Nov. 7, 1933. R. C. INGERSOLL ET AL 1,933,593

METHOD OF FORMING ROLLED METAL ARTICLES

Filed Oct. 5, 1931

Fig. 1.

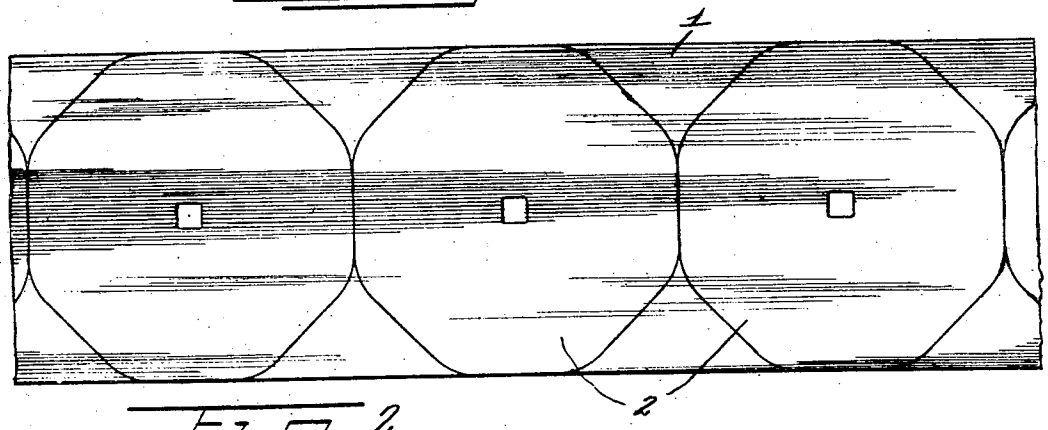


Fig. 2.

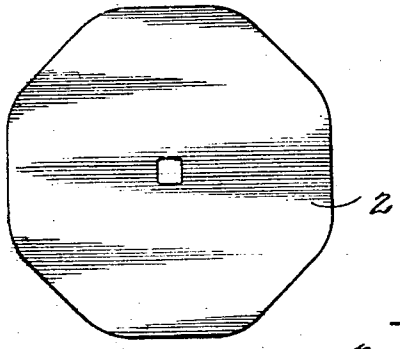


Fig. 3.

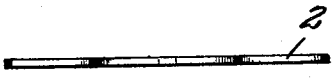
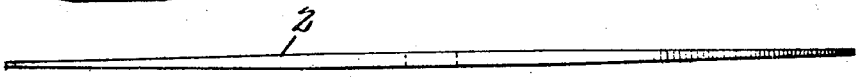


Fig. 5.



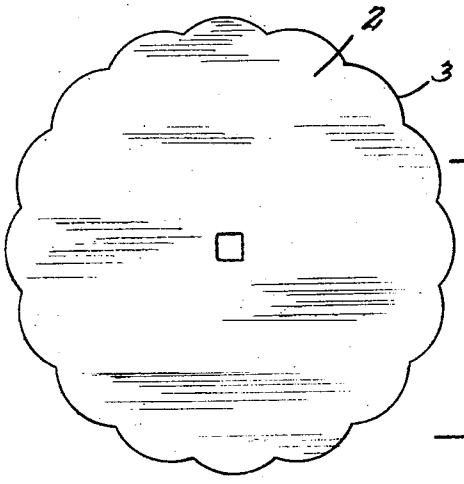


Fig. 4.

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By Charles W. Hill Attys.

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METHOD OF FORMING ROLLED METAL ARTICLES

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Application October 5, 1931. Serial No. 566,952

7 Claims. (Cl. 80—16)

This invention relates to a method for forming metal discs. The object of the invention resides primarily in a method that results in a minimum of waste in relation to the blanks used and the finished discs.

The invention comprises the novel method hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawing which illustrates the blank and the discs in various stages of formation:

Figure 1 is a plan view of a blank illustrating the cutting of octagonal discs therefrom.

Figure 2 is a plan view of an octagonal disc as cut from the blank.

Figure 3 is an edge view of the blank shown in Figure 2.

Figure 4 is a plan view of the disc after being rolled, and

Figure 5 is an edge view of the completed disc.

In carrying out the method, a blank 1 in accordance with the desired width of the disc is first formed; octagonal blanks 2 are then successively stamped from the blank 1. On account of the shape of these blanks 2, there will be less waste resulting from the blank 1 than if circular discs were cut therefrom. Consequently, the blanks 2 will have more metal for expanding purposes.

After the blanks are cut from a continuous strip, they are subjected to a rolling action. Any suitable apparatus may be used for subjecting the blank to the proper rolling action. We however prefer to use such a rolling machine as is disclosed in our copending application Serial No. 566,971 filed October 5, 1931 which involves a pair of gap rolls and a shiftable carriage upon which the blanks may be turned or revolved as desired to bring a fresh segment in the sphere of the rolls.

