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3,007,377

FLUTED PAPER CUPS AND MACHINE FOR MAKING SAME

Filed March 11, 1959

2 Sheets-Sheet 1

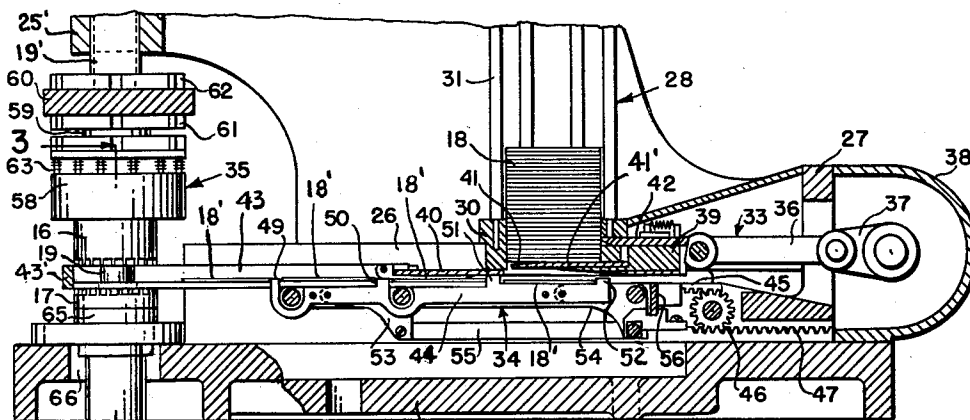


FIG. 1.

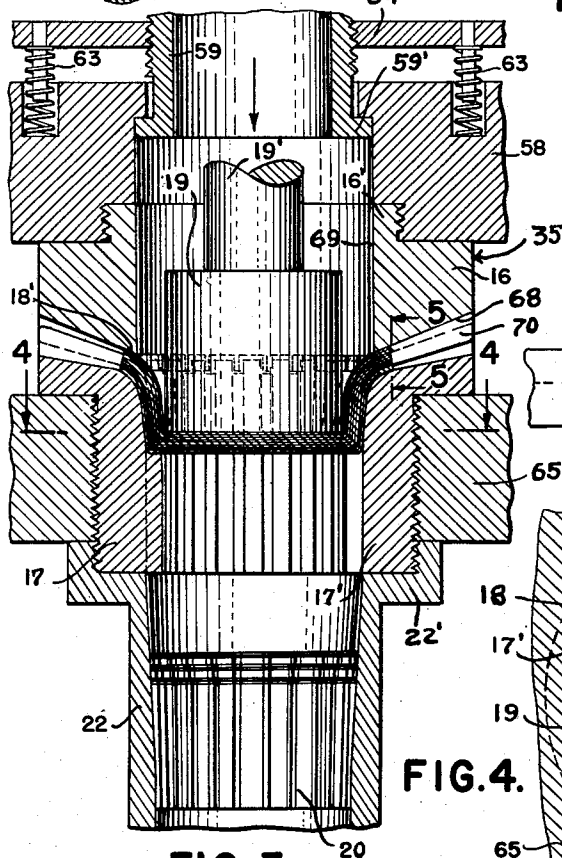


FIG. 3.

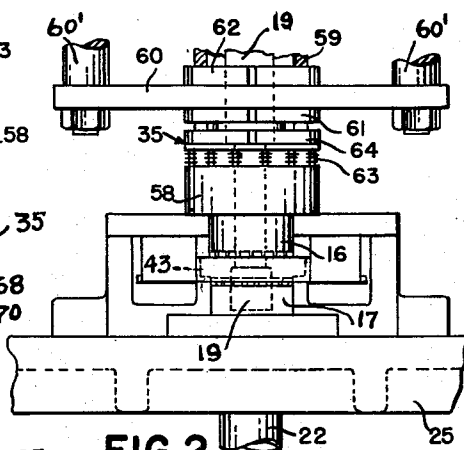


FIG. 2.

