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G. J. MEYER

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STRIP METAL PROCESSING

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FIG. 1

WITNESSES
M. E. Downey
C. A. Neal

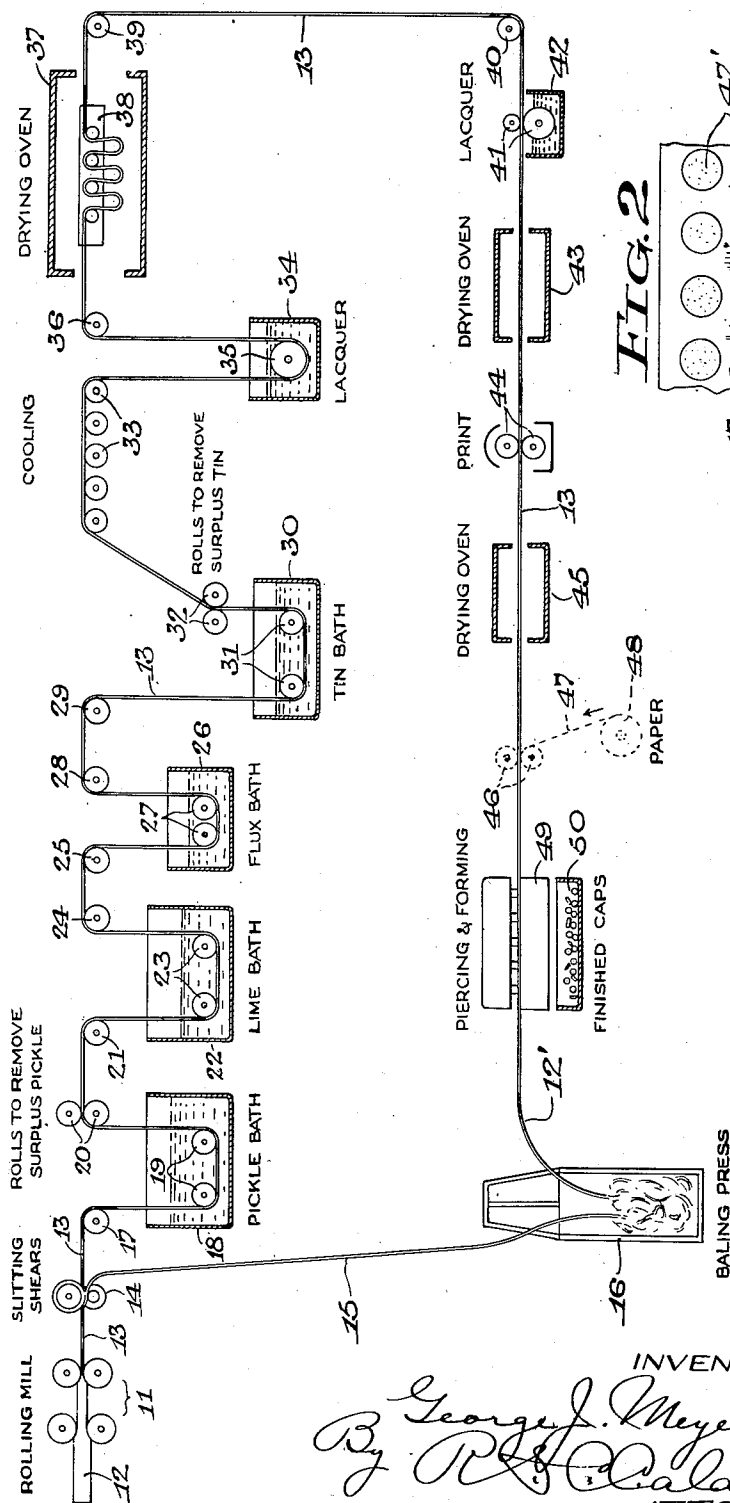
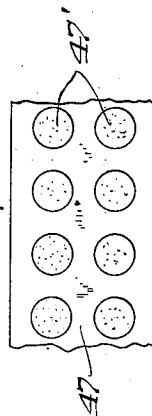


FIG. 2



INVENTOR
George J. Meyer
By R. A. Caldwell
ATTORNEY

UNITED STATES PATENT OFFICE

GEORGE J. MEYER, OF MILWAUKEE, WISCONSIN

STRIP METAL PROCESSING

Application filed February 11, 1929. Serial No. 339,174.

The invention relates to the processing of strip metal.

