

- (21) Application No. 36269/75
- (22) Filed 3 Sep. 1975
- (23) Complete Specification Filed 2 Sep. 1976
- (44) Complete Specification Published 2 Apr. 1980
- (51) INT. CL.<sup>3</sup> A47G 19/23
- (52) Index at Acceptance  
A4A 1B1 1B2 1C1 2B 6D
- (72) Inventor: RONALD KELLY

(19)



(54) DISPOSABLE DRINKING CUP

(71) We, MONO CONTAINERS LIMITED, a Company organised under the laws of England, of Malt House, Field End Road, Eastcote, Ruislip, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to disposable drinking cups such as those of seamless plastics sheet material preferably high impact sheet polystyrene but possibly also foam sheet polystyrene material and one object is to provide a suitable design enabling a cup to be stacked with identical cups, leaving a space between the bottoms of a pair of nested and nesting cups in which a metered amount of an ingredient such as powdered coffee for subsequently making a drink can be stored while the stack of nested cups is being delivered to the machine or is in the machine waiting for a cup to be dispensed when a drink is purchased by a customer.

According to the present invention the cup comprises a disposable drinking cup comprising a bottom and side wall which has means defining upper and lower stacking surfaces and has a projection arranged around the side wall substantially normal to the axis of the cup so that when two such cups are nested together the lower stacking surface on the upper cup sits on the upper stacking surface of the lower cup and the projection on one cup engages with slight interference a substantially plain portion of the side wall of the other cup to resist frictionally the separation of the two cups.

The arrangement can provide location against tilting of one cup in relation to the other and/or it can provide a seal between the space between the bottoms of the two cups and the outside of the nested pair in which space the ingredient will be housed and/or it can prevent the cup being sepa-

rated without an axial pull.

Conveniently the upper and lower stacking surfaces are designed at top and bottom respectively of an upwardly converging local part of the side wall.

The seal between the space between the bottoms of the two cups and the outside of the nested pair could be achieved where the stacking surfaces locate one another if these are circumferentially continuous surfaces and/or it could be achieved where the projection engages the side wall of the other cup where the projection is circumferentially continuous. Indeed there may be two seals one at each place.

The projection might be an internal ring so that it is the ring on the lower cup that engages the side wall of the upper cup but it is preferred that it is an external projection so that it is the ring on the upper cup that engages the side wall of the lower cup because then the ring can effectively constitute a lid groove either for the upper most cup only in the stack to provide a seal for the space containing the ingredient or indeed can be used after the drink has been made by pouring boiling water on the powder to prevent the drink spilling before use.

Conveniently the side wall of the cup has upper and lower radically projecting latching means so that when the two such cups are stacked together with their stacking surfaces seated, the lower latch means on the upper cup engages with the upper latch means on the lower cup to hold them positively engaged in sealing contact by use of elastic deformation of the wall material of the cup.

The invention includes a stack of two or more such cups all of which, with the possible exception of the upper cup include an ingredient for making a drink in the space between the bottoms of a nested pair of cups. There may also be a lid or other closure means in the uppermost cup of the

50

55

60

65

70

75

80

85

90

stack.

The invention may be carried into practice in various ways and one embodiment and a modification will now be described by way of example with reference to the accompanying drawings, of which:-

*Figure 1* is an elevation of a cup

*Figures 2 and 3* are details to an increased scale showing how two cups as shown in *Figure 1* co-operate with each other, when nested; and

*Figure 4* shows a modification of *Figure 3*.

In the cup of *Figure 1* the bottom 11 is generally flat with a very shallow central recess and the side wall 12 is generally frusto-conical diverging upwards. At the bottom there is a ring 13 which converges upwards at an angle of  $2^\circ$  to the axis, leading to an outward narrow horizontal shoulder 23. Above the shoulder 23 a short wall portion 24 diverges upwards at an angle of  $15^\circ$ , and leads to the main part of the side wall 12 which is at an angle of  $4^\circ$  and leads to a curled over drinking rim 15 at the top.

The central part of the wall 12 has a number of strengthening ribs 25 formed by narrow horizontal shoulders and vertical cylindrical rings.

The uppermost cylindrical ring terminates in an upwardly-divergent frusto-conical ring 26 and above that an upwardly-convergent frusto-conical ring 27 of greater height than the ring 26 and at a shallow angle of  $2^\circ$  to the vertical axis.

The shoulder 23 defines a stacking surface for the stacking surface formed at the lower corner 17 of an upper, nested cup as shown in *Figure 2*. The outward projection 14 on the upper cup formed by the rings 26 and 27 is an interference fit with the a substantially plain portion of the side wall of the lower cup above the ring 27 so that it slightly deforms that side wall as shown in *Figure 3* to locate the cups against relative tilting, to provide a seal against the passage of air to and from the space between the two cups and to provide, without interlocking, sufficient frictional resistance to prevent the cups of a stack being separated without a reasonable axial pull on them.

