To all whom it may concern:

Be it known that I, CHARLES WALES, a citizen of the United States, residing at New Haven, New Haven county, State of Connecticut, have invented certain new and useful Improvements in Processes of Forming Angular Bosses, of which the following is a full, clear, and exact description.

My invention relates to improvements in the process of forming angular bosses, and has for its object to provide a process for forming from a metal blank an angular boss integral with a hub or base, in an inexpensive and expeditious manner.

It further has for its object to provide a process in which the bosses formed shall be uniform.

The following is a description of a process embodying my invention and certain apparatus used in carrying out the same, reference being had to the accompanying drawings, in which—

Figure 1 shows a side elevation of the blank to be treated. Fig. 1 shows a partially formed blank in a press beneath a plunger having formed in its bottom face a recess whose side walls are parallel to the axis of the blank and so disposed that when the die descends it will cut away segments of the head along planes which are perpendicular to the plane of the groove and are removed from the axis of the blank by a distance slightly greater than the distance between said axis and the bottom of the groove 2. The successive interior angles of the recess in the die are preferably equal so as to form a regular polygon. The groove, particularly when its radius is slightly less than the distance between the axis of the blank and the straight sides of the boss to be formed, permits the ready shearing away of the portions of the reduced head above the groove, thereby enabling me to form a boss without milling or machining and in an expeditious and inexpensive manner, all the bosses being of uniform size and shape. The blank is provided with a longitudinal bore and the die is provided with a pin which enters said bore, fitting the same snugly, so as to center the die relatively to the blank.

In the drawings, 1 is the metal blank having a central bore 2. 3 is the blank after the groove 2 has been turned therein and with the reduced head 3 formed thereon.

4 is the die bed having a recess for centering the blank.

5 is the movable die plunger having, in this particular instance, an octagonal recess 6 and a centering pin 7, the recess having its sides parallel to the axis of the blank as it lies upon the die bed and separated from the axis of the die by a distance slightly greater than the radius of the groove 2. The maximum radius of the recess is equal to the radius of the head 3.

The blank 1, after the recess 2 and head 3 have been formed thereon, is placed upon the die bed 4 and the plunger 5 is then forced downward, with the result that the die shears away segments of the head 3, thus forming an angular boss 8. The groove permitting the cuttings or sheavings to break away readily. The portions which are cut away are cut away simultaneously, so that the straight sides of the boss are all formed by a single movement of the press. It is preferable that the successive interior angles between the ad-
The process of forming a polygonal boss upon a metal base which consists in cutting adjacent to one end of a blank an annular groove having a diameter nearly equal to the smallest dimension of the desired boss, and shearing away portions of the metal of said blank simultaneously on one side of said groove along planes adjacent and approximately tangential to but not intersecting the bottom of said groove and parallel to a line perpendicular to the plane in which said annular groove lies.

2. The process of forming a polygonal boss upon a metal base which consists in cutting adjacent to one end of a blank an annular groove having a diameter nearly equal to the smallest dimension of the desired boss and shearing away portions of the metal of said blank simultaneously on one side of said groove along planes adjacent and approximately tangential to but not intersecting the bottom of said groove and parallel to a line perpendicular to the plane in which said annular groove lies.

3. The process of forming a polygonal boss upon a metal base which consists in forming a cylindrical blank having an annular groove adjacent one end, the bottom of said annular groove having a diameter nearly equal to the smallest dimension of the desired boss, and shearing away segments of the metal of said blank on one side of said groove simultaneously along planes perpendicular to the plane of said groove adjacent and approximately tangential to but not intersecting the bottom of said groove.

4. The process of forming a polygonal boss upon a metal piece which consists in forming upon a blank a head of smaller diameter than said blank and having an annular groove at its base, the bottom of said groove having a diameter nearly equal to the smallest diameter of the desired boss, and then shearing away portions of said metal simultaneously along planes perpendicular to the plane in which said groove lies and adjacent and approximately tangential to but not intersecting the bottom of said groove.

CHARLES WALES.

Witnesses:
Edward S. Swift,
L. Hartland.