

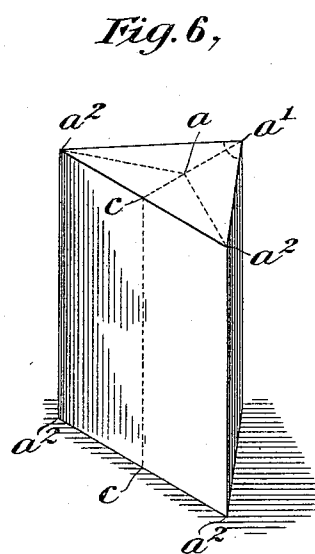
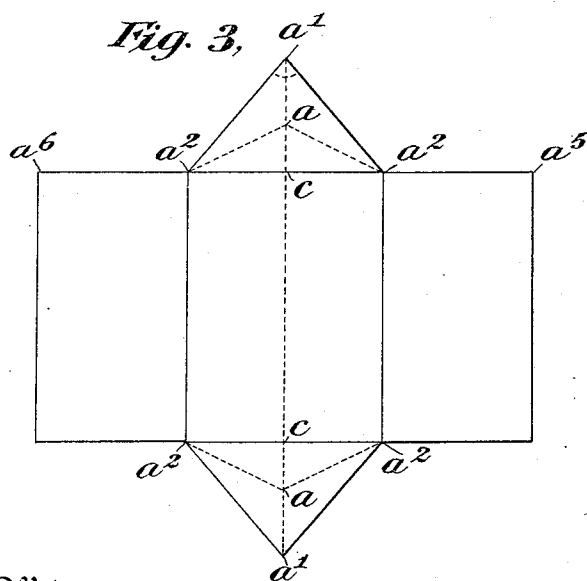
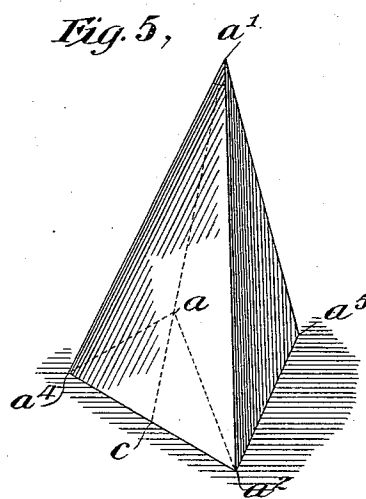
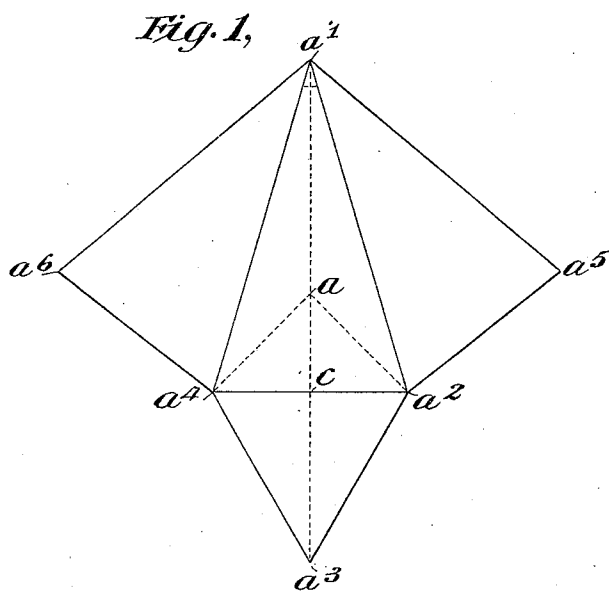
(No Model.)

3 Sheets—Sheet 1.

E. W. ROBERTS.  
FOLDING HOLLOW BODY.

No. 490,680.

Patented Jan. 31, 1893.



Witnesses  
*C. E. Ashley*  
*H. W. Lloyd.*

Inventor  
*Ellwood Walter Roberts*  
By his Attorney  
*William Parker Foulke*

(No Model.)

