

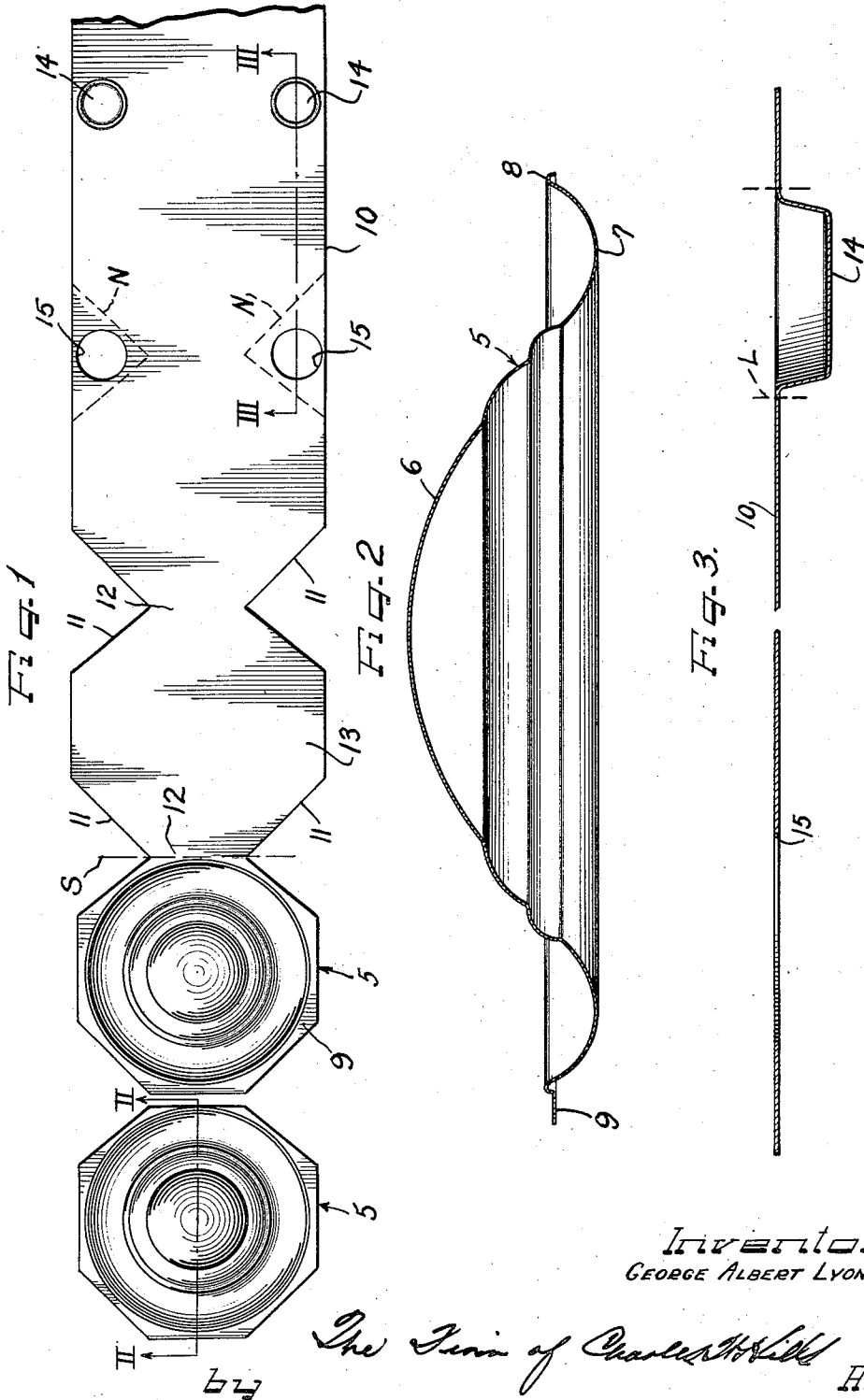
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METHOD OF MAKING WHEEL COVERS

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METHOD OF MAKING WHEEL COVERS

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The present invention relates to improvements in making metal articles and more particularly concerns the step-by-step progressive formation of a succession of articles from strip material.

An important factor in the cost of production of sheet metal articles comprises the material from which the articles are made. Often times small savings in material will afford competitive advantage over less efficient methods of production wherein slightly more material is required for production of identical articles. This is especially true in mass production sheet metal articles such as automobile accessories and the like.

An important object of the present invention is to provide an improved method of making sheet metal articles by progressive steps from strip material and by which method substantial savings in material are effected by elimination of waste in the formation and trimming of the successively produced articles.

Another object of the invention is to provide an improved method of forming sheet metal articles from strip material whereby substantial material is saved lengthwise of the strip as the articles are formed and severed therefrom.

A further object of the invention is to provide an improved method of making a plurality of different kinds of articles from the same strip of sheet material in such a manner that waste of material is reduced to a bare minimum.

