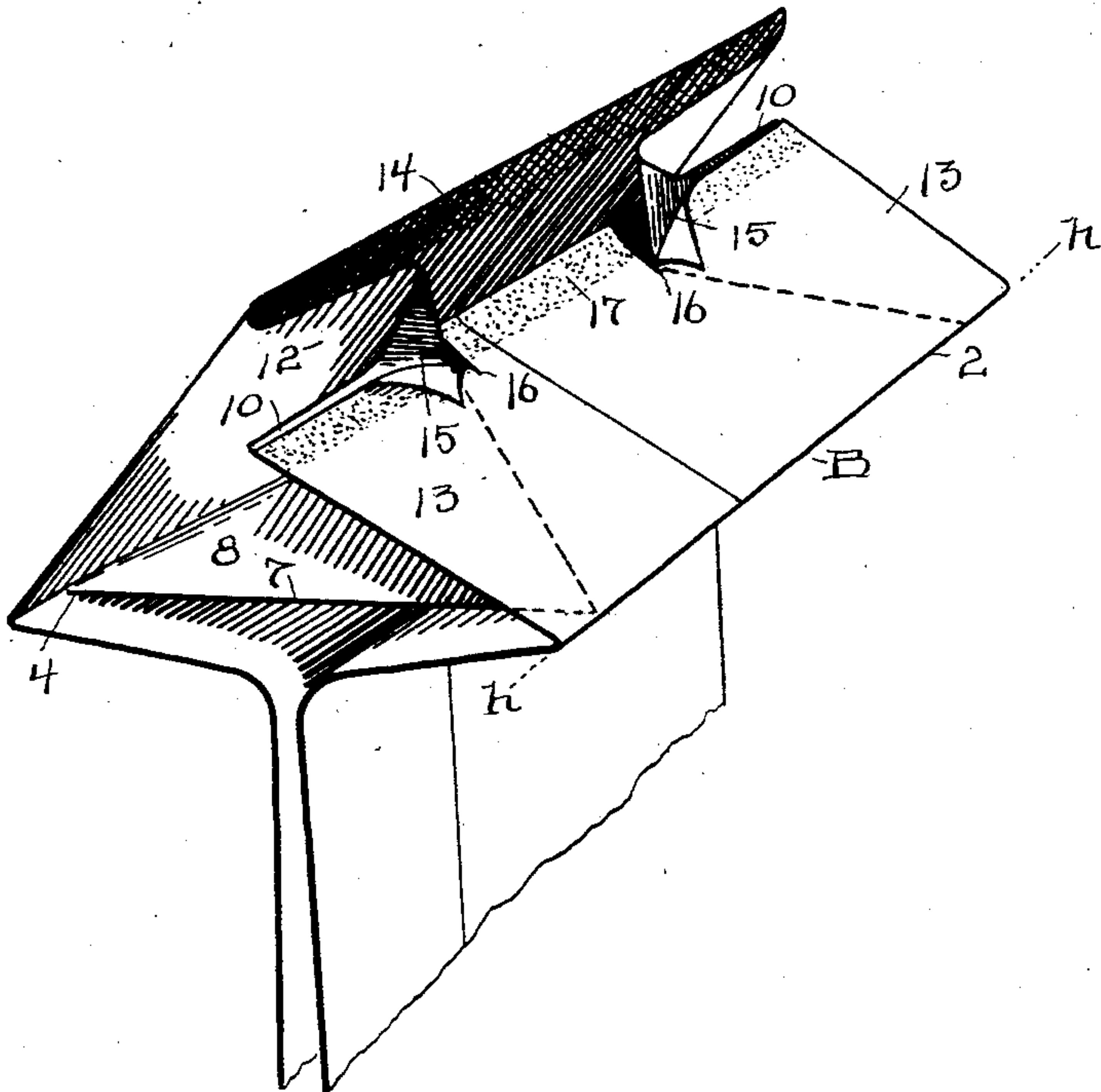
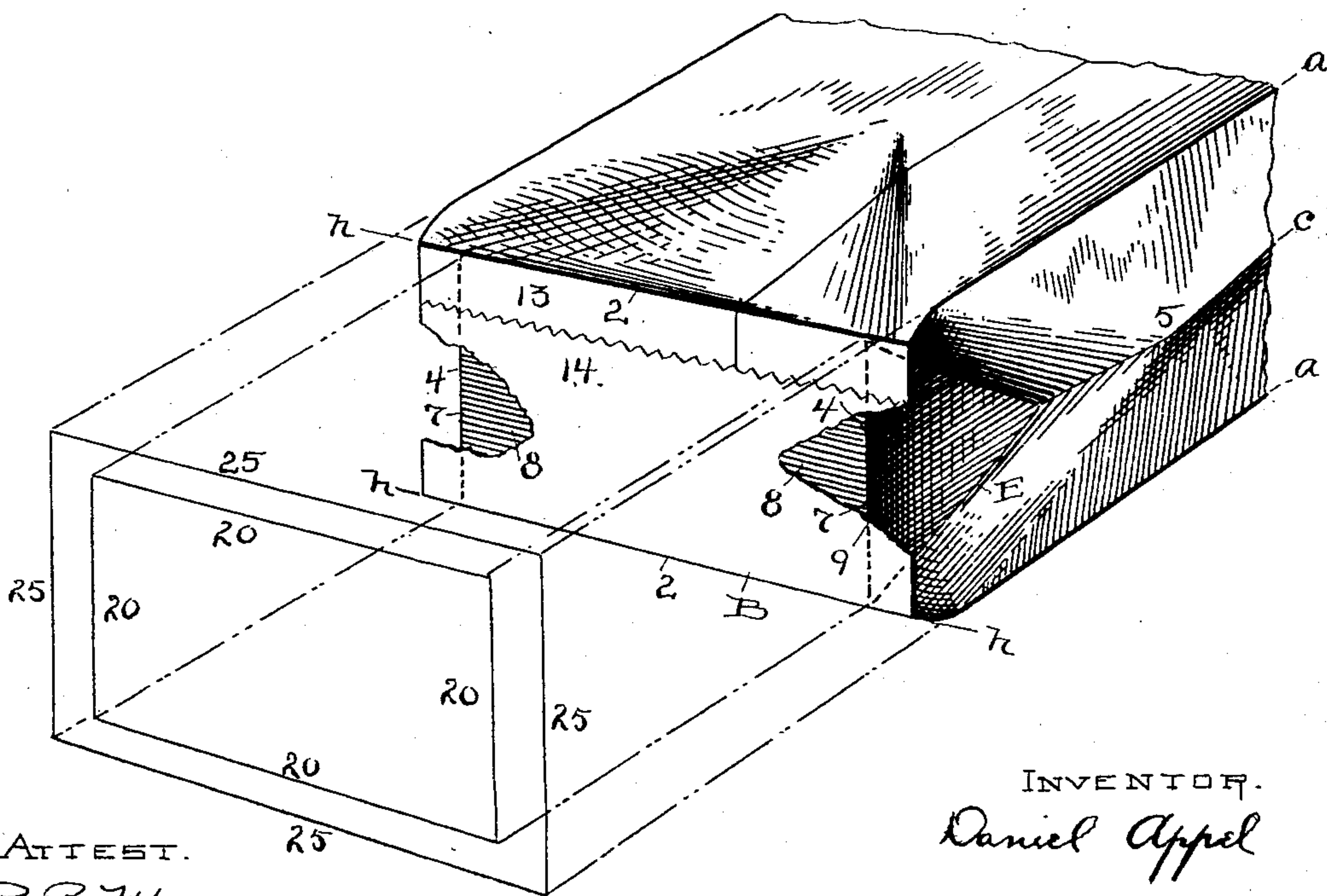