3 Sheets—Sheet 2.

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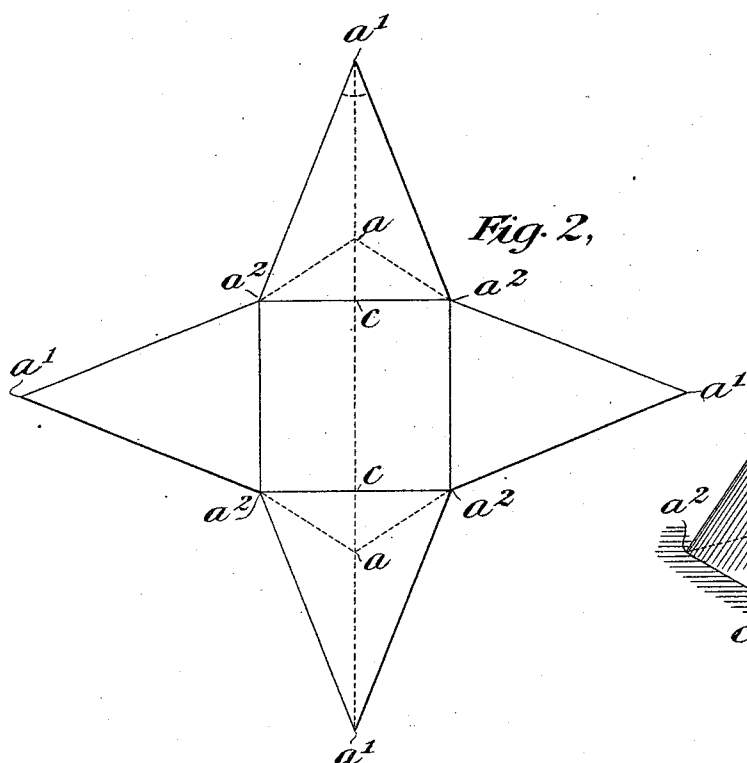


