(No Model.)

J. BURKHARDT.

METHOD OF FORMING HOLLOW BALLS, &c., FROM SHEET METAL.

No. 480,708. Patented Aug. 16, 1892.

Fig. 1.

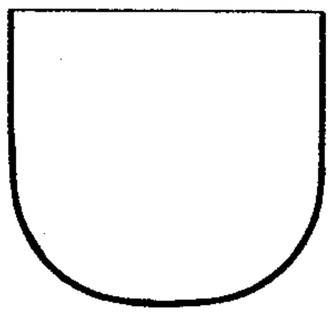


Fig. 2.

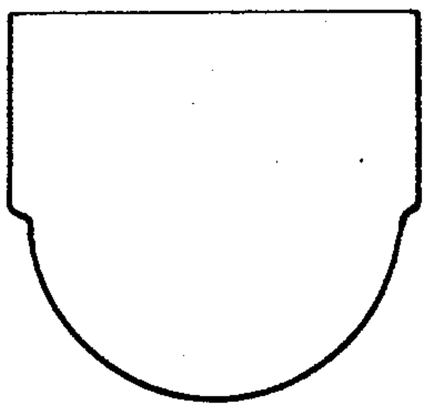


Fig. 3.

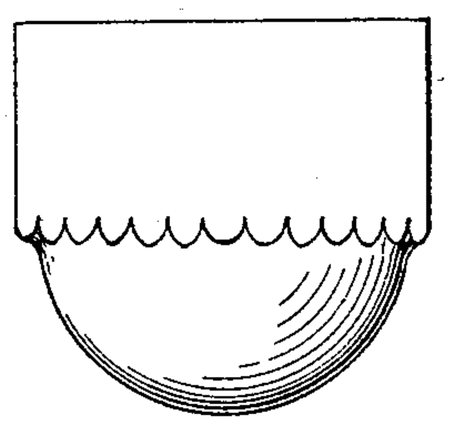


Fig. 4

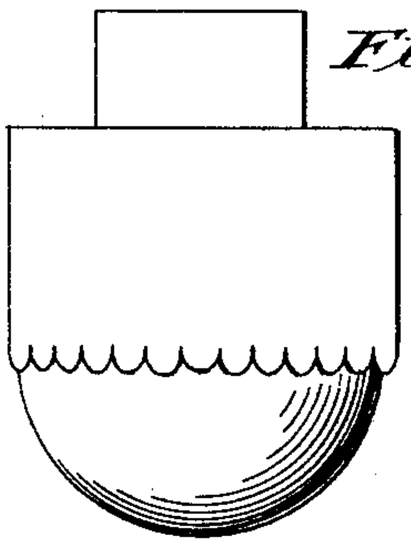


Fig. 5

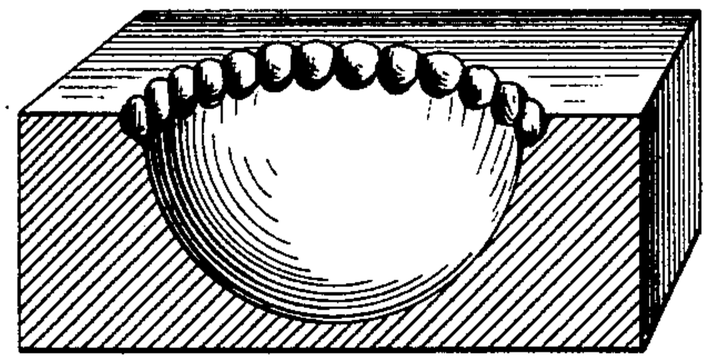


Fig. 8