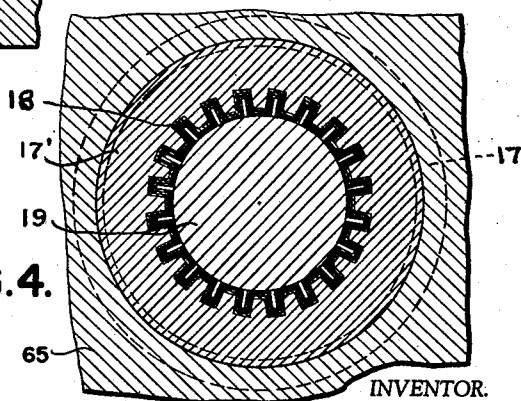


FIG. 4.

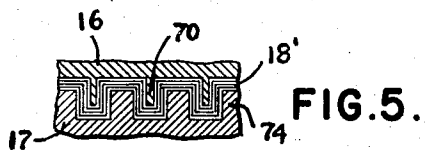


FIG. 5.

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2 Sheets-Sheet 2

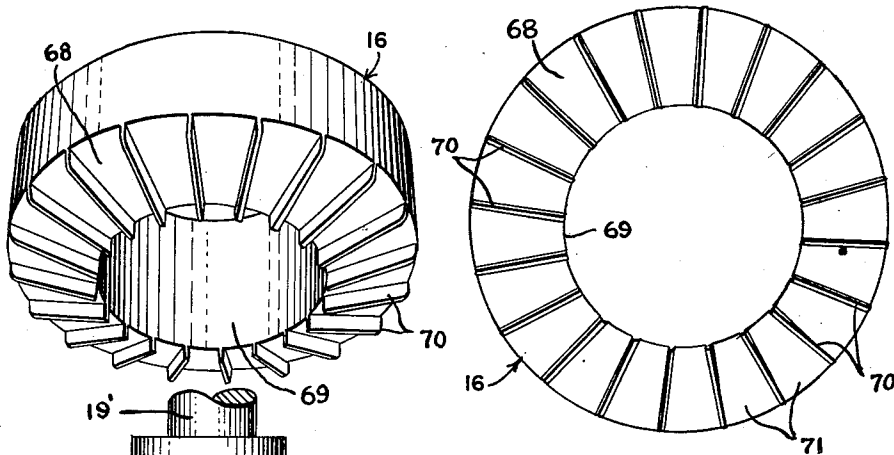


FIG. 7.

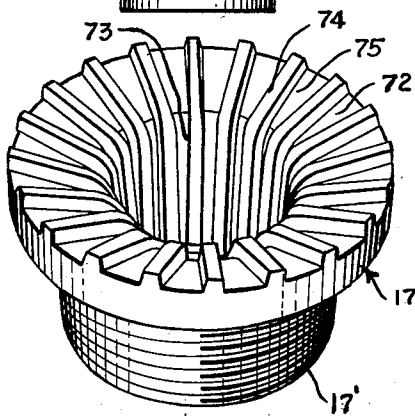


FIG. 6.

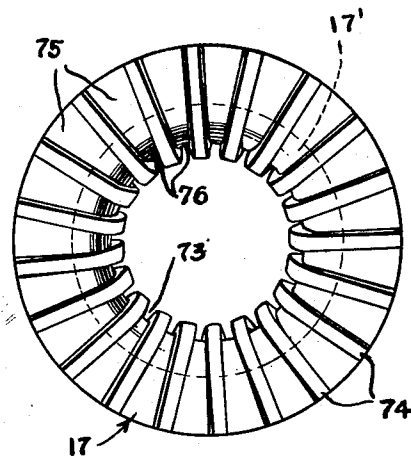


FIG. 8.

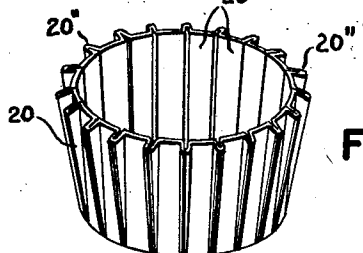


FIG. 9.

