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C. D. BONSALE

1,915,084

PROCESS OF MAKING SHEETS

Filed March 31, 1932

Fig. 1.

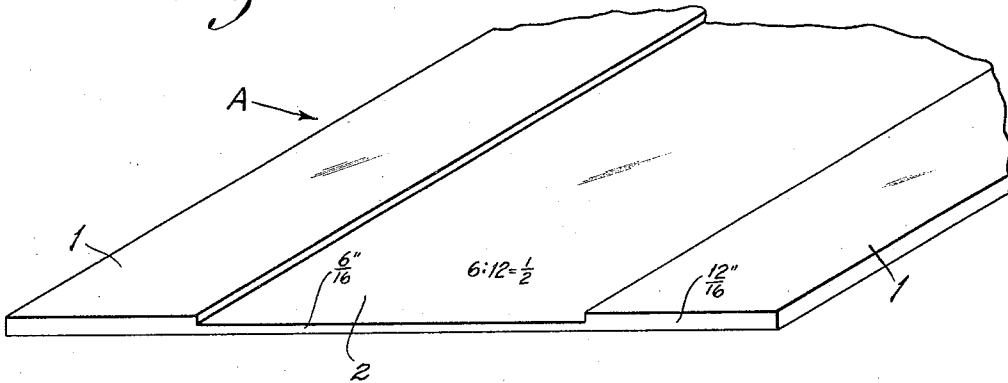


Fig. 2.

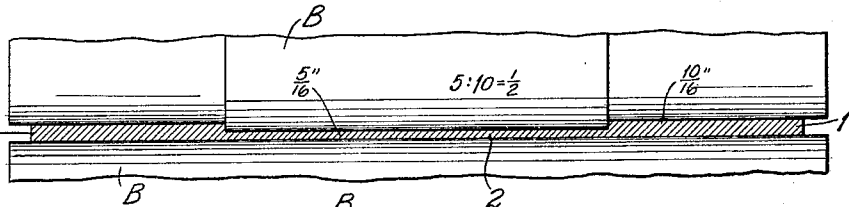


Fig. 3.

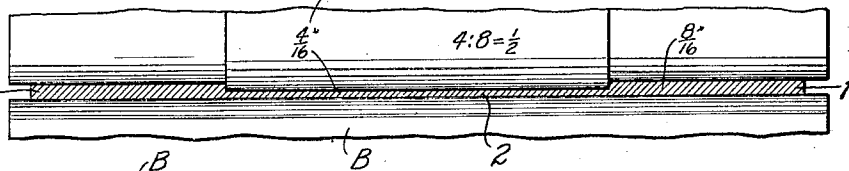


Fig. 4.

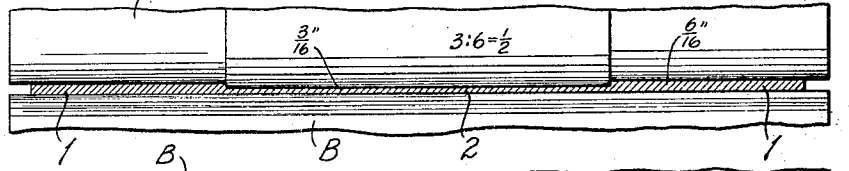


Fig. 5.

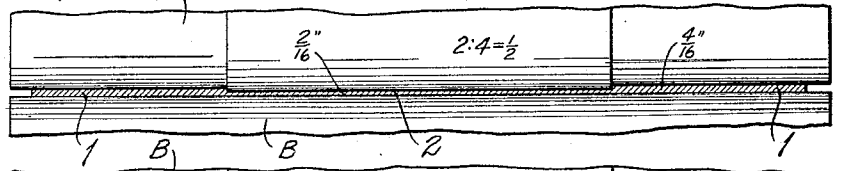
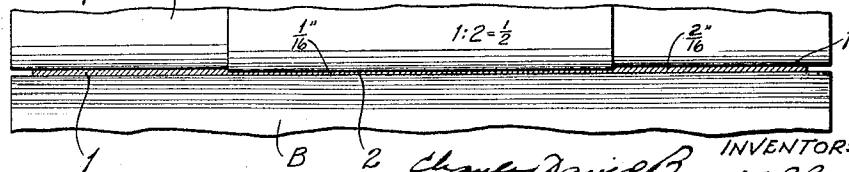


Fig. 6.



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# UNITED STATES PATENT OFFICE

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## PROCESS OF MAKING SHEETS

Application filed March 31, 1932. Serial No. 602,143.

My invention relates to the manufacture of metal sheets and has for its principal object to devise a process whereby sheets may be made economically with longitudinally extending portions of different thicknesses, as, for instance, sheets with side marginal portions thicker than the intermediate portion. The invention consists principally in starting with a sheet bar whose thickness at all points in its width bears the same ratio to the thickness of the product at the corresponding points in its width, and rolling such sheet bar so that the thickness thereof at all points is reduced in the same ratio.

