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2,014,815

METHOD OF AND MEANS FOR MAKING PRESSED PLATES, DISHES AND THE LIKE

Original Filed Jan. 20, 1934

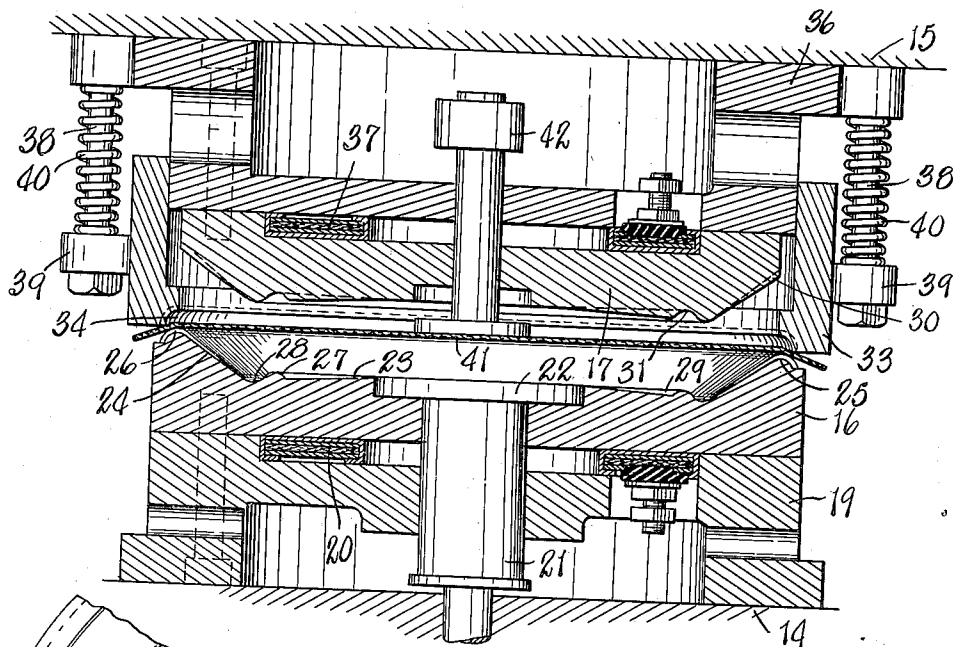


Fig. 1

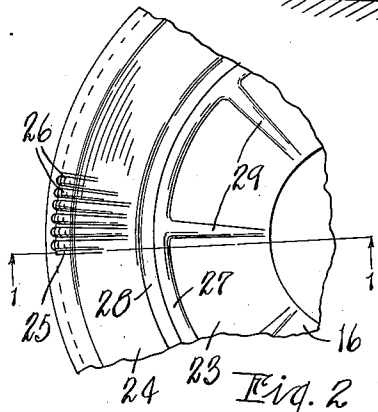


Fig. 2

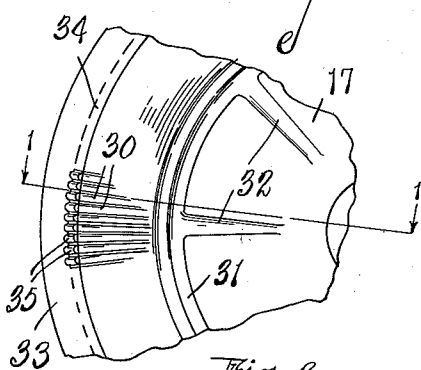


Fig. 3

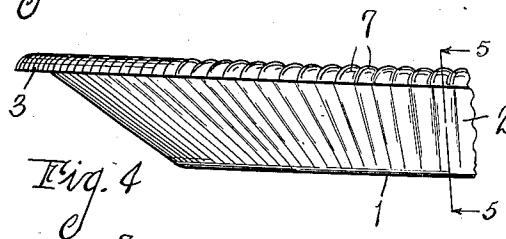


Fig. 4

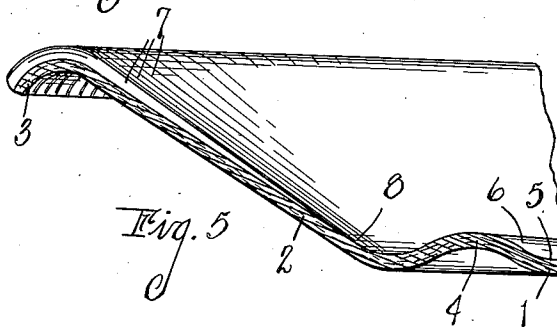


Fig. 5

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2,014,815

METHOD OF AND MEANS FOR MAKING
PRESSED PLATES, DISHES, AND THE
LIKERobert E. Rutledge, Kalamazoo, Mich., assignor
to Sutherland Paper Company, Kalamazoo,
Mich.Original application January 20, 1934, Serial No.
707,481. Divided and this application May 4,
1934, Serial No. 723,899