The discs 2 as cut from the blank 1 are substantially of uniform thickness; they have to be expanded and tapered, and made circular. The expanding and tapering of the blanks are accomplished by simultaneously rolling both sides of a segment of the blank from a point adjacent the center thereof to the outer periphery thereof. Such a segment may be defined as consisting of one-eighth of the blank and as extending from lines drawn from the center of the blank to a pair of apices on the periphery thereof. These apices consist of the corners or projections between a pair of adjacent sides of the blank. As such a segment is being rolled, the metal is expanded and extended to form a scallop between a pair of apices. In the event that the method is carried out in a machine as disclosed in the above identified application in which the axes of the rolls are fixed, the blank is revolved a sixteenth of a revolution and the rolling process repeated. The segment that is now rolled as the disc has been rotated one-sixteenth of a revolution comprises one-half of the previously rolled segment and one-half of the adjacent segment. When the second segment has been rolled in the same manner as the first segment, the blank will be revolved another one-sixteenth of a revolution and the process repeated until the entire blank has been thuswise rolled. Each rolling operation will form a scallop upon the periphery of the blank which will approximate a circle. The blank is then trimmed to produce a true circular form.

Instead of revolving the blank one-sixteenth of a revolution after each operation, the blank may be advanced one-eighth of a revolution and adjacent segments rolled. When the blank is given one-eighth of a revolution, there will be eight segments each of which will be substantially equal to one-eighth of the blank and will embrace an area of metal defined by drawing lines from the center of the blank to a pair of adjacent apices. When the disc is rolled in such segment, the metal will be expanded and extended in the form of a scallop between a pair of apices since the rolling operation is exactly the same as heretofore required. After the eighth segment has been rolled, the blank may be given one-sixteenth of a revolution and the segment re-rolled that overlaps substantially one-half of the eighth segment and substantially one-half of the first segment. This may be termed an overlapping segment and in rolling this overlapping segment as previously set forth, the metal will be expanded and extended to form an intermediate scallop between two previously formed scallops. After the first overlapping segment has been rolled, the blank is turned one-eighth of a revolution and another overlapping segment will be rolled and this process will be continued until the blank has been completely re-rolled upon segments which overlap the previously rolled segments. As in the first instance, the completed blank will have a periphery containing sixteen scallops that approximate a circle as shown in Figure 4 so that very little trimming will be required to produce a circular blank and very little waste will occur.

From the foregoing it will be obvious that there is very little waste in cutting the polygonal

blank from a continuous strip of metal as shown in Figure 1 and due to the process of rolling which produces a periphery upon the disc that approximates a circle, very little has to be trimmed to produce a true circle.

We are aware that numerous details of the invention may be varied through a wide range without departing from the spirit of this invention, and we do not desire limiting the patent granted other than as necessitated by the prior art.

We claim as our invention:

1. The method of forming metal discs which consists in cutting an octagonal blank from a strip of metal, rolling a segment of said blank to expand and extend the same outwardly, then simultaneously re-rolling a portion of such segment and rolling an adjacent portion and continuing until the disc has been completely rolled, and then trimming the edge of said disc.

2. The method of forming metal discs which consists in cutting successive octagonal discs from a strip of metal, rolling said discs from the center outwardly and expanding the edges in the form of scallops and re-rolling said discs for extending scallops between adjacent scallops.

3. The method of forming metal discs which consists in cutting successive octagonal blanks from a strip of metal, rolling said blanks to successively extend the metal at the free boundary edges thereof and between the apices of the octagons and then rolling the blanks along segments overlapping lines joining the apices and the center of the blank whereby the metal is extended between the previously extended portions.

4. The method of forming metal discs which consists in cutting an octagonal blank from a strip of metal, rolling said blank from the center outwardly in overlapping segments and trimming the circumference of the rolled blank.

5. The method of rolling metal discs which consists in cutting polygonal blanks having more than four sides from a continuous strip, rolling the blanks to extend the metal thereof to form scallops between the apices of the blank and subsequently rolling the blank in zones including such apices whereby the metal of the blank is extended to form intermediate scallops and the blank approximates a circle.

6. The hereindescribed method of rolling a metal disc which consists in simultaneously rolling both sides of the disc from a point adjacent the center of said disc to the periphery thereof in predetermined segments, revolving the disc a distance equal to the outer periphery of each segment after each rolling thereof and similarly rolling an adjacent similar segment and continuing this operation until the blank has been completely rolled, then revolving the disc substantially one-half the distance of the previously rolled segment and rolling a segment which substantially overlaps one-half of the last rolled segment and one-half of the first rolled segment and then revolving the disc a distance equal to the rolled segment and rolling an adjacent segment and continuing this operation until the disc has been completely re-rolled upon segments overlapping the previously rolled segments.

7. The method of making circular tapered discs from a continuous strip of metal which consists in cutting a polygonal blank having more than four sides from said strip of metal, simultaneously rolling both sides of said blank and extending the metal thereof in an equal number of predetermined segments, then re-rolling said disc upon intermediate segments which overlap previously rolled segments and trimming the edges of said blanks to circular form.

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