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FLUTED PAPER CUPS AND MACHINE FOR MAKING SAME

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3 Claims. (Cl. 93—60)

This invention relates to fluted paper cups and to a machine for forming the same.

It is the principal object of the present invention to provide a paper cup more particularly adapted for receiving and supporting fruit.

It is another object of the invention to provide a paper cup for supporting fruit without injuring the fruits but that can be formed by forcing a multiple number of paper blanks through dies in the same manner as with the forming of the ordinary sharp fluted cups made for cakes and pastries.

It is still another object of the invention to provide a paper cup for fruit which is fluted to provide a large flat area inside the cup next to the fruit so that the fruit will be cushioned and not subjected to sharp creases of the conventional cup that tend to penetrate and cut into the fruit as the fruit is shaken during transport and handling.

It is a further object of the invention to provide in a machine for making fluted paper cups for supporting fruit in which all of the multiple blanks when forced through the dies will be assured when shaped into the cups to have the flat flutes inside every cup regardless of whether a cup was made from the top blank or the bottom blank of the group upon being forced through holding and forming dies.

Other objects of the invention are to provide a paper cup for supporting fruit having the above objects in mind, which is simple in construction, as inexpensive to manufacture as the standard cake cups, requires dies of simple configuration, made with a non fluted plunger in which the cup is of pleasing appearance, easy to handle, keeps its shape, light in weight, efficient and effective in use.

For other objects, and for a better understanding of the invention, references may be had to the following detailed description taken in connection with the accompanying drawing, in which:

FIGURE 1 is a longitudinal sectional view of a paper cup forming machine for feeding the paper blanks in multiple number to the die and plunger assembly in which the present cup is made,

FIG. 2 is a fragmentary end elevational view of the cup forming machine,

FIG. 3 is an enlarged vertical sectional view taken through the die and plunger assembly with one set of blanks in the process of being forced through the dies and other cups in the delivery tube, this view being taken generally on line 3—3 of FIG. 1,

FIG. 4 is a transverse sectional view taken through the bottom of the die and plunger assembly as viewed on line 4—4 of FIG. 3,

FIG. 5 is a fragmentary vertical sectional view of the upper and lower dies with the paper cups therebetween and as viewed on line 5—5 of FIG. 4,

FIG. 6 is a collective view of the die and plunger assembly with the upper and lower dies in perspective and the plunger in fragmentary elevation,

FIG. 7 is a bottom plan view of the upper die,

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FIG. 8 is a top plan view of the bottom die, and

FIG. 9 is a perspective view of the paper fruit cup of the present invention and shaped with the above die assembly.

Referring now to the drawings, 15 represents the paper cup forming machine from which the present cups are made. Circular blanks are separated in multiple number as indicated at 18, say from thirty to thirty-five, from a stack 18 in a magazine 28 by a separating mechanism 33 and delivered by a conveyor mechanism 34 to a die and plunger assembly 35 where the cups are finally shaped. This die and plunger assembly 35 generally comprises an upper die 16 that is lowered onto the multiple number paper blanks 18' and a fluted lower die 17 and a plain non fluted plunger 19 that forces the paper blanks through the bottom die to form the cups 20 and drop them into a delivery chute 22.

In order to have a paper cup adapted for fruit so as to prevent the same from being cut by the internal creases, the cup 20 of the present invention has in lieu of the usual creases of the standard fluted cup internal parallel flat flutes 20', FIG. 9 against which the fruit rests and is cushioned. Accordingly an entirely new die and plunger assembly has had to be worked out for the forming of these cups and such that they may be formed in mass production and multiple number as with the standard sharply creased fluted cups made for pastries and cakes and the like and which have proved unsuitable as above stated for fruits because of their sharp internal edges or creases tending to cut through the surface of the fruit, injure, destroy their appearance, and cause their decay. A die and plunger assembly has been made that is unlike the fluted die and plunger assemblies which have been used for the ordinary sharp fluted cups. The upper and lower dies for the ordinary cups have been similarly fluted and the plunger has been fluted to carry through the fluting of the upper die on forcing the cups through the lower die.

