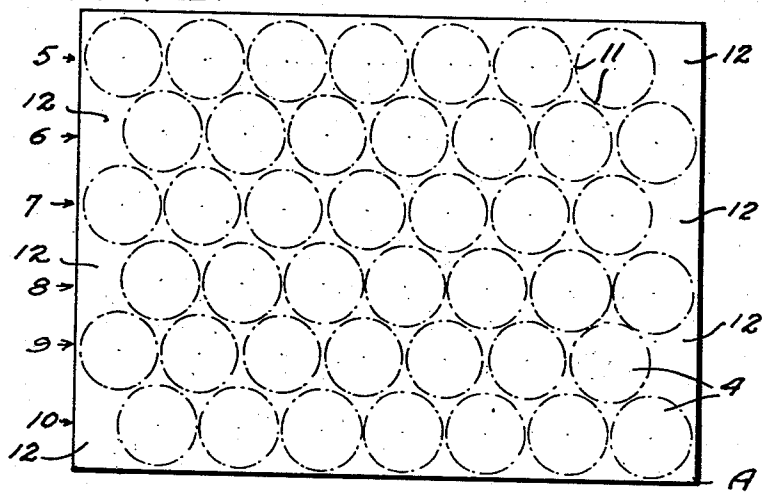
Nov. 30, 1943. R. W. MESSENGER 2,335,292

SHEET AND METHOD OF PRODUCING SAME FOR THE ECONOMICAL PRODUCTION OF BLANKS

Filed April 3, 1942

OLD FORM SHEET

FIG. 1.



NEW FORM SHEET

FIG. 2.

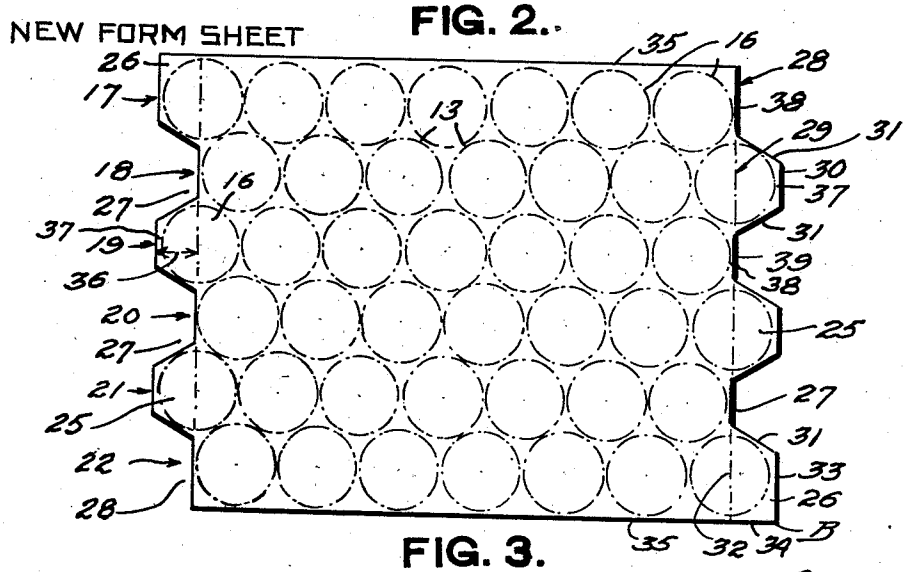
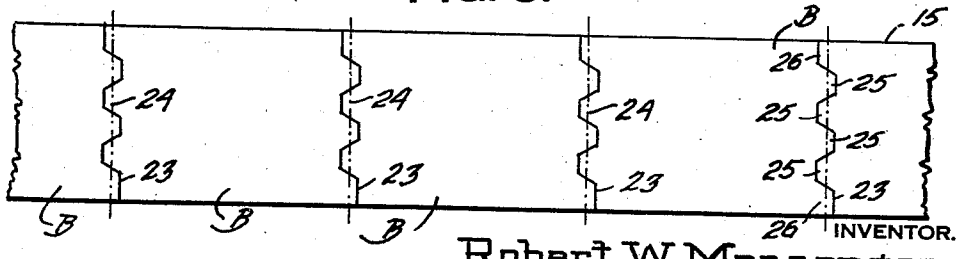


FIG. 3.



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SHEET AND METHOD OF PRODUCING SAME FOR THE ECONOMICAL PRODUCTION OF BLANKS

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10 Claims. (Cl. 164—17)

The present invention relates broadly to the art of cutting and punching sheets. It is particularly well adapted, altho not necessarily limited, to the manufacture of can ends.

