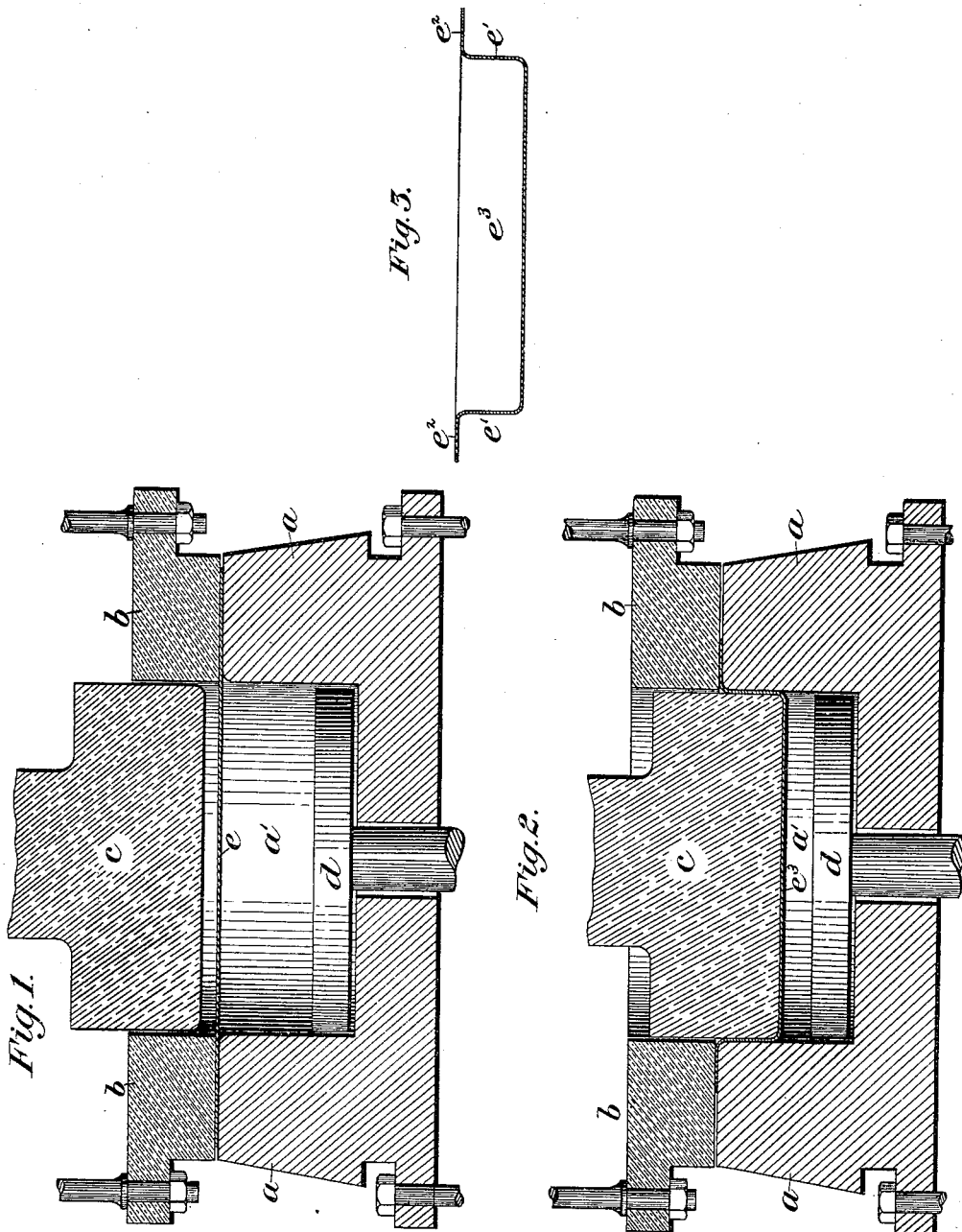


A. W. PAULL & G. F. BUTTERS.

DRAWING SHEET METAL ARTICLES.

No. 344,458.

Patented June 29, 1886.



Witnesses  
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Fig. 5.