FIG. 14.



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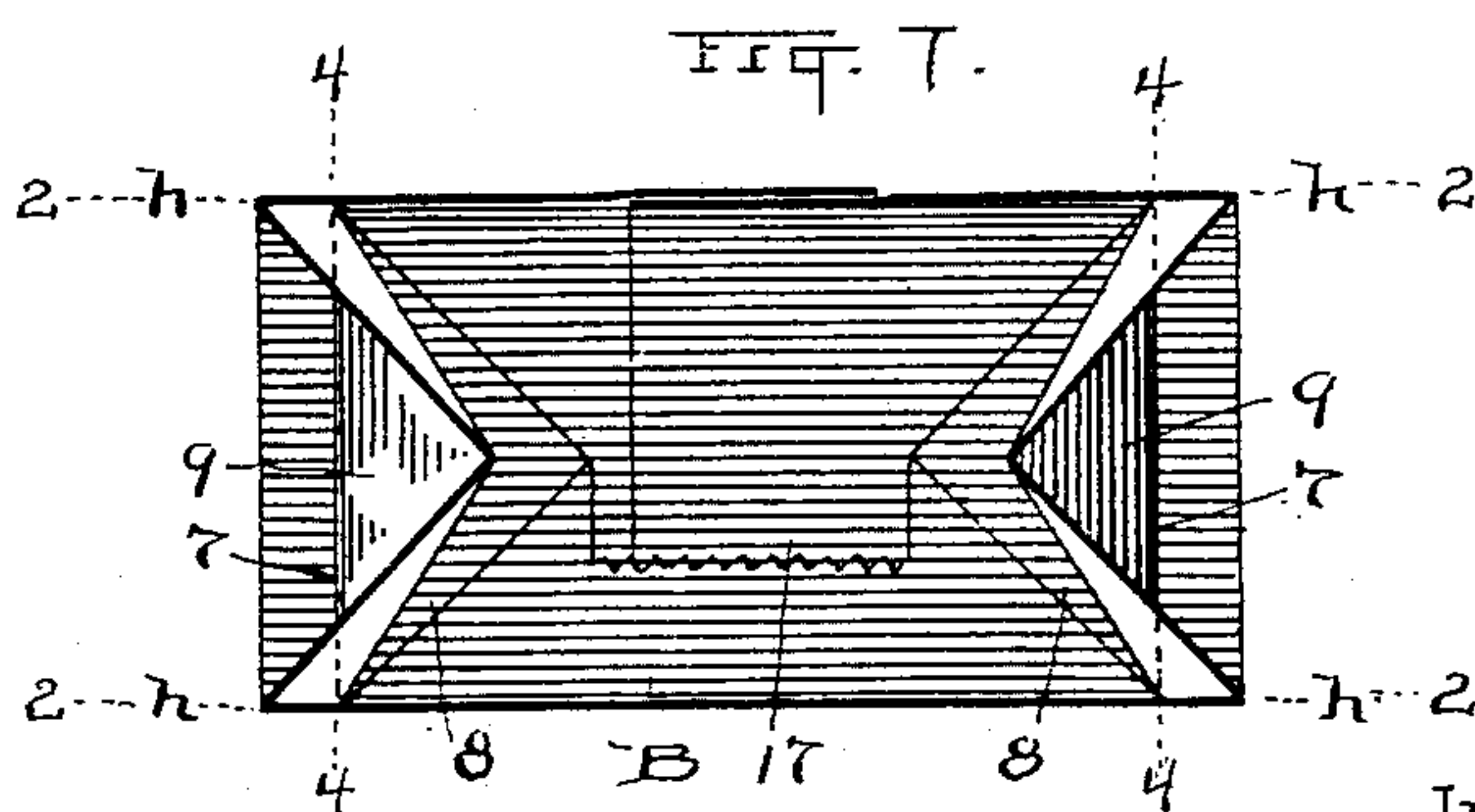