Fig. 2,

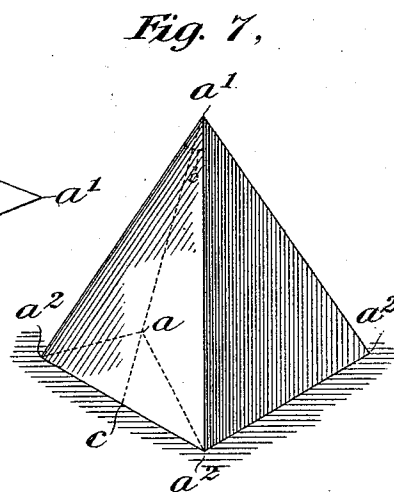


Fig. 7,

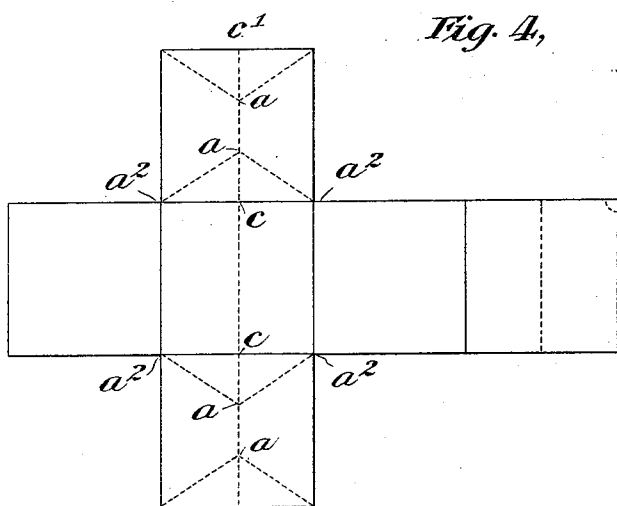


Fig. 4,

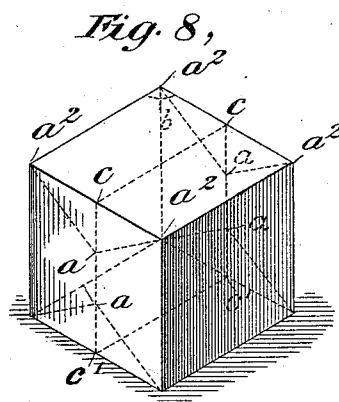


Fig. 8,

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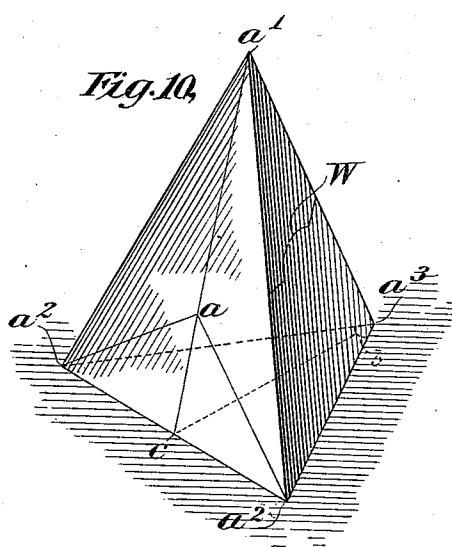
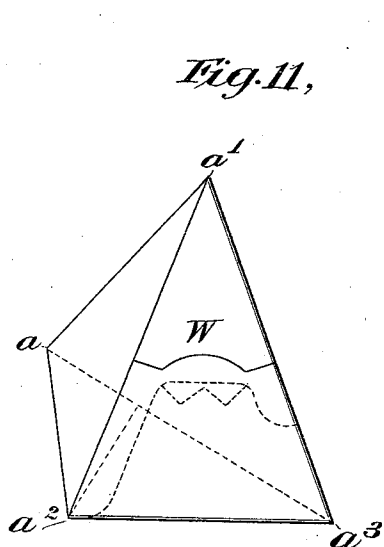
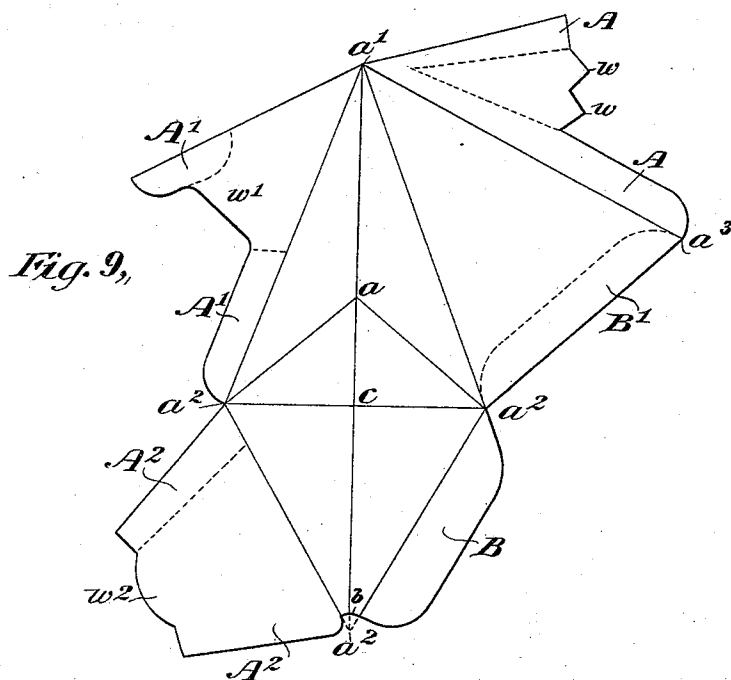
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# UNITED STATES PATENT OFFICE.

ELLWOOD WALTER ROBERTS, OF BROOKLYN, NEW YORK.

## FOLDING HOLLOW BODY.

SPECIFICATION forming part of Letters Patent No. 490,680, dated January 31, 1893.

Application filed February 5, 1892. Serial No. 420,419. (No model.)

*To all whom it may concern:*

Be it known that I, ELLWOOD WALTER ROBERTS, a citizen of the United States, and a resident of Brooklyn, Kings county, State of New York, have invented a new and useful Improvement in Folding Hollow Bodies, of which the following is a specification.

My invention relates to an improvement in folding hollow bodies, and the object is, primarily, to improve the construction of the coin receptacle provided with devices in its interior for preventing the egress of coins, described and claimed by me in Letters Patent of the United States No. 465,649, issued to me on the 22d day of December, 1891; and, secondarily, to provide a receptacle having such devices in its interior which may be folded for the purposes of packing and which will be cheap and easy to construct.