In the manufacture of bottle caps or crown caps, as it is now carried out, use is made of sheets of tin plate of rectangular shape. In the production of these sheets, steel is first rolled and sheared, then pickled in acid to remove the scale, then immersed in lime water to remove the acid, then, sometimes, dipped in hot tallow for fluxing, and then dipped in tin for tinning, all of which operations require a great deal of manual labor and handling. The sheets, after being cooled, are given one or more coats of lacquer to further protect the metal. After the sheets are lacquered and dried, they are usually printed with the proper decorations adapted to the particular goods. Between these operations, the sheets must be dried and the sheets separated or spaced to permit proper drying. The sheets are then ready to be punched and formed, and in the large machines the sheets are pierced, a sheet at a time, which requires manual handling of the blanks and scrap. In the smaller machines, the sheets are cut into strips and this requires still more blanks and scrap to be manually handled.

In order to obviate the great amount of manual labor required in the handling of the metal from the rolling operation through the finished product and also to facilitate coating and drying operations, it is an object of the invention to provide a method of processing metal in which a continuous length of strip metal is subjected, without interruption, to successive operations to form the finished product.

Another object of the invention is to provide a method for processing strip metal in which the metal in the form of a continuous strip passes from the rolling mill without interruption through a plurality of successive surface-treating operations.

A further object of the invention is to combine with the metal strip or web another web, preferably of non-metallic material such as paper, rubber, or cork, adapted for incorporation into the finished articles.

A further object is to combine with the metal strip or web another web, preferably

of non-metallic material such as paper having mounted thereon in properly spaced relation plates, disks or rings of rubber, cork or other suitable material for incorporation into the finished articles.

The invention further consists in the several features hereinafter set forth and more particularly defined by the annexed claims.

In the accompanying drawing, Fig. 1 shows a schematic diagram of apparatus for processing strip metal in accordance with the invention; and

Fig. 2 is a fragmentary detail view of a disk-carrying web adapted to be combined with the strip metal.

In the drawing, the numeral 11 designates a multiple-pass rolling mill which reduces an ingot 12 to a strip of sheet metal 13 of suitable width and thickness. The sheet metal strip 13 leaving the rolling mill is passed through slitting shears 14 to trim the edges of the strip and to obtain the proper width. The scrap 15 from the slitting operation is introduced into a suitable baling press 16, where it is automatically baled.

The trimmed sheet metal strip 13, after leaving the slitting shears, is passed over a guide roller 17, from which it descends into a pickle bath 18 where the scale is removed, the strip being guided within the bath on rollers 19. The strip ascends from the bath and passes between rolls 20 which remove the surplus pickle. The strip continues over a roller 21, from which it descends into a lime bath 22 for removing the pickle, the strip being guided in this bath by guide rollers 23. The sheet metal strip ascends from the lime bath to pass over guide rollers 24 and 25 and descends from the latter roller into a flux bath 26 containing hot tallow or other suitable flux, the strip being guided through the flux bath on rollers 27. The strip ascends from the flux bath to pass over guide rollers 28 and 29 and descends from the latter roller into a tin bath 30, where the strip is coated with tin, the strip being guided through the tin bath by rollers 31. The tinned strip ascends from the tin bath and passes between rolls 32, which remove the surplus tin. The strip 13 leaves the rolls 32 in an ascending flight in

which the tin cools and hardens, and the tinned strip then passes over supporting rollers 33, on which it is further cooled.

From the last roller 33 the tinned strip descends into a lacquer bath 34, where it passes over a guide roller 35. The lacquered strip ascends from the lacquer bath 34 in a long flight and passes over a roller 36, this ascending flight of the strip being sufficiently long so that the lacquer will harden somewhat before it engages the roller 36. From the roller 36 the lacquered strip passes through a drying oven 37 and may be supported in its passage through the oven or carriers 38 including spaced transverse bars, from which the strip may hang in festoons, as in machines for making wall-paper. After passing from the drying oven, the lacquered strip 13 passes over guide rollers 39 and 40, from the latter of which the strip may pass between rollers 41, one of which dips into a lacquer bath for giving one side of the strip an additional coat of lacquer. The strip then passes through another drying oven 43 and thence between rollers 44, one of which forms a printing roller for printing the desired decorations and other matter on the strip. The printed strip then passes through an oven 45 for drying the ink.