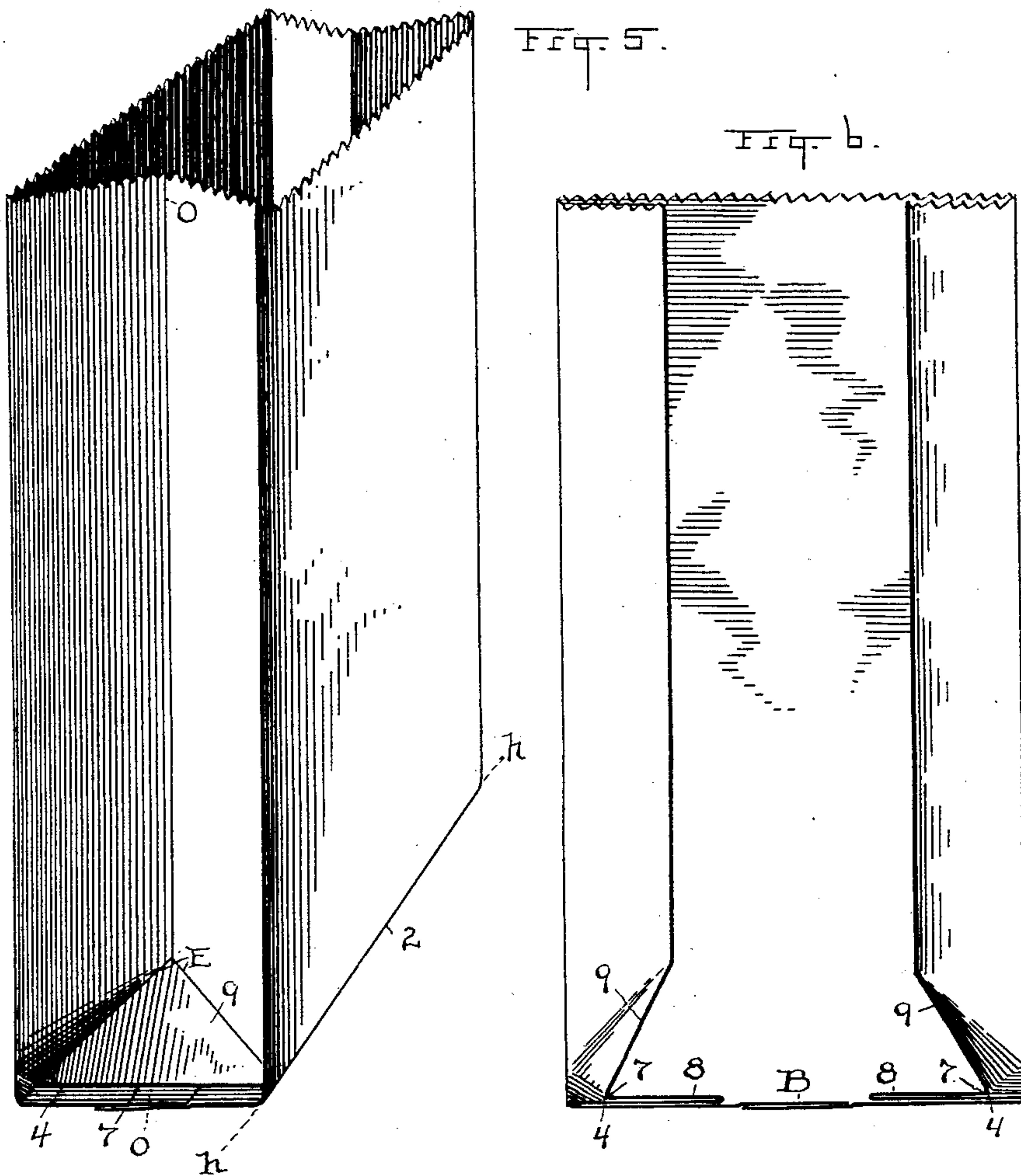
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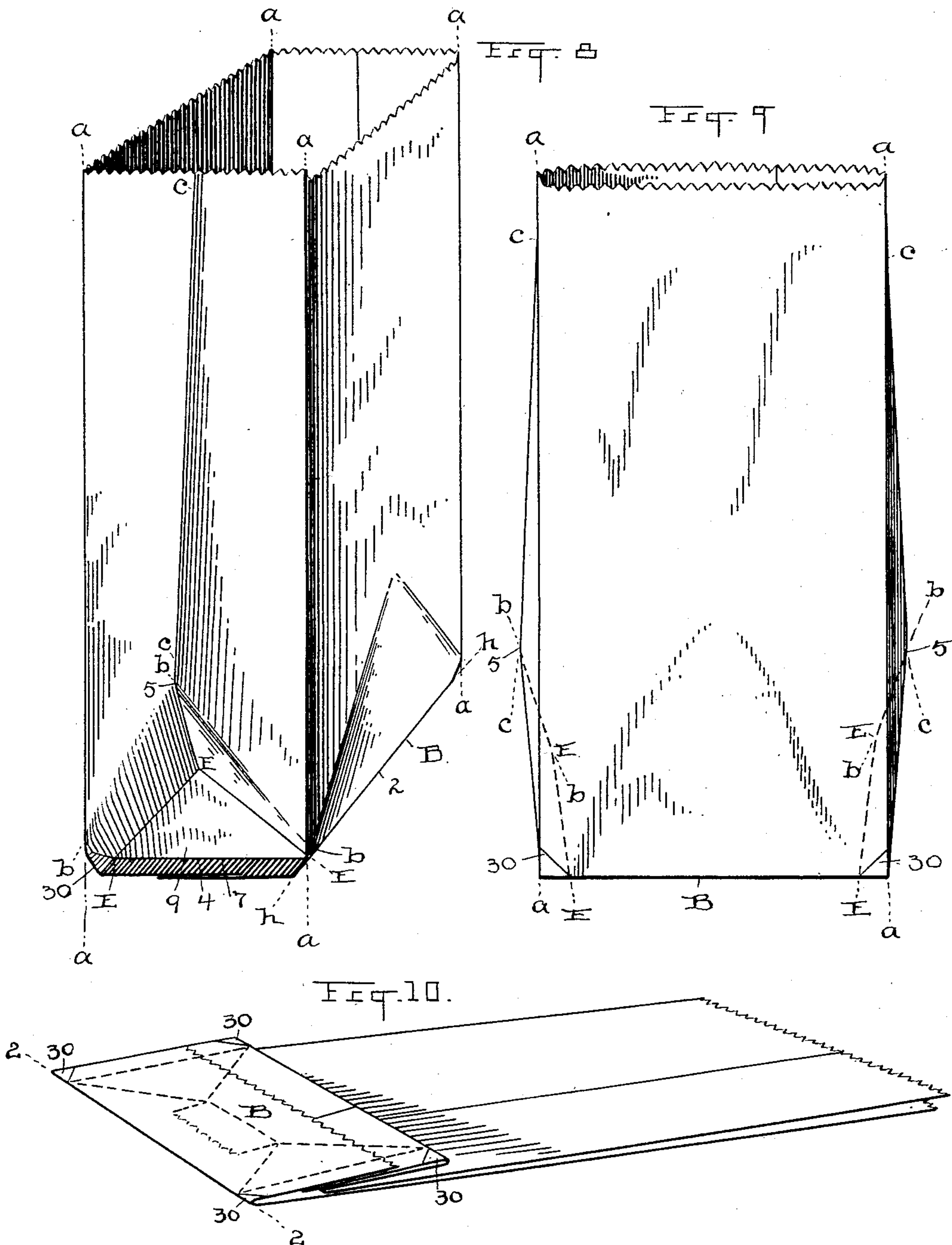