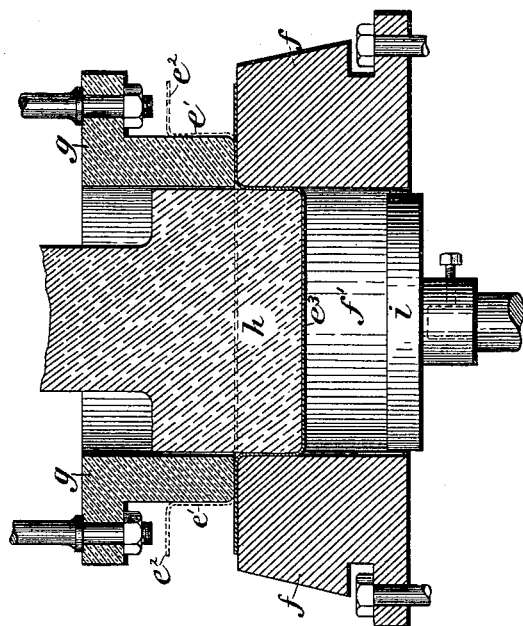


Fig. 7.

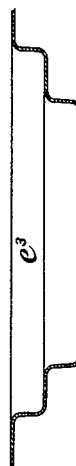


Fig. 4.

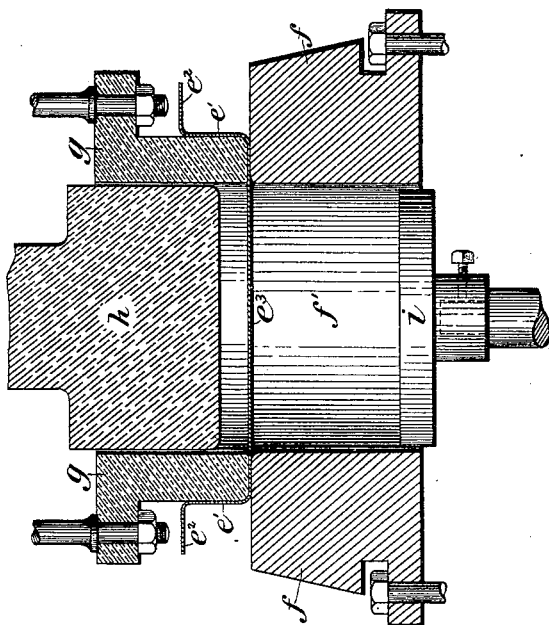
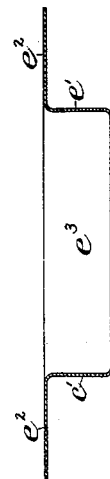


Fig. 6.



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# UNITED STATES PATENT OFFICE.

ARCHIBALD W. PAULL AND GEORGE F. BUTTERS, OF WHEELING, WEST VIRGINIA; SAID BUTTERS ASSIGNOR TO SAID PAULL.

## DRAWING SHEET-METAL ARTICLES.

SPECIFICATION forming part of Letters Patent No. 344,452, dated June 29, 1886.

Application filed April 23, 1886. Serial No. 199,903. (No model.)

*To all whom it may concern:*

Be it known that we, ARCHIBALD W. PAULL and GEORGE F. BUTTERS, of Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Improvement in Drawing Sheet-Metal Articles; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our present invention consists of an improved method of producing cup-shaped articles of sheet metal having a wide horizontal flange without seam or joint, by drawing the same from a flat blank or piece of sheet metal.

To enable others skilled in the art to make use of our invention, we will now describe it with reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the dies and plunger by which the first step of our improved method is effected. Fig. 2 is a view of the same dies and plunger at the completion of the first step of our improved method. Fig. 3 is a view of the blank after having been thus acted upon. Fig. 4 is a vertical section of the dies and plunger by which the second step of our improved method is effected. Fig. 5 is a like view of the same dies and plunger at the completion of the second step. Fig. 6 is a view of the blank at the completion of the second step. Fig. 7 is a view of another form of blank which can be produced by the same method.

Like letters of reference indicate like parts in each.

In Fig. 1, *a* indicates the die, which is placed on a suitable bed-plate, and is provided with a die-cavity, *a'*.