In some instances, it may be desirable to coat one side of the strip 13 with a sheet of paper, rubber, cork, or other suitable material, and this can readily be done by passing the strip between rollers 46, one of which guides the coating sheet 47 onto the strip from a supply roll 48. The coating sheet 47 can be cemented to the strip 13 in any suitable manner and may become incorporated into the finished articles. The sheet or web 47 might also form a carrier for plates, disks or rings 47' of rubber, cork, or other suitable material, to be incorporated into the finished articles, and, in such event, the members 47' are secured to the web in properly spaced relation, as indicated in Fig. 2. The sheet or web 47 in such instance may be of paper, although other material could be used, and when combined with the metal strip 13 it may or may not become incorporated into the finished articles. Either the strip 47 or the members 47' mounted thereon may be secured in contact with the metal strip. The plate members 47' are adapted to form the gaskets or sealing members of bottle closures of various types.

The strip 13 now enters a piercing and forming machine 49, from which the finished caps 50 or other finished products are discharged. The strip continues from the piercing and forming machine 49 in the form of scrap 12', which is led into the baling press 16 or into another automatically operated baling press.

To effect its passage through the several instrumentalities the strip can be propelled

in any suitable manner at as many driving points as may be found convenient.

It is obvious that the strip could be subjected to additional operations than those described, according to the requirements of the finished product, and in other instances some of the steps could be omitted. In the manufacture of tin cans, for example, the tinned metal strip of the proper width could be fed directly to a can-making machine without interruption of surface-treating operations. In the manufacture of some types of bottle caps, it would not be necessary to use a tinned strip and the strip of sheet steel or other metal could be treated with suitable lacquer or enamel and thus dispense with the tinning operation, which is expensive.

The sheet metal strip is preferably as long as it is practicable to roll it in order to minimize interruption of process. If desired, the adjacent ends of long successive strips could be joined by butt welding or other suitable operation, after leaving the rolling mill, to facilitate the passage of the following strip through the successive instrumentalities.

The term "continuous strip of metal" as herein used means a strip which is unbroken in length between the first specified processing instrumentality and the processing instrumentality which completes the finished product.

The term "uninterruptedly" or "without interruption", as it applies to the passage of the strip, may include intermittent motion.

It is possible in a process embodying the invention to utilize either hot rolled strip metal or cold rolled strip metal and in the latter case no pickling would be required.

In some instances the processing of the strip metal may commence at a step succeeding the rolling operation, for example the lacquering step, in which event a metal strip of great length is subjected to the successive surface-treating operations and to the operation of fabricating the finished articles.

What I claim as new and desire to secure by Letters Patent is:

1. The method of minimizing handling operations in the manufacture of sheet metal closures which comprises securing to a long continuous strip of metal a web which carries plates of non-metallic material thereon, and then fabricating from the combined strip successive finished articles which include said plates.

2. The method of minimizing handling operations in the manufacture of sheet metal articles which comprises rolling a continuous strip of metal, simultaneously therewith subjecting previously rolled portions of the continuous strip to a plurality of successive surface-treating operations, and simultaneously fabricating a plurality of finished articles from treated portions of the continuous strip.

3. The method of minimizing handling

operations in the manufacture of sheet metal closures which comprises rolling a continuous strip of metal, simultaneously therewith subjecting previously rolled portions of the continuous strip to a plurality of successive surface-treating operations, and simultaneously fabricating a plurality of finished closures from treated portions of the continuous strip.

10 4. The method of minimizing handling operations in the manufacture of sheet metal articles which comprises rolling a continuous strip of metal, simultaneously therewith subjecting previously rolled portions of the continuous strip to a plurality of successive surface-treating operations including a lacquering operation, and simultaneously fabricating a plurality of finished articles from treated portions of the continuous strip.

15 5. The method of minimizing handling operations in the manufacture of sheet metal closures which comprises rolling a continuous strip of metal, simultaneously therewith subjecting previously rolled portions of the continuous strip to a plurality of successive surface-treating operations including a lacquering operation and a printing operation, and simultaneously fabricating a plurality of finished closures from treated portions of the continuous strip.

20 6. In the manufacture of container closures, the method which comprises providing a continuous strip of sheet metal, affixing patches of non-metallic material to a non-metallic strip, combining the sheet metal strip with the non-metallic strip, and fabricating closures from the combined strip.

25 7. In the manufacture of container closures, the method which comprises providing a traveling continuous strip of sheet metal, affixing preformed gaskets to a face of said traveling strip, and fabricating closures from the gasket-bearing portions of the strip.

30 In testimony whereof I affix my signature.
35 **GEORGE J. MEYER.**

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