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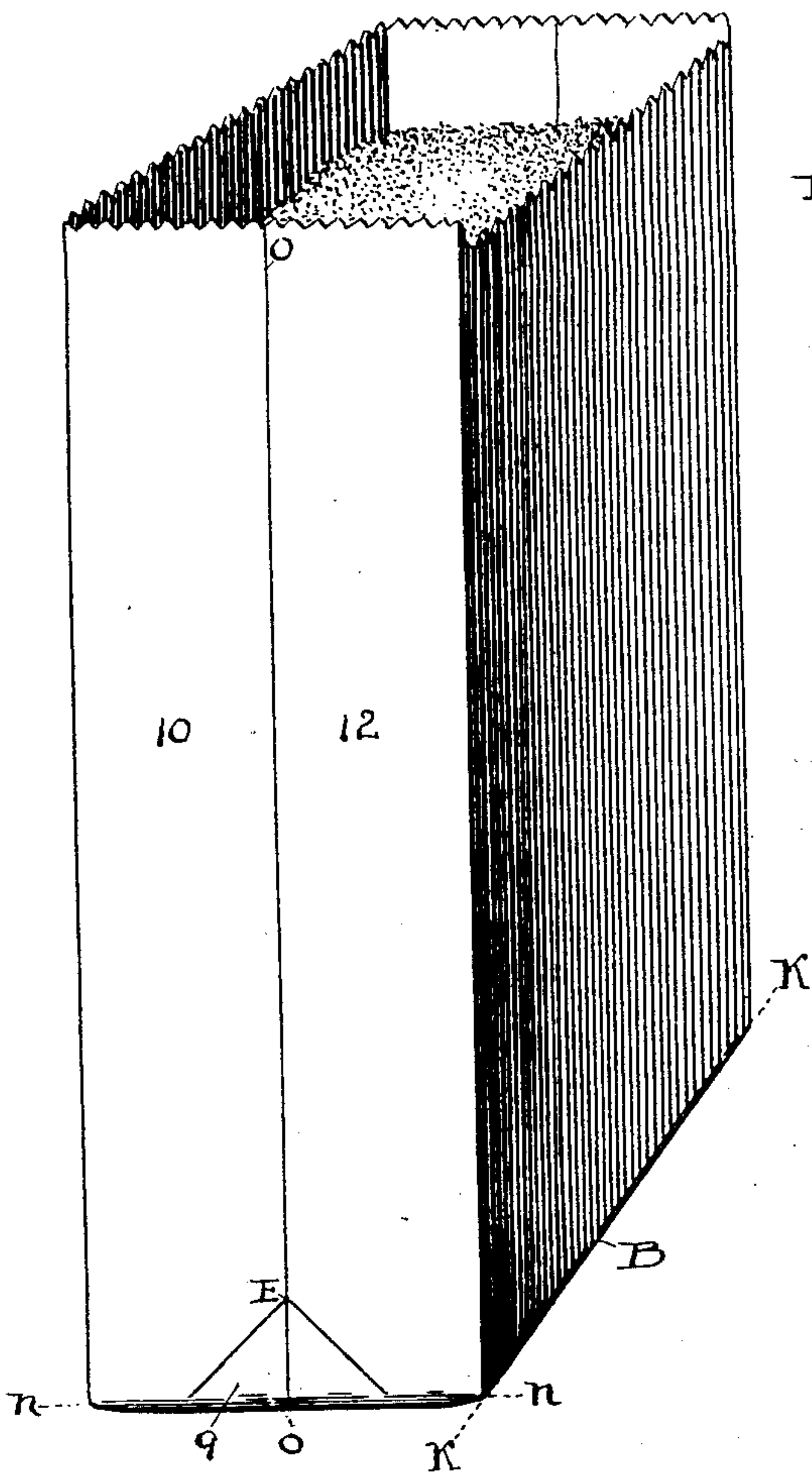