Accordingly, there has been worked out a die and plunger assembly in which the same mass production of the cups as with the ordinary cups can be maintained yet provide this different shape cup with the flat internal cushion flutes. According to the die assembly of the present invention the flutes or ribs of the upper die are minute and widely spaced for the more or less standard internally fluted lower die wherein the flutes are wide and the spacings between are equal to the width of the flute and the plunger is unfluted and of cylindrical shape with a smooth surface. These are the distinguishing features of the present die and plunger assembly which has had to be developed for the shaping of the cups suitable for holding fruit. A more detail description of the die and plunger assembly will be given hereinafter.

The ordinary creased fluted cups for cakes have been made with machine shown in the present inventor's own Patent 1,413,181 and a brief description of this machine will be made for so much of the same as is shown in the figures of this present description, in order that the procedure and manner of feeding the blanks and forming the cups in mass production may be understood.

This cup forming machine 15 has a bed plate 25 with upstanding side flanges 26 closed at one end by an end flange 27 and opened at the other end. The magazine 28 is kept filled with circular paper blanks and has a bottom ring 30 from which guide bars extend upwardly.

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The separating mechanism 33 is reciprocated by a connecting rod 36 and a power driven crank 37 in casing 38 on the end flange 27. This separating mechanism has a carriage 39 on which is a plate 40 that supports the stack of blanks 18 while the group of blanks is being separated therefrom by the blade 41 as the mechanism is moved forwardly. An independently operable blade 41 is biased to compress the lower portion of the stack onto the plate 40 to insure that an equal number of the blanks will always be separated by the separating blade 41. The operation is such that as soon as the blanks are held by the blade 42 the separating blade 41 engages the stack therebeneath and as soon as the separating blade has completely separated the group of blanks the blade 42 is released so as not to interfere with the subsequent movement of the blanks therebetween. A blade 41' under the separating blade 40 serves to peel the separated blanks which may tend to adhere to the underside of the blade 41 as they abut the side of the magazine ring 30 and leave the plate 40 for deposit on the conveyor mechanism as shown at 18' under the magazine 28, and with the conveyor mechanism 34 fully retracted. The conveyor mechanism steps the groups of blanks 18' along a guideway 43.

The conveyor mechanism has a carriage 44 under the guideway 43 and a rack 45 of the separating carriage 39 works a reversing gear 46 and a rack 47 to reciprocate the carriage 44 in reverse movement to the separating carriage 38. The conveyor carriage 44 has upwardly extending fingers 49, 50, 51 and 52 which move the respective groups 18' of blanks forwardly and are then retracted as the carriage is returned to again move the group of blanks forwardly. The last finger 49 on its forward movement locates the group of blanks against a stop 43' of the guideway 43 and between the upper and lower dies 16 and 17 of the die plunger assembly 35, the dies having been opened in time relation to this movement to receive the blanks. The fingers 49, 50, 51 and 52 are lowered by bell cranks 53 and 54 that are connected together by a link 55 and operated by a stop 56. In this manner the groups of blanks are delivered to the die and plunger assembly 35.

The die and plunger assembly 35 has a heavy ring 58 into the underside of which upper die 16 is secured by its threaded projection 16', FIG. 3. This ring 58 is slidably supported upon a vertically extending threaded sleeve 59 and held against downward displacement therefrom by its flange 59'. The upper end of the sleeve 59 is adjustably fixed to a reciprocating arbor plate 60 by means of lock nuts 61 and 62. The arbor 60 has vertical operating members 60' that connect with timed operating mechanism not shown to raise and lower the upper die. Adjustable upon the sleeve 59 below the lock nut 61 is an adjustable spring tensioning nut 64 that is adjustable upon the threaded sleeve 59 to vary the spring tension of the spring assembly 63 that react between the adjusting nut 64 and the ring 58 to maintain the desired operating pressure upon the group of blanks 18' being forced by plunger 19 through the dies 16 and 17 and the finished cup 20 into the delivery chute 21. A plunger rod 19' that carries the plunger 19 is reciprocated in the sleeve 59 and arbor 25' in FIG. 1 extending upwardly from the bed frame 25 of the machine.