*b* indicates the holding-ring; *c*, the plunger, and *d* the vertically-moving discharging-bottom of the die.

The die, clamping-ring, and plunger are mounted in the usual way in a vertical drawing-press, and separate movements are given to the clamping-ring and plunger by means of separate cams placed on a shaft mounted above in the frame of the machine.

The drawing-press and the parts just named and their arrangements are old and well-known, so that it will not be necessary to give any description of the press. A blank or piece of thin sheet metal, *e*, of suitable size,

is placed on top of the die *a* over the cavity *a'*, as shown in Fig. 1. The clamping-ring *b* then descends and clamps the edge of the blank upon the top surface of the die *a*, and then the plunger *c* descends and forces the blank down into the die-cavity *a'*, drawing its edge from between the clamping-faces of the die *a* and ring *b* until a shallow cup is formed, and the total diameter of the blank is that which is desired in the finished article, as shown in Fig. 2. When this point is reached, the downward movement of the plunger terminates and it is withdrawn, after which the ring *b* is raised and the article is discharged from the die in the usual way. The effect of this operation upon the blank *e* is shown in Fig. 3, where it has been transformed into a cup-shaped article having a horizontal flange, *e'*, around the edge of the cup. This operation constitutes the first step of our improved method. The blank is then submitted to the operation of the devices shown in Fig. 4, where *f* is the die; *g*, the clamping-ring, of a diameter capable of entering the cup of the blank *e*; *h*, the plunger, and *i* the discharging-bottom. The blank *e* being placed on top of the die *f* over its cavity *f'*, the ring *g* descends into it and clamps the outer circle of its unflanged portion on the surface of the die *f* around the cavity *f'*, as shown in Fig. 4, leaving the flanges *e'* and *e''* free. Then the plunger *h* descends upon the central portion of the blank and forces it down into the cavity *f'*, drawing the metal from between the clamping-faces of the die and ring *g*. This movement of the blank reduces the height of the vertical sides *e'* of the cup *e'* until they entirely disappear and the horizontal flange *e''* is brought down into contact with the upper face of the die *f*, as shown in Fig. 5. The downward movement of the plunger *h* ceases at this point, and the result is a wide, flat, sheet-metal blank, with a narrow cup in the center, as shown in Fig. 6.

If it is desired, an article like that shown in Fig. 7 can be produced by terminating the downward movement of the plunger *h* before the wide shallow cup *e''* disappears, as indicated by dotted lines in Fig. 5.

Our invention is particularly applicable to the manufacture of lantern-trimmings, where

the bottom and top both require cups with wide flanges.

What we claim as our invention, and desire to secure by Letters Patent, is—

5 1. The method of making cup-shaped articles of sheet metal having a wide horizontal flange without seam or joint, which consists, first, in drawing a blank of thin sheet metal into a flanged cup by clamping the edges of  
10 the blank between clamping-surfaces and forcing the central unclamped portion into a die until the clamped portion is partially drawn from between the clamping-faces and the total diameter is that of the final product,  
15 and then clamping the outer edge of the bottom of the cup between clamping-faces and forcing the central unclamped portion into a die forming a cup until the vertical sides of the first cup are drawn between the clamping-  
20 faces and its flange is reduced to the plane of the clamping-faces, substantially as and for the purposes described.

2. The method of making double-cupped

flanged articles of sheet metal, which consists, first, in drawing a blank of thin sheet  
25 metal into a flanged shallow cup by clamping the edge of the blank between clamping-surfaces and forcing the central unclamped portion into a die until the clamped portion is partially drawn from between the clamping-  
30 faces, and then clamping the outer edge of the bottom of the cup between other clamping-faces and forcing the central unclamped portion into a die forming a cup until the vertical sides of the first cup are partially drawn  
35 in between said clamping-faces, substantially as and for the purposes set forth.

In testimony whereof we have hereunto set our hands this 25th day of February, A. D. 1886.

ARCHIBALD W. PAULL.  
GEORGE F. BUTTERS.

Witnesses:

W. B. CORWIN,  
THOMAS B. KERR.