Fig. 11.

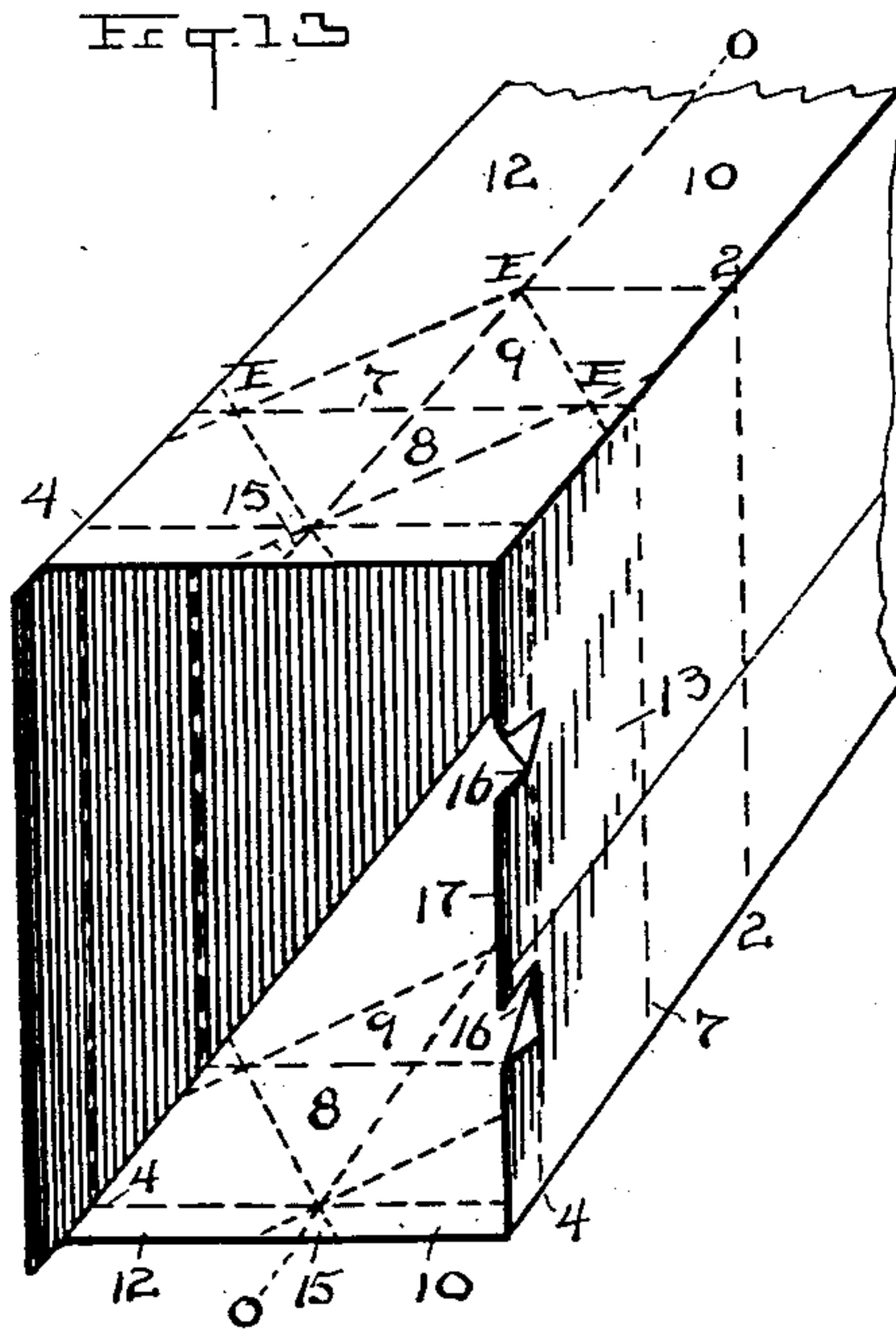