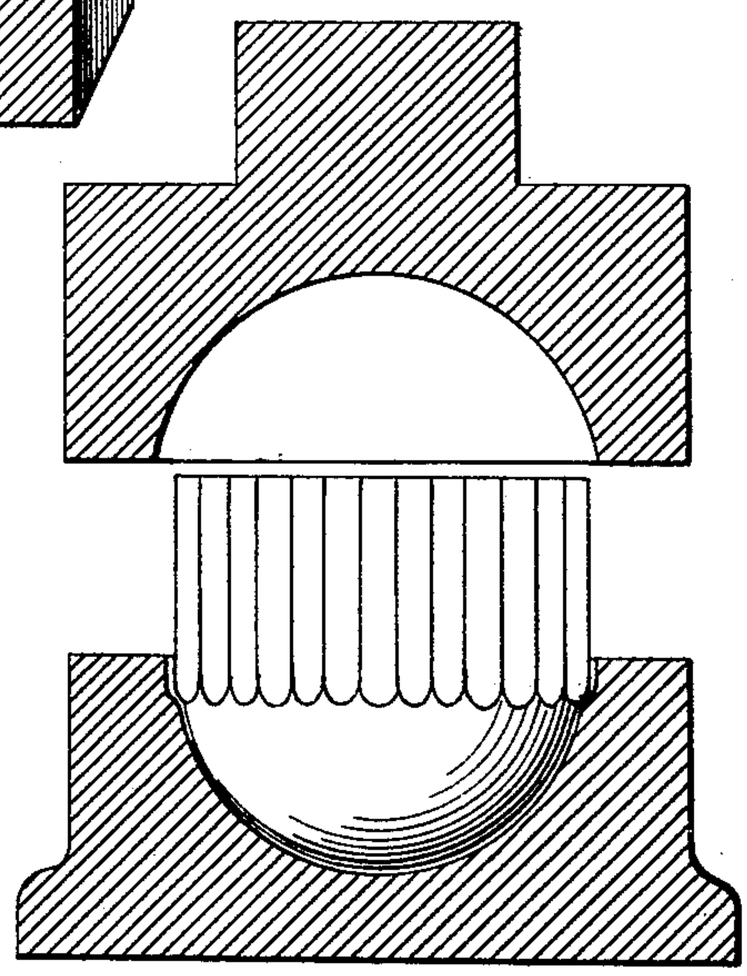


Fig. 6

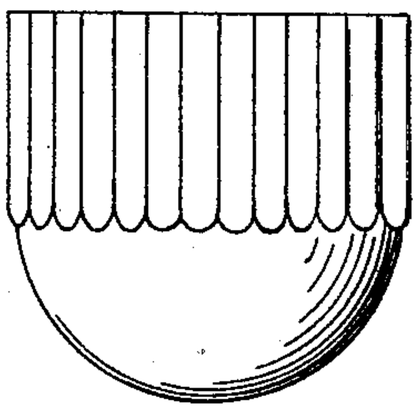


Fig. 7

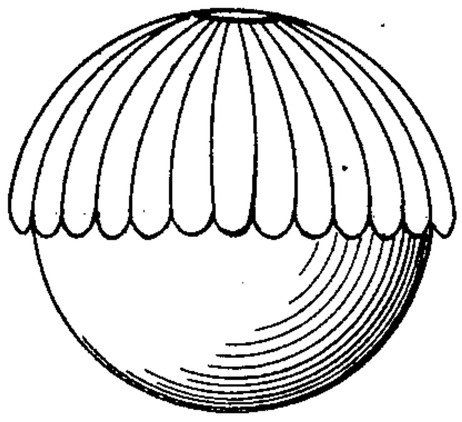


Fig. 9

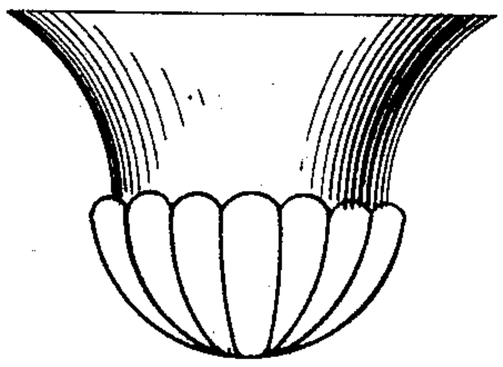
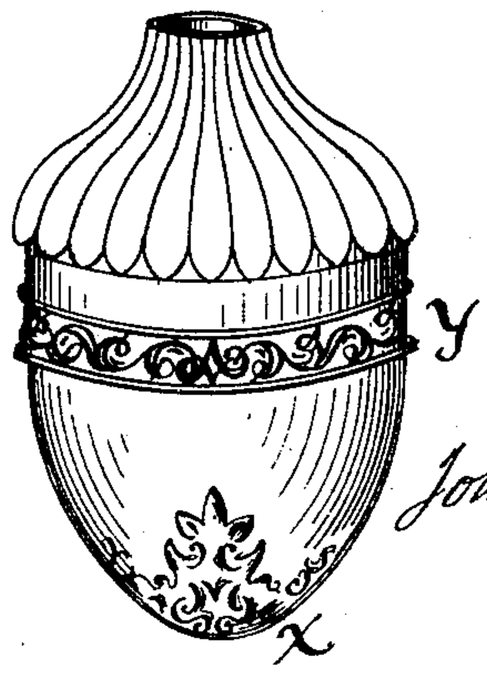


Fig. 10



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UNITED STATES PATENT OFFICE.

JOHN BURKHARDT, OF NEW YORK, N. Y., ASSIGNOR TO WILLIAM H. JACKSON & CO., OF SAME PLACE.