4 Claims. (Cl. 113—46)

This application is a division of my application, Serial No. 707,481, filed January 20, 1934, for Paper dishes and method and apparatus of forming.

5 The main objects of this invention are:

First, to provide a method of forming paper dishes, plates, and the like in which the stock in the formed dish is so disposed that the displacing strain thereon is minimized and the resulting dish is relatively rigid and attractive in appearance.

Second, to provide a method of forming paper dishes in which the number of defectives produced is greatly reduced when compared to the defectives produced by the other methods now in vogue or commercially practiced.

Third, to provide an improved apparatus for forming pressed dishes, plates, and the like capable of a large output with a minimum of defective dishes.

Fourth, to provide an improved method of and means for pressing paper dishes, plates and the like from flat blanks, the resulting product being very strong and rigid even when formed of light stock, the strain upon the stock in forming being minimized.

Objects relating to details and economies of my invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view mainly in section on a line corresponding to line 1—1 of Figs. 2 and 3 of my improved machine or apparatus, a single unit being illustrated.

Fig. 2 is a fragmentary plan view of the female die.

Fig. 3 is a fragmentary inverted view of the coating male die.

Fig. 4 is a fragmentary side or edge view of a plate made in accordance with my invention.

Fig. 5 is an enlarged fragmentary section taken on a line corresponding to line 5—5 of Fig. 4.

The plate or dish resulting from the practice of my invention is shown by Figs. 4 and 5 and comprises a bottom 1 and a side-wall 2, the side wall having a downturned rim 3. The bottom 2 merges into the side wall with a reverse curve providing an annular bead 4 at the base of the side wall. The bottom of the illustrated embodiment has a flat central portion 5 and radial substantially spaced inwardly tapered ribs 6. These ribs merge or fade into the flat portion of the bot-

tom. While I prefer to use a circular blank and radial ribs in my preferred embodiment, the blank may be any desired shape with the direction of the ribs changed accordingly.

The side wall of the dish has radial flute-like corrugations 7 which extend from the outer edge of the dish over its curved rim and to a point indicated at 8 which is above but adjacent the bottom of the dish. These flute-like ribs or corrugations taper inwardly so that they fade out at this point or zone 8. The resulting dish is very strong and rigid even when formed of relatively light stock and is attractive in appearance. The rim is stiffened so that the dish itself may be picked up by grasping the rim and side wall without the objectionable springing or yielding commonly incident to paper dishes.

A further advantage of these flute-like ribs in the side wall and rim is that the dish may be formed without undue displacement of the stock during the forming operation; that is, such displacement of the stock that will result in folds and tears and cracks which commonly result in a relatively large percentage of defective dishes in the manufacture of pressed dishes in accordance with the methods commonly employed.

The flutings or corrugations of the rim and side wall are highly desirable without the special bottom features, but the bottom conformation and the side wall conformation result in a very rigid dish as well as one which is attractive in appearance.

Other shapes may be satisfactorily produced embodying certain of the features of my invention.

In Figs. 1, 2 and 3, I illustrate my apparatus or machine for forming the improved dishes, 14 representing the bed of the machine and 15 a reciprocating plunger. I have illustrated but a single unit, but it will be understood that in practice a plurality of the die or forming units are provided. The machine consists of a female die 16 and a coating male die consisting of an inner member 17 and an outer annular coating member 33. The female die is supported on the die block 19 mounted on the bed of the machine, this being designed to receive a heating unit 20.

The knock-out 21 is provided with a disk-like head 22, the face of which is flush with the bottom of the die. A fragmentary plan view of the female die is shown in Fig. 2 and this consists of the bottom portion 23 and the side wall portion 24 terminating in a down-curved rim portion 25. The rim and side wall portions have inwardly tapered corrugations or flutings 26

which merge into the side wall or flat portion thereof at a point adjacent but above the bottom. Only a portion of these flutings are shown, but it will be understood that they extend around the entire circumference of the female die member.