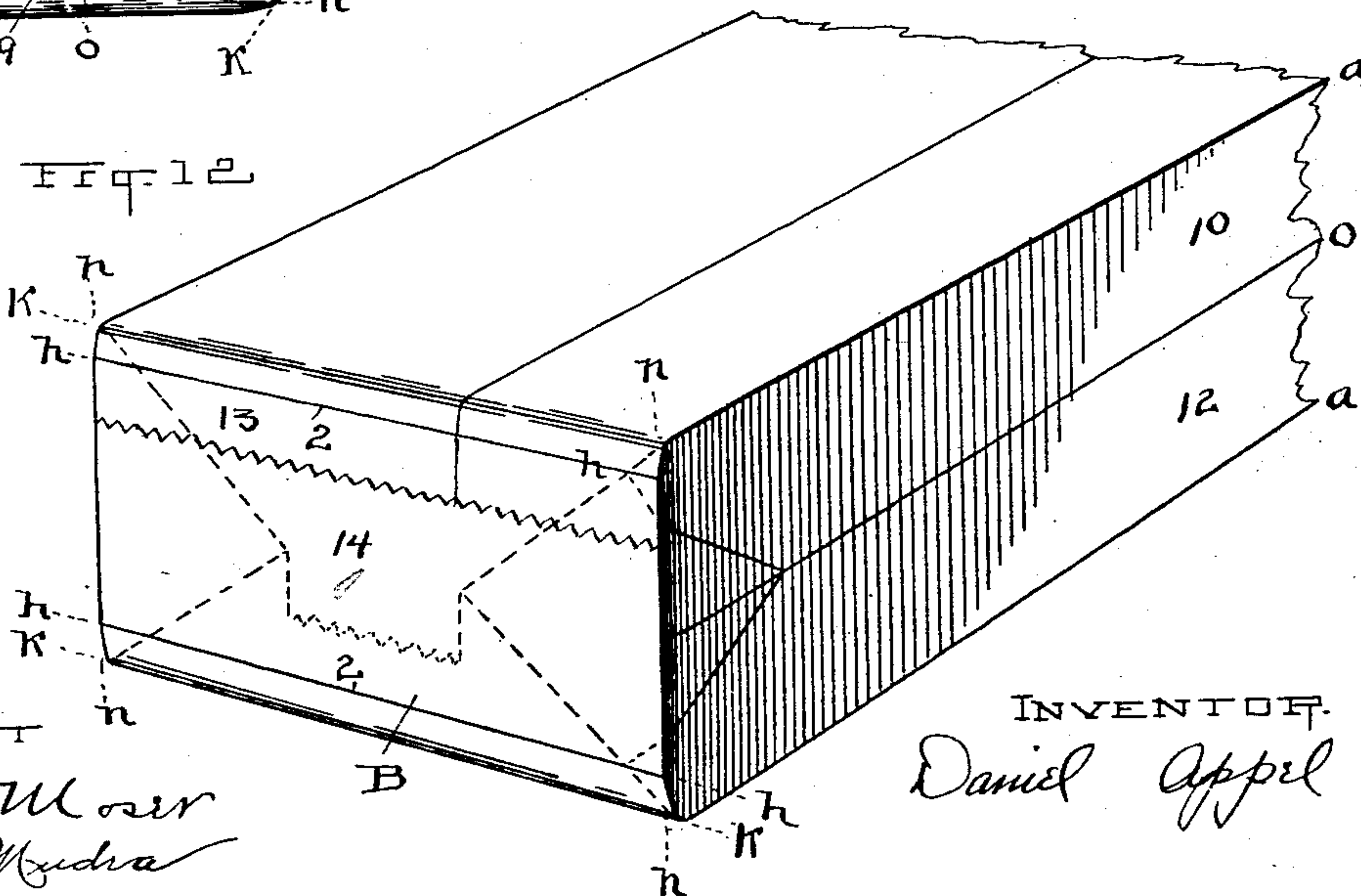