According to the general features of the invention there is provided an improved method of making articles from strip sheet material which comprises stamping successive blank sections of a strip of material to form the same into the desired article shape, and severing each stamped blank section from the next succeeding blank section on a line at the adjacent extremity of the hold-down area joining it to the next succeeding blank section, whereby the entire hold-down area joining the blank sections remains on the succeeding blank section.

According to other general features of the invention the method of making articles from strip material by a drawing operation which includes using part of the hold-down area of the next succeeding blank section on the strip for hold-down purposes in drawing the leading terminal blank section and prior to severance of the terminal blank section from the next succeeding blank section.

According to still other general features of the invention, there is provided a method of making a plurality of different articles from sheet ma-

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terial which comprises stamping and separating from a strip of sheet material at predetermined spaced intervals in the margin thereof articles of small size derived from areas which would subsequently remain as scrap in the formation of larger articles from the strip and with relatively large blank sections intervening between the areas in which the small articles are formed, and thereafter forming large sized articles in the large blank sections and severing the large blank sections from the strip.

According to additional features of the invention the areas from which the small articles are derived are notched out of the blank prior to formation of the large size articles whereby to leave relatively narrow connecting necks of material between the large blank sections to facilitate lateral shrinkage of the blank section in the formation of the larger size articles.

Other objects, features and advantages of the present invention will be readily apparent from the following detailed description of a preferred embodiment of the invention taken in conjunction with the accompanying drawings in which:

Figure 1 is a plan view of a strip of material and showing successive steps in the formation of articles from the strip;

Figure 2 is an enlarged transverse sectional view through a formed blank taken substantially on the line II—II of Figure 1; and

Figure 3 is a fragmental, enlarged sectional view taken substantially on line III—III of Figure 1.

As shown on the drawings:

An example of the practical application of the present invention is in the manufacture of automobile wheel trim or covers which it has heretofore been customary to produce from individual sheet metal blanks or plates. That is, each wheel cover has been drawn or stamped from a separate metal plate in which ample peripheral area has been afforded for hold-down purposes entirely about the area of the blank actually used for the article. For effective hold-down a substantial hold-down flange area was necessary for uniform gripping of the blank between the forming dies so that the draw would be uniform all around and there would be no portion of the margin that would draw free from the hold-down and thus cause uneven drawing at any side of the blank and consequent distortion and spoiling and scrapping of the blank.

By the present invention the hold-down flange area about each blank section is substantially reduced by leaving each blank section attached

to the strip of material from which derived until the draw has been completed, thereby making use of the hold-down area of the next succeeding blank section in each instance and effecting a substantial saving in material where a quantity of articles are produced.

Having reference to Figures 1 and 2, a partially completed wheel blank 5 is shown including a central raised crown portion 6, an annular bordering trough-like portion 7 providing a relatively wide axially outwardly facing groove and axially inwardly projecting rib of substantial radius, and a marginal extremity narrow annular rib 8 at the radially outer extremity of the concave rib 7 and of convex form humped axially outwardly or to the front side of the cover blank and with the channel thereof opening rearwardly. In the blank, as stamped or drawn, the rib 8 is bordered by a horizontal hold-down flange 9. This hold-down flange is of importance in the drawing operation to provide adequate area to be gripped by the usual hold-down ring portions of the forming dies whereby the blank is held under uniform radial tension as the drawing of the blank proceeds. Subsequent to the drawing operation, the hold-down flange area 9 may be trimmed from the blank or it may be utilized after further working as a part of the finished cover.

Until the cover blank has been drawn, it remains part of a strip of material 10 from which derived. This strip is of proper width and of such calculated length that by appropriate indexing as the strip is progressively converted into wheel covers, a predetermined multiple of wheel cover blanks will be derived therefrom with utmost economy and without scrap aside from the minimum scrap which may be derived from each of the blank sections in the various forming operations.

Since in blanking the circular wheel covers there is uniform radial shrinkage of the blank, the material strip 10 is notched out in alignment from opposite sides at predetermined uniform intervals, as indicated at 11 so that only a narrow neck 12 of material connects each successive blank section with the strip. Thus, when a flat blank section 13, predefined by the notches 11, and severed from the preceding drawn blank 5 on a transverse straight severance line S, is drawn uniform radial shrinkage is accommodated since the entire periphery of the blank section is free with the exception of the narrow connecting neck 12 which constitutes but a small fraction of the blank periphery and can draw freely toward the blank section 13 in the course of the drawing operation by longitudinal movement of the remainder of the material strip 10 toward the blank section undergoing drawing.

An important advantage of retaining each of the successive flat blank sections 13 connected by the connecting neck 12 to the remainder of the strip of material until the drawing operation has converted the flat blank section 13 into the drawn blank section 5, resides in the ability thereby to use the neck in each instance as part of the hold-down area for each of two succeeding drawing operations. Thus, the neck 12 which connects the drawn blank section 5 and the next succeeding flat blank section 13 as shown in Figure 1 serves as part of the hold-down flange area 9 of the drawn blank or the blank undergoing drawing by affording a continuation of the hold-down flange at the connected side of the blank. After the blank section has been drawn there is no longer any need for the hold-down flange area

as such and it is therefore possible to effect the severance S quite close to the formed periphery of the wheel cover. As a result, what constituted the connecting neck 12 between the formed blank and the next succeeding flat blank 13 remains as a full width portion of the hold-down flange area of the succeeding blank.