Now, I have discovered, that by constructing receptacles of the form hereinafter described, and in the manner indicated, out of one or more pieces of cardboard or other suitable material, or out of separate thin pieces of any other material cut in the precise shapes indicated, and by folding, or if made in separate pieces, by connecting with flexible strips, and attaching the folded or connected parts in the manner indicated, a receptacle will be formed which may be packed flat when not in use, and distended whenever it is to be used for receiving coins from time to time.

The invention will be best understood with reference to the accompanying three sheets of drawings, forming a part of this specification, in which

Figures 1, 2, 3 and 4 show the material cut to form a three sided pyramid, a four sided pyramid, a prism or wedge and a cube respectively. Figs. 5, 6, 7 and 8 show the completed receptacles, and Figs. 9, 10 and 11 show a three sided pyramidal receptacle provided with the interior coin-opening-protecting devices referred to in said patent, made pursuant to the hereindescribed method.

Similar letters refer to similar parts in Figs. 1 and 5. In the remaining views the similar parts are designated by the same letters.

When, for example, an ordinary three sided pyramid of card board or paper, is opened

and laid flat, a variety of groupings of the base and sides may be formed. Thus for instance the various faces may assume the position shown in Fig. 1, the base being attached to any one of the three sides, as for example, to the side  $a' a^2 a^4$ , or the sides may be grouped radially around the base, or one side may be grouped on one side of the base and one on another, and the third side may be attached to either one of the said sides. The same is true when any other form of receptacle is opened up. If now, a crease or fold be made on the line  $a' c$  the perpendicular of the face  $a' a^2 a^4$  or the face of any other side on which the base will abut when the receptacle is put together, and the same be extended on the line  $a^3 c$  of the base, which is the perpendicular of the base on the side abutting against the side already creased, and inclined auxiliary folds  $a a^2$  and  $a a^2$  from the perpendicular to the corners of the base be provided the pyramid when put together will assume the form shown in Fig. 5, and, provided that an air hole be provided at a convenient point, the line  $a^4 a^2$  may be pressed in at the point  $c$  by the finger and the material will bend in on the dotted lines  $a a^4$  and  $a a^2$  and the point  $a$  will be thrown outward by reason of the fact that the diagonal creases  $a a^2$  and  $a a^2$  fold outward and the pyramid will assume the folded form shown in Fig. 11.

Where it is desired to provide the pyramid with interior devices for protecting the coin opening, the card-board or material is cut in the precise form shown in Fig. 9, and bent upon the bottom lines  $a^2 a^2$ ,  $a^2 a^2 a^2 a^2$  of the base  $a^2 a^2 a^2$  and the lines  $a' c$  and  $a^2 c$  and the two interior lines  $a a^2$ ,  $a a^2$  of the face  $a' a^2$ , so that  $a^2 a' a^2$  and  $a^2 a' a^2$  represent two of the sides of the pyramid and  $a^2 a^3 a^2$  the base, while for the purposes of making an opening for receiving the coins, the third side  $a' a^3 a^2$  of the completed Fig. 10, is made as shown in two parts  $A a' a^3$  and  $a^2 A a^2$ . Where a simple opening in any face is used without interior protecting devices, the parts  $a' A a^2$  are dispensed with and the third side  $a' A a^3$  continued out to be of the same dimensions as the other faces.  $w w$  are teeth, which when

the pyramid is glued together, form the indentations upon the flap protecting the coin opening, while  $a' A' a^2$  is a strengthening or underlying face which may or may not be used, whereby  $w'$  and  $w^2$  form respectively the inner and outer walls of the coin opening W on the completed pyramid. The pasting surfaces are indicated by the capital letters and dotted lines on Fig. 9. If now, the piece of cardboard so cut and bent be glued together by pasting, the surfaces A A against the surfaces A' A', and the surfaces A<sup>2</sup> A<sup>2</sup> against the surfaces A A, and the pasting the surface B within and upon the surface B', a pyramid is formed provided with interior devices for protecting the coin opening of the general character shown in Fig. 10.

When the pyramid is pressed inward at the point  $c$  on the lines  $a^2 c$ ,  $c a^2$  and  $a' a c$ , Fig. 10, the pyramid will be found to fold up flat, the point  $a$  projecting outward at the left as shown in Fig. 11, and the two points  $a^2$  taking up a position immediately behind each other. At one point of the face  $a^2 a^2 a^2$  the material is cut away as shown so as to leave a small opening  $b$  when the pyramid is put together to permit the air being expelled and preventing it from bursting on being folded.