Fig. 13.

Fig. 12.



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UNITED STATES PATENT OFFICE.

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SQUARE-BOTTOM PAPER BAG.

SPECIFICATION forming part of Letters Patent No. 590,559, dated September 28, 1897.

Application filed June 19, 1896. Serial No. 596,121. (No model.)

To all whom it may concern:

Be it known that I, DANIEL APPEL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Square-Bottom Paper Bags; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to square-bottom paper bags; and the invention consists in a paper bag having a temporary square bottom formed on lines that vanish when the bag is filled and the bottom thereby developed to its full size and in which the plicated sides are folded transversely to the plies at some distance inward from their edge, so that when the bag is opened by a dip of air the plicated sides will bulge out and develop diagonal braces which will keep the bag distended from bottom to top and make it especially convenient for filling, substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plain side elevation of a section of paper tube or blank from which the bag is made. Fig. 2 is a perspective view of the bag with the near edges cut away longitudinally and the bottom shown as it may appear in the process of folding, and showing the relations of the plies and sides at this stage of the process. Fig. 3 is a perspective view of the bottom of a bag, looking inside, and serving especially to show the inside folds, as well as the recess in the bottom and plicated side, the body of the bag being removed to afford this view. Fig. 4 is a perspective view of the bottom of the bag, showing how the side plies are folded and turned over the short lap of the bottom as the bottom is being produced and also the transverse fold of the plies in the recess back from the edge of the bag. Figs. 5 and 6 are perspective elevations of a semidistended or opened bag; and Fig. 7, a plan view thereof, illustrating the perfect parallelism of the sides in the opened bag. Fig. 8 is a perspective view, and Fig. 9 is a plain broad-side elevation, of a bag in a fully-opened condition preparatory to being filled, and illustrating not only the parallelism on

its sides, but also the primary and the induced brace-lines proceeding out of the bottom and serving to maintain this position and to keep the bag from collapsing. Fig. 10 is a perspective view of a finished bag folded as for shipping. Fig. 11 is a perspective view of the bag as it appears when filled. In this view it will be seen that the temporary bottom-lines shown in the other figures have all disappeared and that the filled-in material has developed the bottom on entirely new lines parallel with its sides. Fig. 12 is a perspective view of the bottom of the bag when it is developed on the new or filled lines seen in Fig. 11. Fig. 13 is a perspective view of a bag-tube having its bottom-stock unfolded to show the lines of fold. Fig. 14 is a perspective view of the bag, showing the proportions of the temporary and finished bottoms, as hereinafter described.

The bottom B of the bag as thus shown has several novel features of construction—thus, for example, in the matter of the outlines of the bottom, as seen, for example, in Figs. 5, 6, and 7, where all the boundary-lines 2 2 and 4 4 of the bottom as originally developed are only temporary lines and compass, say, about four-fifths of the area of the full bottom when the bag is filled. These lines 2 2 and 4 4 are the manufactured lines which define the limits of the bottom as it enters the hands of the consumer, but the said lines vanish and are merged in the bottom on all four sides when the material which fills the bag develops the bottom on its true lines and rectangular with the square of the body of the bag, as appears in Figs. 11 and 12, and which is the bottom proper of the completed bag. This partial or unfinished development of the bottom in the manufacture of the bag is, however, purposely contemplated in order that other points of material advantage in the manufacture and opening of the bag may be attained. Having reference now to the latter advantage, attention is called to Figs. 8 and 9, where the bag is shown as fully opened for filling. Here it will be seen that the corners *a a* from top to bottom are perfectly parallel and that all four sides are fully distended, while the bag is in condition to stand alone, box-like, on its flat bottom B. It will also be seen that the plicated sides are abnormally bulged or dis-

tended at 5 and that two divergent lines meet at this point, the lower one *b b* extending diagonally over the exposed surface of the ply and apparently losing itself behind the edge of the bag, Fig. 8, and the other line *c c* extending from point 5 substantially to the top of the bag, where it is gradually lost. Now these lines are not distinct marks on the bag, but represent rather the swells which are induced and rendered possible by the distinct angle-lines *E E* lower down, and which converge from the transverse fold or rib 7 on each plicated side to the center line of the plies and for the time being are the true but temporary boundary-lines of the bottom B at these sides. Thus are defined the means on which I rely to hold the bag fully open after a dip of air, and the induced swells of the sides having their focal point at 5 operate as stiff braces which not only spread the sides of the bag to its full rectangular outlines, as seen in Fig. 8, but hold the sides in that position and relation preparatory to filling and without other means to keep the bag from collapsing.

Referring now to Fig. 9, it will be seen more clearly how these brace-lines are originated and induced. First of all we have the distinct crease-lines *E E*, which are permanent fold-lines of the plies into the bottom, and by reason of their starting from the ends of the transverse bottom rib 7, which is back from the outer edges of the bag by about one-fourth the depth of the plies, it follows when the bag is dipped and thrown open that the said lines *E E* are carried out at their top to the diagonal position seen in dotted lines *E E*, Fig. 9. Then because these lines *E E* are shortened by being caught back in the recess by the ends of rib 7 there is naturally induced the secondary line *b b* higher up, because here the stock is free to come out to what will ultimately become the bottom fold-line of the filled bag. These secondary lines are supported by the primary ones *E E*, forming a bracing-angle, and then there is that further upwardly-extending swell which carries its laterally-bracing effect clear into the open mouth of the bag. Thus by reason of retiring the side rib 7 within the sides, as shown, and limiting the bottom to this inner boundary to begin with I am enabled to utilize the plies of the bag from bottom to top to hold the bag open for filling, as seen in Figs. 8 and 9. When the bag is thus opened, it will be further seen in these figures that the rib 7 remains as a present factor in the structure and that the broad sides of the bag also are contracted thereby at the bottom on both sides to the depth of the rib in the recess, and the bag shows a somewhat rounded surface above the transverse crease-lines *h h*, which are coincident with the ends of rib 7. These lines *h h* and the ribs 7 at the plicated sides define the outline of the temporary bottom hereinbefore described, and both said lines and ribs disappear and are taken up in the

bottom B and wholly new bottom lines form on all four sides, as indicated by *k k* and *n n*, Fig. 11, when this bag is being filled, and which then become the edges of the finished bag for use.