The lower die 17 has a threaded shank portion 17' that is threaded through and retained in a bottom block 65 that rests on the bed frame 25 over an opening 66. The delivery tube 22 is secured by its internally threaded flange 22' to the lower end of the shank 17' of the bottom dies so that the bottom die is held against upward displacement from the block 65 and the delivery chute will extend downwardly through the opening 66.

As above related, it will be understood that specially shaped dies 16 and 17 and an unfluted plunger is needed to produce the paper flute cup 20 shown in FIG. 9. The

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upper die 16 has a bottom conical underface 68 that is tapered from a plunger opening 69 upwardly and outwardly to approximately twenty-six and one half degrees. Thin radially-extending projections 70 depend from this conical surface 68 and have their lower edges inclined approximately nineteen degrees from their inner ends to their outer ends. These projections 70 are circumferentially spaced to provide space 71 therebetween in a diverging manner from one another beginning from their inner ends and outwardly and due to their thinness allow a wide flat flute to be established on the interior of the cup 20 and cause but a small external sharp flute 20'' on the exterior of the cup, FIG. 9.

The lower die 17 is differently shaped and has a top conical surface 72 extending at an angle of approximately thirteen and one half degrees from internal plunger opening 73 upwardly to the outer periphery thereof. Ribs 74 extend from the opening 73 that are relatively thick and with their edges running upwardly therefrom at an angle of approximately twenty degrees. The ribs 74 extend also downwardly through the opening 73 in the shank 17' and while having flared spacings 75 upon the conical surface 72 run downwardly through the opening with uniform spacings.

The surface 75 is rounded at 76 as it passes into the opening 73. The paper blanks are preshaped and by the projections 70 of the upper die 16 when closed upon the paper blanks to force them into spaces 72 of the bottom die. As the smooth unfluted plunger 19 continues to force the paper blanks downwardly through the opening 73 they are drawn over the portions of the ribs so that their inner flutes are not indented or caused to be restrained in the spaces 73 as the final shaping of the cups is being effected. By relieving the plunger of flutes permits the forming of flat wide internal flutes of the cup, unshaped by the sides of the plunger and conforming to its preshaping by the thin depending projections of the upper die. Accordingly there has been provided a machine and die assembly by which wide internally fluted and cushioned cups adapted for supporting fruit without rupture to the same has been resulted.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A die and plunger assembly for forming fluted paper cups with wide internal flattened flutes from a multiple number of paper blanks with one forcing operation comprising a lower die having a conical top surface and a central opening therethrough, uniformly spaced ribs extending over the conical surface and downwardly through the central opening, said ribs running substantially parallel to one another and spaced from one another substantially the width of the rib, a top die having an opening therein and a conical undersurface, said undersurface having thin depending and radially extending projections adapted to enter the spaces between the ribs on the conical surface of the lower die, centrally thereof and leaving sufficient space to accommodate the multiple thickness of the paper blanks, said upper die having an opening therethrough and a plunger operable through the openings of the dies to pull the multiple blanks through the joined ribs and projections on the conical surfaces of the upper and lower dies, said plunger having a cylindrical and smooth external surface.

2. A die and plunger assembly as defined in claim 1, and said conical surface of the die being rounded into the central opening, said spaces on the bottom die diverging from the opening to the outer periphery and said thin depending and radially extending projections on the undersurface of the upper die diverging from the opening to the outer periphery.

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3. A die and plunger assembly as defined in claim 2, and said conical face on the lower die running approximately thirteen and one half degrees horizontal and the upper edges of the ribs over the conical surface running at an angle of approximately twenty degrees, and the conical undersurface on the upper die running outwardly and upwardly at an angle of approximately twenty-six and one half degrees and the lower edges of the projections running similarly at an angle of approximately nineteen degrees.

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