Heretofore it has been the practice to cut a number of disc-like elements of the same size from a rectangular sheet of material in such manner that there is a considerable amount of waste material, and attempts have been made to utilize this waste material in the manufacture of secondary smaller disc-like elements or other fittings from the so-called "recovery piece." However, it is questionable that there is much, if any, economy in doing this because of the time and labor necessary to punch these smaller disc-like elements or fittings from the recovery piece, or to segregate them from the main products of the sheet if both the main and secondary products are cut simultaneously. Furthermore, the quantity of secondary products that may be produced from a sheet of a given size is to a degree fixed, say for example, four secondary products to twenty-eight main products. The demand for the number of secondary products may be greater than is supplied by this procedure, whereupon additional quantities must be produced by some other method, to supply the demand. On the other hand, the demand for the secondary products may be small, whereupon only a portion of those produced by the method are utilized, and many are wasted.

Even when sheet material is plentiful, the scrap which accumulates, as a result of striking disc-like blanks therefrom is often difficult to dispose of, and with the scarcity of materials, the wastage is a vital factor.

The principal object of the present invention is to reduce this wastage to a minimum, by the provision of sheets, cut from strip material, in such manner that a great number of disc-like elements of the same size may be struck therefrom without leaving any so-called "recovery pieces" and without the necessity of producing secondary products, in an attempt to conserve material.

More specifically, an object of the invention is to provide sheets from which disc-like blanks may be punched or cut, obtaining a greater number of such pieces per ton of sheets than can be obtained by blanking the pieces from the usual rectangular sheets.

Another object of the invention is to follow such steps in the method of producing the sheets from strip material that they may be made economically available, and packed for shipment and storage, occupying no greater space than the ordinary rectangular sheets of the same over-all dimensions, producing the same number of blanks per sheet, yet weighing less.

A still further object of the invention is to provide sheets each having an area sufficient for a plurality of potential disc-like blank providing spaces with material allowing for threads or webs between the blanks when they are cut or punched from the sheet, so as to avoid defective products, and which sheets each have marginal portions allowing for slightly greater threads or webs of material between certain blanks and margins of the sheets. This allowance for greater marginal threads or webs, among other things, avoids many defective blanks due to careless handling of the sheets, and affords a substantial area not intended for the potential disc-like blanks which may be placed next adjacent to gauge members generally used as parts of cutting or punching machines.

Other objects and advantages of the invention will appear in the following detailed description, taken in connection with the accompanying drawing, forming a part of this specification, and in which drawing:

Figure 1 is a plan view of the old form of rectangular sheet, illustrating by dot and dash lines the potential disc-like blank producing spaces thereon as quite commonly followed.

Figure 2 is a plan view of the new form of sheet illustrating by dot and dash lines the production of the same blanks from a smaller surface.

Figure 3 is a plan view on a reduced scale, showing a typical example of the manner in which strip material may be cut into sheets of the character shown in Figure 2.

In the drawing A designates an old form of rectangular sheet of material from which a great number of like blanks of the same size may be struck, but with considerable waste of material. By way of illustration this may be a commercial tin plate used for the production of "No. 2" can ends. By dot and dash lines potential can end producing spaces 4 are indicated, arranged in rows 5 to 10, inclusive, the spaces of any given row being in staggered relation to an adjacent row. This leaves a web or thread of material 11 between the openings formed by cutting of the can ends and an effort is made to make this web or thread as narrow as possible without producing defective products. The very considerable waste is indicated at the end of each row, as at the so-called "recovery pieces" or waste areas 12. In the example shown, these areas 12 are each

large enough to have struck therefrom the equivalent of substantially one-half a can and, if such were useful. As it is, these areas 12 are either mere waste or may be utilized for the production of secondary smaller disc-like elements or other fittings as previously described, but the economy of doing so is questioned. In sheet A, of the example shown, there is sufficient material which is either waste or potential recovery pieces equal to three can ends, if it were practical or economical to use them divided diametrically.

I provide a new form of sheet B cut from a strip 15 of parent material, shown in Figure 3. It is proposed to shear these specially shaped sheets, preferably, altho not necessarily, on a continuous strip mill, so they will be of uniform size sufficiently large to have a plurality of rows of potential can top or disc-like blank producing spaces 16, like in the old form sheet, but without the so-called "recovery pieces" or waste areas. For instance, in the example shown, the sheet B has potential can end producing spaces 16, as shown by dot and dash lines, arranged in rows 17 to 22 inclusive, the spaces of any given row being in staggered relation to the spaces of an adjacent row. A web or thread of material 13 is of course left between the openings formed in the sheet, similar to the web or thread 11 above mentioned.