Several details of construction enter into the production of the bag in addition to those already described which are of importance. Thus, referring to Fig. 3, it will be seen that on each plicated side of the bag there is a triangular fold 8, which has its base in the transverse rib 7. This triangle is in fact a double triangle having the median fold-line *o o* of the plies through its center and being formed one-half from each of the side plies. The counterpart thereof is seen in the triangle 9, Fig. 8, which works into both the bottom and side of the bag when the bag is opened. These two triangles develop in the form of a square when the bag is made and practically determine the construction of the bottom. The opposite sides 10 and 12 of the plies corresponding to the triangle 8 are folded into the bottom with the laps 13 and 14 over triangle 8, after the manner seen in Fig. 2, where the edge of the bag is cut away to clearly disclose these parts. In making this fold at the junction of the plies and angles described a short triangular turn is given to the stock where the plies meet, as seen at 15, Figs. 4 and 13, whereby the inner ply 10 is turned down with short lap 13 and the outer ply 12 is brought across lap 13 through the slit 16 and folded down with long lap 14 on top. This brings the short lap 13 between the two outside plies in the bottom, while the long lap 14 is folded and pasted over all on the opposite side of the bottom, as seen in Figs. 10 and 12.

The slits 16 are made just inside of the inner or median lines *o o* of the plies, and the material at the outer side thereof is turned under the overlapping triangle 15, whereby the parts are lapped across each other and thereby contribute materially to the strengthening of the bottom to make a perfect seal of the bottom. Between these slits a tongue 17 is developed which forms a part of the short lap 13 and is projected to the opposite side of the bottom from lap 14 when the bottom is folded, as shown.

The bag is pasted in the blank either when it is open, as seen in Fig. 1, or at a subsequent period in the manufacture, and the paste is applied to the lips or laps of the bottom along the edges, as shown in Fig. 4.

If the bag were made with plies of relatively less depth than here shown, the back fold to produce rib 7 and the recess in which it rests would be proportionately greater in said plies.

It will be noticed that in folding the bottom the tongue 17 extends beneath and is pasted to the under side of the lap 14, while lap 14 pastes on the opposite side of the bottom over or upon the short side or lap 13, and the stock outside of the slits 16 pastes under the ply 12.

Fig. 14 shows the sizes of the temporary and

the finished bottoms, respectively, by contrast on the projected lines 20 and 25. Here it will be clearly seen that the manufactured bottom is very materially contracted as compared with the ultimate finished and full bottom of the filled bag, and this contraction is the result of the recessed ribs 7, which draw in the broad sides directly at the bottom to the depth of the ribs in the bottom. This contraction of the bottom furthermore induces brace-lines on the broad side of the bag corresponding to the induced braces on the plicated sides and extending up over said broad sides in such way as to spread and hold them to the full flat parallel forms shown in Figs. 8 and 9. As already stated, the lines 20 totally disappear and are flattened out in the bottom when the bag is filled and developed to lines 25.

A further feature of improvement is the creasing of the corners 30 of the bag at an angle to the sides, as seen in Fig. 10. This crease-line runs from the temporary bottom corners on line 20 to the points which form the corners or angles of the lines 25, and thus not only helps to fix and determine those corners when the bottom develops in filling, but prevents any fine or granulated material creeping into those corners and embarrassing the symmetrical development of the corners of the bottom.

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

1. A paper bag substantially as described, having a rib transversely of its side plies in the bottom of the bag inward from the edge thereof and diagonal brace-lines from the ends of this rib to the center of the plies, substantially as described.

2. The bag described, having a rib at its bottom on each plicated side back from the edge proper of the bottom and shorter than the said edge, and converging brace-lines between the ends of said ribs terminating in the center of the plies, substantially as described.

3. A paper bag having temporary folding bottom lines on its four sides over which the four sides of the bag spread and unfold the bottom on new lines parallel with the square of the bag when the bag is filled, substantially as described.

4. A square-bottom bag having the broad

sides of the bottom folded one across the other in opposite directions and one of the plicated side plies at each side folded in between said broad sides, substantially as described.

5. The bag having the under lap of the bottom slitted and the plies of each side turned to substantially a triangle at their juncture and folded through said slits over the under lap, and the outer lap folded over all, substantially as described.

6. The bag-bottom described having its shorter lap at the bottom slitted from the intersection of the side plies, and the said side plies turned to a substantially triangular shape at their intersection and folded back through said slits, and the longer lap folded and pasted over all, substantially as described.

7. In paper bags, a bag having a square bottom formed on temporary lines across the broad sides of the bottom and the plies on both sides folded to form ribs retired about one-fourth the depth of the plies from the edge of the bag, whereby temporary unfolding-lines are produced on all sides of the bag, substantially as described.

8. A paper bag having a temporary flat square bottom of less dimensions than the square of the bag in cross-section, and transverse ribs in the plicated sides contracting the four sides of the bottom on temporary lines, substantially as described.

9. In square-bottom paper bags, a bag having a temporarily-formed bottom of less size than the full bag in cross-section, and having the corners of said temporary bottom creased at an angle to its sides, whereby the opening of the bottom on full lines is facilitated, substantially as described.

10. A paper bag having outside ribs at its bottom extending transversely across the plicated sides thereof and retired from the outer edge of the bag, substantially as described.

Witness my hand to the foregoing specification this 15th day of June, 1896.

DANIEL APPEL.

Witnesses:

H. F. FISHER,
R. B. MOSER.