In the accompanying drawing, which forms part of this specification and wherein like numerals refer to like parts wherever they occur,

Fig. 1 is a perspective view of a sheet bar used in my process of manufacturing metal sheets with thickened side marginal portions.

Figs. 2 to 6 inclusive illustrate the decrease in thickness due to the rolling operations.

According to the present invention, the thickness of the sheet bar at all points in its width is reduced at each pass through the rolling mill in the same ratio as the thickness thereof at all other points, but no substantial change is made in the width thereof. Accordingly, in designing the cross section of the sheet bar, it should be of substantially equal width with the sheet desired and should have one or more flat ribs corresponding in width and position with the thick portions of the sheet; and the proper thickness at all points in the width of the sheet bar is ascertained by multiplying the thickness of the desired sheet at the corresponding point thereof by the same numerical factor. For instance, the example illustrated in the drawing contemplates the manufacture of a sheet with a body portion  $\frac{1}{16}$  inch thick and side marginal portions  $\frac{1}{8}$  inch thick. To produce such a sheet, the present process contemplates starting with a sheet bar A of substantially even width with the sheet and having flat marginal ribs 1 of substantially even width with the thick marginal portions

of the sheet. Assuming that the middle portion 2 of the sheet bar is  $\frac{1}{16}$  of an inch thick (which is six times the thickness of the body portion of the sheet), then the side marginal portions 1 of the sheet bar should be six times the thickness of the thick marginal portions of the desired sheet, so that the said marginal portions of such sheet bar should be  $\frac{1}{8}$  of an inch.

Said sheet bar is then rolled in a sheet mill, preferably in a continuous sheet mill, with its rolls B shaped and adapted to reduce the thickness of the sheet bar at each pass in the same ratio throughout the width of the sheet bar. For instance, assuming that the sheet bar A is  $\frac{1}{16}$  of an inch thick in the middle portion and  $\frac{1}{8}$  of an inch along its margins which gives the ratio  $6:12 = \frac{1}{2}$ , and assuming further that the rolling is accomplished in six equal passes, then the first pass should reduce the thickness of the middle portion by  $\frac{1}{16}$  of an inch and the thickness of the marginal portion by  $\frac{2}{16}$  of an inch. The result of this first reduction is to make the middle portion  $\frac{5}{16}$  of an inch thick and the marginal portions  $\frac{1}{8}$  of an inch thick, their ratio being  $5:10 = \frac{1}{2}$ , like proportionate reductions are made at each pass. The amount of reduction depends, of course, upon the longitudinal profile of the mill rolls B, which are quite familiar to the art.

While, for the sake of example, I have illustrated the manufacture of a sheet with thick margins, it is practicable to manufacture sheets with margins thinner than the intermediate body portion or with thin and thick portions alternating.

What I claim is:

1. The process of making sheets with longitudinally extending portions of different thicknesses which consists in rolling a longitudinally ribbed sheet bar so that all portions thereof are reduced in thickness in the same ratio.

2. The process of making sheets with longitudinally extending portions of different thickness which consists in rolling in successive passes a sheet bar having relatively thick and thin portions whose thicknesses

are in the same ratio as the thicknesses of the product, the thickness of said bar at all points being decreased in the same ratio at each pass.

5 3. The process of making sheets with longitudinally extending portions of different thicknesses which consists in forming a longitudinal sheet bar of substantially the width of the desired sheet and with flat ribs corresponding in width and position with the  
10 thick portions of said sheet, the thickness of the sheet bar at all points in its width bearing the same ratio to the thickness of the sheet at corresponding points, and rolling  
15 such sheet bar to reduce the thickness thereof in the same ratio throughout its width.

4. The process of making metal sheets with longitudinal portions of different thicknesses which consists in rolling in successive passes  
20 a sheet bar of the same width and having longitudinal portions of the same width as those of the product, the ratio of the thickness of the sheet bar to the thickness of the sheet being equal for corresponding points.

25 5. The process of manufacturing metal sheets with longitudinal bands of different thicknesses which consists in making and rolling a sheet bar of the same width and having ribs of equal width with those of the desired  
30 product, the reduction of thickness throughout the width of the bar being proportional to the thickness thereof.

6. The process of manufacturing sheets with longitudinally extending portions of  
35 different thicknesses which consists in forming a sheet bar of substantially the same width as the sheet and having longitudinally extending portions corresponding to those of the desired sheet, said corresponding portions  
40 of the sheet bar being of substantially the same width and of substantially the same proportionate thickness, rolling said sheet bar and maintaining said proportionate thickness throughout the rolling operation.

45 Signed at New Kensington, Pennsylvania, this 28th day of March, 1932.

CHARLES DAVID BONSALE

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