The sheet B is preferably provided by severing the parent strip 15 transversely along spaced zigzag or serpentine lines 23. Each line 23 is reversely symmetrical about a transverse axis 24 producing spaced tabs 25 and 26 at opposite margins of the sheet B, as shown in Figures 2 and 3. It will be noted that the parent strip 15 is divided into a great number of sheets B which in cutting position dove-tail together so that there is no waste of material in the cutting of the parent strip into sheets. The result is that the tabs 25 and 26 at one margin of the sheet are in staggered relation with the tabs 25 and 26 at the opposite margin of the sheet. In other words, the tabs 25 and 26 on one margin of the sheet are complementary to notches 27 and 28, respectively, on the other margin of the sheet. The zigzag or serpentine cut is so made as to provide a tab 25 or 26 and a notch 26 or 27, respectively, for each row of potential blank producing spaces 16. Each tab is also of a size to provide substantially one-half of the space for a potential blank.

It is preferred to have each tab 25 of trapezium shape, so as to have a base line 29, an end edge 30 parallel thereto and diagonally related side edges 31, in converging relation from base line 29 to end edge 30. Obviously each end tab 26 may be likewise formed, but in the example shown each has a base line 32, an end edge 33, a diagonally related side edge 31 and a right angularly related side edge 34. The latter forms a continuation of opposite parallel sides 35 of the four sided sheet B which sides 35 parallel the axes of the rows 17—22 of spaces 16.

In practice, I find it desirable altho not essential to provide the tabs 25 and 26, each with an altitude 36 sufficiently great as to provide a thread 37 of material between the blank producing space 16, partially provided by the tab, and the end edge of the tab, that is greater than the narrowest portion of the web or thread 13 between adjacent spaces 16, when the blanks are punched from the sheet. This may be accomplished by allowing a minimum area of material for a thread 38 at each base 39 of the notch at the opposite side of the sheet. This additional material on the tabs, over or above that required for reasonable assurance that the blanks will be full size and that thread or web material will not be drawn into the die by the punch during the punching operation, has advantages not at once apparent. For instance, if the edge is nicked due to careless handling, there is sufficient material which will not be needed for production of the blank to receive the average blow without the nick extending into the blank space 16, whereas the thread or web area 38 is in a more protected position.

In the example shown in Figure 2 there are 6 rows of potential disc-like blank areas thus providing two tabs 26, one on each of two diagonal corners of the sheet, and this would be true whenever the number of rows is even. However, if the sheet is dimensioned for an uneven number of rows with corresponding tab and notch for each row, then there would be two tabs 26 on the same end of the sheet, yet when the sheets are in cutting position, as shown in Figure 3, they dove-tail together in the same manner, and the same knife or set of knives may be used to make all cuts of the strip material into sheets.

While I have herein referred to can ends as typical examples of disc-like blanks which may be made from the sheets B, it is understood that this is merely by way of example, and that the term "disc-like" is used in a broad sense to designate elements which may be economically cut in rows in staggered relation, such as polygonal or oval elements.

The term "zigzag" is also used in a broad sense to define the lines of severance of the strip material into sheets. It is intended to include such terms as "serpentine" or "in-and-out direction," altho it is believed a knife or knives for making tabs of trapezium shape is low in cost of manufacture and easy to keep sharp.

The strip material may, of course, be of metal, paper, cardboard, plastic board, etc., the principal object of the invention being to conserve material, worth saving, but which in the past has been wasted, due mainly either to its initial low cost when plentiful, or to the tendency of producers to continue use of old equipment regardless of the need for conservation.

I claim:

1. The method of providing sheets of the same over-all dimensions, from long, thin strip material, for the economical production of a great number of like blanks therefrom, which consists in severing said strip material transversely along zigzag lines at uniform, widely spaced intervals to produce sheets having spaced tabs at opposite edges, each tab of a size to provide substantially one-half of a potential blank.

2. The method of producing sheets of the same over-all dimensions, from long, thin strip material, each having an area sufficient for a great number of parallel rows of potential disc-like blank producing spaces, with the spaces of any given row in staggered relation to an adjacent row, which consists in severing said strip material transversely along zigzag lines at uniform, widely spaced intervals to produce sheets, each having a plurality of spaced tabs at opposite edges, each tab of a size to provide substantially one-half the area of one of said potential disc-like blank producing spaces, and axially aligned with one of said rows.