The bottom is provided with a raised rib 27 which merges into the side wall with a reverse curve 28. This rib 27 is annular and forms the annular bead 4 of the dish. The female die has inwardly tapered ribs 29 which form the ribs 6 of the dish. The inner male die member 17 is formed to complement the female die member, that is, the parts thereof with which it coacts, the male die member having on its side wall portion inwardly tapered corrugations 30 complementing the inner portions of the corrugations 26 of the female die member. It has an annular groove 31 complementing the annular rib 27 of the female die member and radial grooves 32 complementing the radial ribs 29 of the female die member.

The outer annular male die member 33 has a rim forming portion 34 which complements the side wall portion of the male die member and coacts with the outer rim portion of the female die member. This outer die member 33 has corrugations 35 aligned with the corrugations 30 of the male die member when the forming dies are closed.

The die member 17 is mounted upon the die block 36 which carries a heating element 37. The die member 33 is reciprocatingly mounted on the die block 36 and plunger 15, guide rods 38 being provided slidably engaging the ears 39 on the die member 33. Coiled springs 40 are arranged on these guide rods and act to urge the die member forwardly, so that as the plunger is advanced, the outer die member 33 will first engage the work 41, as shown in Fig. 1, which has been positioned upon the female die member.

The plunger 15 is indicated in a slightly advanced position. As advancement continues, the die member 33 is yieldingly advanced to engage the work although it will draw in somewhat due to the center engaging weight 42 reciprocatingly disposed through the inner male die member and engaging the work, as shown in Fig. 1. As the dies are closed, the work is gradually conformed, the edges being drawn inwardly and the corrugations in the side wall and rim formed and also the bottom conformations produced.

The conforming stresses are so distributed that there is no serious rupturing, breaking or folding of the stock, the flutings caring for the excess stock in the rim resulting from the dishing action of the dies. The resulting product is highly attractive in appearance and is very strong and rigid considering the stock employed.

The simultaneous forming of the flutings with the dishing of the blank distributes the stock uniformly throughout, and I am enabled to produce highly satisfactory dishes with a minimum of waste or defective dishes.

Blanks of any shape may be used as disclosed

in the parent application, in which case the corrugations and ribs would conform to the shape selected and would not necessarily be annular or radial.

I have illustrated and described my improvements in a highly practical embodiment thereof. I have not attempted to illustrate or describe various adaptations which are possible as it is believed that this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of forming paper dishes from circular blanks of fibrous material, consisting of pressing into dish form and simultaneously forming an annular bead in the bottom adjacent and merging into the side wall with a reverse curve, radial inwardly tapering ribs extending inwardly from the bead and merging into a flat central portion of the bottom, and a down-curved rim with uniformly spaced inwardly tapered flute-like corrugations extending inwardly from the edge of the rim and fading out adjacent the bottom of the side wall.

2. The method of forming paper dishes from circular blanks of fibrous material, consisting of pressing into dish form and simultaneously forming an annular bead in the bottom adjacent and merging into the side wall with a reverse curve, and inwardly tapering ribs extending inwardly from the bead and merging into a flat central portion of the bottom.

3. The method of forming paper dishes from circular blanks, consisting of pressing into dish form, and simultaneously forming a down-curved rim and inwardly tapering uniformly spaced flute-like corrugations extending inwardly from the edge of the rim and fading out in the side wall of the dish.

4. In an apparatus for forming dishes from paper blanks, the combination of a dished female die having a side wall portion provided with curved edge and radial inwardly tapering flute-like corrugations extending inwardly from the edge and fading out at a point above but adjacent the bottom of the die, the bottom of the die having an annular rib adjacent the side wall merging into the side wall with a reverse curve and inwardly tapered radial ribs extending inwardly from the annular rib and fading out in substantially spaced relation to the center, a co-acting male die comprising an annular outer member having corrugations complementary to the corrugations of the rim portion of the female die, and an inner member having a face complementary to the bottom and side wall portion of the female die, means for actuating said die members, and means for yieldingly supporting the outer male die member relative to the inner during the initial portion of the closing stroke of the dies whereby the outer male die member is brought into engagement with the work prior to the engagement thereof by the inner male die member.

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