Coffee powder 18 is included in the space between the bottoms 11 of the two cups and is effectively sealed from the atmosphere by a seal at the surfaces 23 and 17 as well as the sealing ring at 14. The cup can be conventionally vacuum formed forming from sheet high-impact polystyrene material to be of cheap seam-less construction suitable for throwing away after use.

The inside of the ring 14 can be used as a recess to receive the peripheral edge of a lid after the drink has been made or indeed for the upper cup of a stack to prevent the ingredient 18 in that upper cup being in contact with the external air before the

drink is made. The cup is suitable for use in automatic vending machines where known mechanism can pull the lower cup from a stack before hot water is poured in to make the drink.

In a modification the ring 14 extends radially inwardly instead of outwardly and similarly provides location against tilting and friction against separation but then it is not very convenient for use with a lid.

The reverse-tapered stacking ring 13 could be near the top of the cup just below the rim rather than at the bottom as shown in *Figures 1* and *2*, and the external circumferential sealing ring 14 could then be near the bottom of the cup. The operation is quite similar except that the seals are the other way round and from some points of view this is considered to have not such a pleasing appearance.

Finally on the modification shown in *Figure 4* it will be seen that the cups of *Figures 1, 2* and *3*, can each have an upper latching means in the form of a radially inward resilient projection 21 and a lower latching means in the form of a radially outward projection 22 which have to be deformed to snap past each other and engage a series of such cups in a stack with the stacking surfaces in good sealing contact against axial separating pull, such engagement operating in addition to the frictional resistance afforded by the projection 14.

#### WHAT WE CLAIM IS:-

1. A disposable drinking cup comprising a bottom and a side wall which has means defining an upper and lower stacking surfaces and has a projection arranged around the side wall substantially normal to the axis of the cup so that when two such cups are nested together the lower stacking surface on the upper cup sits on the upper stacking surface of the lower cup and the projection on one cup engages with slight interference a substantially plain portion of the side wall of the other cup to resist frictionally the separation of the two cups.

2. A cup as claimed in Claim 1 which is shaped such that when two such cups are nested together a seal is provided between the space between the bottoms of the two cups and the outside of the nested pair.

3. A cup as claimed in Claim 2 in which the seal is provided where the stacking surfaces, which are circumferentially continuous surfaces, locate one another.

4. A cup as claimed in Claim 2 or Claim 3 in which the seal is provided where the projection which is circumferentially continuous around the side wall, engages the side wall of the other cup.

5. A cup as claimed in any preceding Claim, in which said projection comprises an upwardly divergent frusto-conical first ring above which is an upwardly convergent

frusto-conical second ring of greater height than the first ring.

6. A cup as claimed in any preceding Claim, in which the upper and lower stacking surfaces are at top and bottom respectively of an upwardly converging local part of the side wall.

7. A cup as claimed in any preceding Claim in which the projection is an internal ring.

8. A cup as claimed in any of Claims 1 to 6 in which the projection is an external projection.

9. A cup as claimed in any preceding Claim in which the side wall has upper and lower radially projecting latching means so that when two such cups are stacked together with their stacking surfaces seated, the lower latch means on the upper cup engages with the upper latch means on the lower cup to hold them positively engaged in sealing contact by means of elastic deformation of the wall material of the cup.

10. A cup arranged substantially as herein specifically described with reference to the accompanying drawings.

11. A stack of two or more cups each as claimed in any preceding Claim, which, with the possible exception of the upper cup, include an ingredient for making a drink in the space between the bottoms of a nested pair of cups.

12. A stack as claimed in Claim 11 in which there is a lid in the uppermost cup of the stack.

KILBURN & STRODE  
Chartered Patent Agents  
Agents for the Applicants

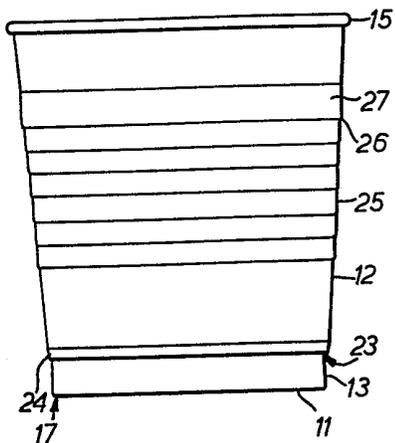


FIG. 1.

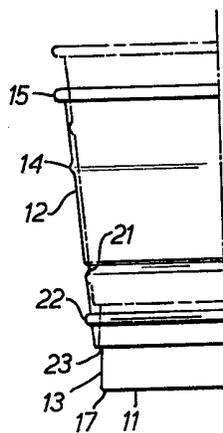


FIG. 4.

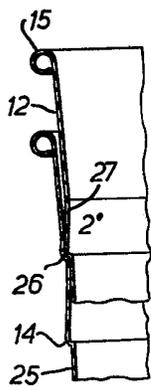


FIG. 3.

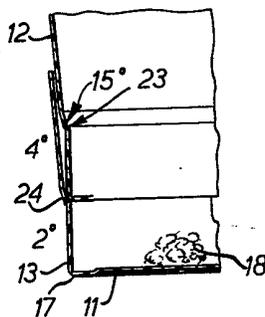


FIG. 2.