3. The method of providing sheets of the same over-all dimensions, from long, thin strip material, each having an area sufficient for a great

number of parallel rows of potential disc-like blank producing spaces, with the spaces of any given row in staggered relation to an adjacent row, which consists in severing said strip material transversely along like zigzag lines at uniform, widely spaced intervals to produce sheets, each having a plurality of spaced tabs at opposite edges, each tab complementary to the space at the opposite edge of the sheet between the tabs thereof, and each tab of a size to provide substantially one-half the area of one of said potential disc-like blank producing spaces, and axially aligned with one of said rows.

4. As an article of manufacture, a four sided sheet for the enonomical production of a great number of disc-like blanks of a given size therefrom, said sheet having two opposite tabbed side margins, the tabs each being of a size to provide substantially one-half the area of the given blank, and two opposite, straight, parallel side margins at least coextensive with the body of the sheet.

5. As an article of manufacture, a four sided sheet dimensioned to provide a great number of parallel rows of potential disc-like blank producing spaces, with a like number of said potential disc-like blank producing spaces in each of the rows, and the spaces of any given row in staggered relation to an adjacent row and with sufficient material to provide threads of material between the blanks when cut from the sheet, said sheet having two opposite straight sides paralleling said rows of spaces and the other two sides having spaced tabs aligned with the axes of said rows, said tabs each of a size to provide substantially one-half of the area of one of the potential blank producing spaces at the end of its respective row.

6. As an article of manufacture, a four sided sheet dimensioned to provide a great number of parallel rows of potential disc-like blank producing spaces, with a like number of said potential disc-like blank producing spaces in each of the rows, and the spaces of any given row in staggered relation to an adjacent row and with sufficient material to provide threads of material between the blanks when cut from the sheet, said sheet having two opposite straight sides paralleling said rows of spaces and the other two sides having spaced tabs aligned with the axes of said rows, said tabs each of a size to provide substantially one-half of the area of one of the potential blank producing spaces at the end of its respective row, and the tabs at one side of the sheet being in staggered relation to the tabs at the opposite side of the sheet.

7. As an article of manufacture, a four sided sheet dimensioned to provide a great number of parallel rows of potential disc-like blank producing spaces, with a like number of said potential disc-like blank producing spaces in each of the rows, and the spaces of any given row in staggered relation to an adjacent row and with sufficient material to provide threads of material between the blanks when cut from the sheet, said sheet having two opposite straight sides paralleling said rows of spaces and the other two sides having spaced tabs aligned with the axes of said rows, said tabs each of a size to provide substantially one-half of the area of one of the potential blank producing spaces at the end of its respective row, each tab being of trapezium shape and having an altitude sufficiently great to provide a thread of material between the blanks cut partially therefrom and the edge of the tab opposite its base line, greater than the thread of material between the other blanks of the row.

8. The method of providing elongated sheets from long, thin strip material of substantially uniform width, for the production of a great number of like blanks therefrom, which consists in severing said strip transversely, at spaced intervals greater than the width of said strip, along zig-zag lines reversely symmetrical about an axis normal to the edges of the strip, to produce elongated sheets, each having spaced tabs at opposite transverse edges, and substantially parallel longitudinal edges.

9. As an article of manufacture, a sheet shaped and dimensioned to economically provide a great number of parallel rows of spaced potential disc-like blank producing spaces, with a like number of said spaces in each row and the spaces of any given row in staggered relation to the spaces of an adjacent row, whereby the terminal blank producing spaces of any given row are offset with respect to the terminal blank producing spaces of any next adjacent row, and at least the opposite margins of said sheet adjacent said terminal blank producing spaces being of zigzag shape, following the said terminal spaces so closely at the axes of the rows that upon cutting the blanks from the sheet, only fine threads of waste material are produced between the terminal blanks of the rows and said zigzag margins at the axes of said rows.

10. As an article of manufacture, a sheet shaped and dimensioned to economically provide a great number of parallel rows of spaced potential disc-like blank producing spaces, with a like number of said spaces in each row and the spaces of any given row in staggered relation to the spaces of an adjacent row, whereby the terminal blank producing spaces of any given row are offset with respect to the terminal blank producing spaces of any next adjacent row, and at least the edges of the sheet at the ends of the rows being defined by a series of intersecting lines, the corresponding lines at the opposite ends of each row being parallel and disposed in close proximity to the terminal spaces of such row.

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