To open the pyramid when folded, the pyramid is grasped by the top, at the point  $a'$ , and the point  $a$  pushed inward so that the face  $a^2 a' a^2$  becomes flat; the triangular surface  $a^2 a^2 a^2$  will thereupon also become flat and serve as the base of the pyramid. The pyramid may be constructed of cardboard, stiff paper or other suitable material, or it may be made of thin pieces of wood or metal, each of which is cut in the particular form shown by the lines in Fig. 11 and connected together by strips of flexible material. The form and number of the teeth  $w w$  will vary from time to time as may be found convenient.

Any desired grouping of the sides of the pyramid when opened, may be employed, provided that when put together, the fold through the base is continuous with the central vertical fold passing through any one side.

The receptacle is not necessarily limited to the particular use above indicated, but may be used for any purpose for which it may be found adaptable, and if desired, it need not necessarily, be used as a receptacle. Thus for example it may be used as a folding form, for displaying a calendar, interest tables, or other similar printed matter. In fact it may be used for any purpose for which a "knock down" hollow body of the particular shapes indicated can be used, or may be available.

The method of folding hereinabove described may be applied to any form of receptacle, the base of which has not more than four sides and particularly to any one of the forms shown in Figs. 6, 7 and 8, by folding the same in the manner indicated by the dotted lines in those figures and in Figs. 3, 4 and 5, which show the forms opened up.  $a^2 a^2 a^2$

$a^2$  represent in each case the base and  $c c$  the governing fold which is in each case a straight line passing through the base and in any four-sided base there must be folds in each side adjacent to those sides of the base through which the governing fold passes. In the case of a cube, or a truncated form, this line is extended upward through the top of the hollow body and in a plane parallel with line made by it through the base, so making double folds at both top and bottom. In this case one fold will be formed at the top on each of the sides, through which the continuation of the governing line passes as will clearly appear by reference to the cube shaped receptacle shown in Fig. 8.

It will be obvious that the diverging diagonal folds  $a a^2$  and  $a a^2$  in the side  $a' a^2 a^2$ , Fig. 9, are an essential part of the construction, for if the same be absent the proper folding of the side containing the vertical fold, cannot be effected.

The diagonal folding lines in the side which folds in any form, may be transposed to the base of the particular form employed, and thereupon the point  $a$  will take a position in the base, and consequently fold out when the receptacle is folded, while the side containing the vertical fold will fold inward, so reversing the method of folding. The same will be the case in any form of receptacle where two or more folds have to be employed.

I claim as my invention:

1. As a new article of manufacture a sealed hollow body, of any one of the forms described provided with a suitable air opening, having a governing fold on the perpendicular of any one side, continued, in the same vertical plane, through the abutting side or sides, and auxiliary folds in either of said sides, each running from the perpendicular or the continuation thereof, to the corners of the nearest abutting side, substantially as described, whereby the hollow body may be folded flat.

2. As a new article of manufacture—a sealed hollow body of any one of the shapes described provided with a suitable air opening composed of a single piece of material, cut substantially as described and put together in the manner indicated, having a governing fold on the perpendicular of any one side, continued in the same vertical plane, through the abutting side or sides, and auxiliary folds in either of said sides, each running from the perpendicular or the continuation thereof to the corners of the nearest abutting side, substantially as described whereby the hollow body may be folded flat.

3. As a new article of manufacture a sealed hollow body of any one of the forms described, provided with a suitable air opening, having a governing fold on the perpendicular of any one side, continued in the same vertical plane, through the abutting side or sides, and auxiliary folds in either of said sides each running from the perpendicular or the con-

tinuation thereof to the corners of the nearest abutting side, substantially as described, and provided with one or more openings in the side walls for the reception of articles, the whole being arranged to fold flat.

5 In testimony that I claim the foregoing as my invention I have signed my name, in pres-

ence of two witnesses, this 30th day of January, 1892.

ELLWOOD WALTER ROBERTS.

Witnesses:

HARRY G. LAWTON,  
J. D. BROWN.