It will thus be apparent that in each blanking step a portion of material substantially equivalent to the width of the hold-down flange area 9 is saved between each succeeding blank section, as compared with the conventional manner of blanking wheel covers from individual flat sheets or blanks entirely separate from the sheet or strip of material from which derived.

As an aid in indexing the blank sections and also to facilitate shrinkage in the draw, the re-entrant extremities or points of the notch-outs 11 are preferably disposed in transverse alignment coincident with the line of severance S.

Inasmuch as the areas of material which are removed in forming the notches 11 are of substantial size, these areas are utilized in the production of smaller size articles. By preference the small size articles are formed prior to removal of the notch areas. To this end, respective articles 14 are stamped or drawn in the areas of the material strip 10 which are subsequently to be notched out and may then be severed from the strip on a severance line L (Fig. 3) to leave respective punch-out openings 15 in the notch-out areas which may subsequently be cut from the material strip on the respective converging notch-out lines N as shown in Figure 1. In the present instance the small articles are shown as generally cup or pan-shaped devices such as may be used for various accessory purposes or as ash trays or the like. In this way scrap waste is reduced to a bare minimum. This, taken together with the substantial aggregate savings in material in the formation of the wheel covers, affords important economies in manufacture since the smaller articles absorb a proportionate share of the cost of manufacture. As a result, both the larger and the smaller articles are susceptible of lower cost production to the ultimate advantage of the users of the articles.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. In the manufacture of wheel covers, notching out triangular portions of a strip of sheet metal at opposite longitudinal sides and with the apexes of the notches in alignment on a line perpendicular to the axis of the strip to provide successive polygonal blanks which are of larger dimension transversely of the strip than longitudinally of the strip, pressing a circular cover form into the endmost blank portion of the strip defined by a pair of notches while utilizing a substantially uniform marginal portion of such blank as a hold-down area except adjacent to the alignment axis of the adjacent notches where the periphery of the circular form closely approaches the axis and in this region utilizing that portion of the succeeding blank which borders said notch apex axis as part of the hold-down area while the circular formation on the endmost blank is being pressed.

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2. In the manufacture of wheel covers, notching out triangular portions of a strip of sheet metal at opposite longitudinal sides and with the apexes of the notches in alignment on a line perpendicular to the axis of the strip to provide successive polygonal blanks which are of larger dimension transversely of the strip than longitudinally of the strip, pressing a circular cover form into the endmost blank portion of the strip defined by a pair of notches while utilizing a substantially uniform marginal portion of such blank as a hold-down area except adjacent to the alignment axis of the adjacent notches where the periphery of the circular form closely approaches the axis and in this region utilizing that portion of the succeeding blank which borders said notch apex axis as part of the hold-down area while the circular formation on the endmost blank is being pressed, and after the pressing operation severing said endmost blank on said apex axis to define a substantially octagonal blank having a marginal flange of uniform dimensions at each of the eight sides except on the line of severance from the next succeeding blank wherein the severed edge closely approaches the periphery of the circular formation.

3. The method of making articles such as circular wheel covers from a strip of sheet metal which comprises forming a pair of triangular notches in the sides of the strip in aligned but spaced relation adjacent to but spaced from an end of the strip a sufficient distance to provide a polygonal blank wider than long and large enough, inclusive of the connecting neck between the apexes of the notches, to afford a circular draw area and a surrounding hold-down flange area on the blank uniformly about the draw area except adjacent to said notches where the material of the neck on the succeeding portion of the strip is utilized as part of the hold-down area, drawing the circular draw area of the terminal blank while uniformly holding down said hold-down flange area and said connecting neck portion of the succeeding portion of the strip, and thereafter severing the drawn terminal blank from the strip on a line through said apexes of the notches while leaving the material of the connecting neck on the succeeding and unsevered portion of the strip to become a portion of the hold-down flange area of the succeeding terminal

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blank which said succeeding portion of the strip becomes as a result of severance of the first mentioned drawn terminal blank.

4. The method of making circular wheel covers or the like which comprises notching out a strip of metal from opposite sides with opposed triangular notches terminating in alignment at apices within the strip to leave a narrow connecting neck between contiguous sections of the strip and in such relation to the sections that the sections are of substantially symmetrical polygonal shape except for an asymmetrical shortening of the terminal section at said neck, drawing a circular formation in the terminal section and with the perimeter of the formation spaced from all edges of the terminal section except for close adjacency to a line through said notch apices as a result of said asymmetrical shortening, while effecting such drawing utilizing the margin of the symmetrical portion of the terminal section and the connecting neck portion of the succeeding portion of the strip contiguous the terminal section for holding down the terminal section to effect uniform draw of said formation, severing the drawn terminal section along said line close to the drawn formation thereof and leaving the area of the connecting neck on said succeeding contiguous section as part of the symmetrical shape thereof.

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