METHOD OF FORMING HOLLOW BALLS, &c., FROM SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 480,708, dated August 16, 1892.

Application filed April 21, 1892. Serial No. 430,142. (No model.)

To all whom it may concern:

Be it known that I, JOHN BURKHARDT, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new and useful Method of Forming Hollow Ornamental Balls and Similar Articles of Sheet Metal, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

In the drawings, Figure 1 is a side elevation of a sheet-metal cup. Figs. 2 and 3 represent the same after the first and second operations of the process are made. Fig. 4 shows the upper die, and Fig. 5 a sectional view of the lower die, by which the form of the cup shown in Fig. 3 is made. Fig. 6 represents the form of the cup after being acted upon by a pair of dies corresponding with the fluted shape of said figure. Fig. 7 shows another form to which the cup is reduced by dies represented in Fig. 8. Fig. 9 represents a form to which the cup is reduced from the shape shown in Fig. 7 after the globular end thereof has been partially removed. Fig. 10 shows, in elevation, a form reduced from the shape shown in Fig. 6 by the use of dies corresponding in form to Fig. 10, but without the central girdle ornamentation which is produced by an intermediate step of my process, as hereinafter specified.

My present invention relates to improvements upon the process and mechanism described in the patents for making articles analogous to those described herein, granted February 21, 1888, and numbered, respectively, 378,412 and 378,417, but, instead of employing metal jackets, as in those patents, to form ornamental surfaces, produces such ornamentation by direct action of operating mechism, as is fully hereinafter explained.

To form ornamental hollow metal articles of various spheroidal shapes and superficial configurations by my present process or method, a plain sheet of brass or other suitable metal of approximately circular form is drawn by dies into cup shape, as in Fig. 1, then it is subjected to the action of a pair of dies of proper form to give to the cup the form shown in Fig. 2. The third step will be to subject the cup, as shown in Fig. 2, to the action of dies represented in Figs. 4 and 5, which will by compression reduce it to the form of said dies, having a row of beads formed around its middle portion. The fourth step will be to subject the beaded cup to the action of dies, the upper one of which will be vertically or longitudinally ribbed and the lower one plain, and thereby the upper half of the cup will be fluted, the flutings terminating with the beads, as shown in Fig. 6. The fifth operation will be to compress the fluted or ribbed article by the action of plain dies, as shown in Fig. 8, by means of which the form shown in Fig. 7 will be produced.

To change the shape of Fig. 7 to that shown in Fig. 9, the plain end of the ball will be partly cut away and a flaring or conical spreading-die will be pressed therein to the desired extent; and to produce from the article shown in Fig. 6 the altered shape shown in Fig. 10, dies of suitable shape will be used to raise ornamental figures at X, and then the article may be placed on a mandrel and revolved while under the action of a suitable engraved revolving tool, which will impress a girdle of ornamental design around its body, as at Y, and after this operation the fluted or ribbed portion of the article may be reduced by compression of dies to any desired shape analogous to that shown in Fig. 10.

To produce a symmetrical or perfect terminal or border line around the central part of the cup or ball having ribs or flutings on one portion, the other half or portion being plain, as in Figs. 6 and 7, it is necessary to form the terminal beaded ends of the ribs, as above mentioned, before producing the ribs which terminate in the beads at the middle of the article, and therefore as a single step of my process I make use of the dies which simply form the circle of beads.

Having described my invention, I claim—

1. The process herein set forth of forming hollow ornamental bodies of sheet metal by successive compressions of the metal between series of dies of different configuration corresponding with the shapes described and in the regular order specified—namely, first forming the metal into cup shape, then enlarging the upper or cylindrical half of the cup and contracting the lower or closed half

of the cup, reducing it to hemispherical shape forming a central girdle of beads around its perimeter, then forming ribs or flutings upon the upper or cylindrical part of the cup corresponding with and terminating in the circle of beads, and then reducing the cup to a spheroidal shape, being ribbed upon one half, as described.

2. The process herein described of forming ornamental hollow bodies of sheet metal, consisting in forming the metal into a cup by compressing the same between dies, then compressing the cup between dies which will enlarge the diameter of a part of the cup, then compressing the cup between dies which will form a row of beads around its middle part, then compressing the beaded cup between dies which form ribs upon part of the cup terminating in the beads at the middle of the cup, then compressing the cup between dies which will form ornamental figures upon the closed hemispherical portion of the cup, then revolving the cup on a mandrel and impressing ornamental figures thereon around its perimeter by the action of a rotary engraved tool, and then compressing the article or cup between plain dies which will reduce it to an oval or spheroidal shape.

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