United States Patent

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[54] **MAGNETIC SYSTEM FOR RETAINING DISHES ON A TRAY DURING SERVICE**
1 Claim, 7 Drawing Figs.

[52] **U.S. Cl.** **220/23.83**
[51] **Int. Cl.** **A47g 19/10, B65g 21/00**
[50] **Field of Search** ..... 206/DIG. 33; 335/303; 248/206 A; 220/23.83, 69; 224/48

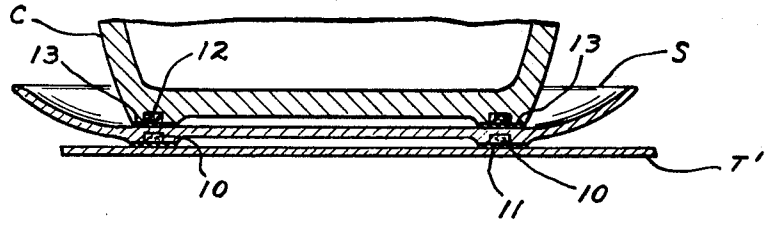
[56] **References Cited**

UNITED STATES PATENTS

425,768	4/1890	Ezell	206/DIG. 33
2,018,271	10/1935	Lewis	220/69
2,737,956	3/1956	Casper	206/DIG. 33
2,845,207	7/1958	Klinghoffer	224/48
2,963,167	12/1960	Norman	248/206 A
3,123,935	3/1964	Williams	248/206 A
3,212,546	10/1965	Lind	335/303 X
3,228,133	1/1966	Baermann	248/206 A
3,483,494	12/1969	Cromie	335/303
3,508,183	4/1970	Pinckard	248/206 A

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ABSTRACT: A combination and structure of serving tray and dishes wherein between the base areas of the dishes and the upper surface area of the tray are interposed permanent magnet elements secured to one of said surfaces, and thin sheets of magnetic metal secured to the other of said surfaces. In both instances (securing of the magnetic elements and securing of the metal elements respectively) the elements are preferably coated and covered and sealed to the said surfaces by thin coatings or laminations of plastic material.



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SHEET 1 OF 2

FIG. 1

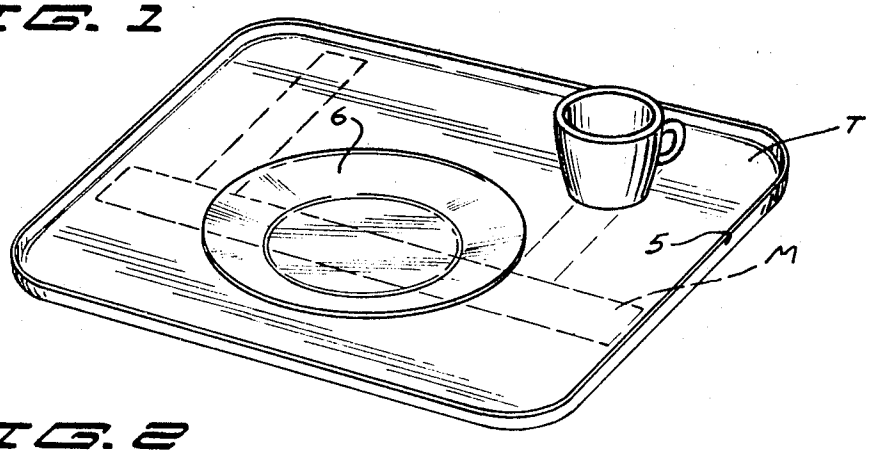
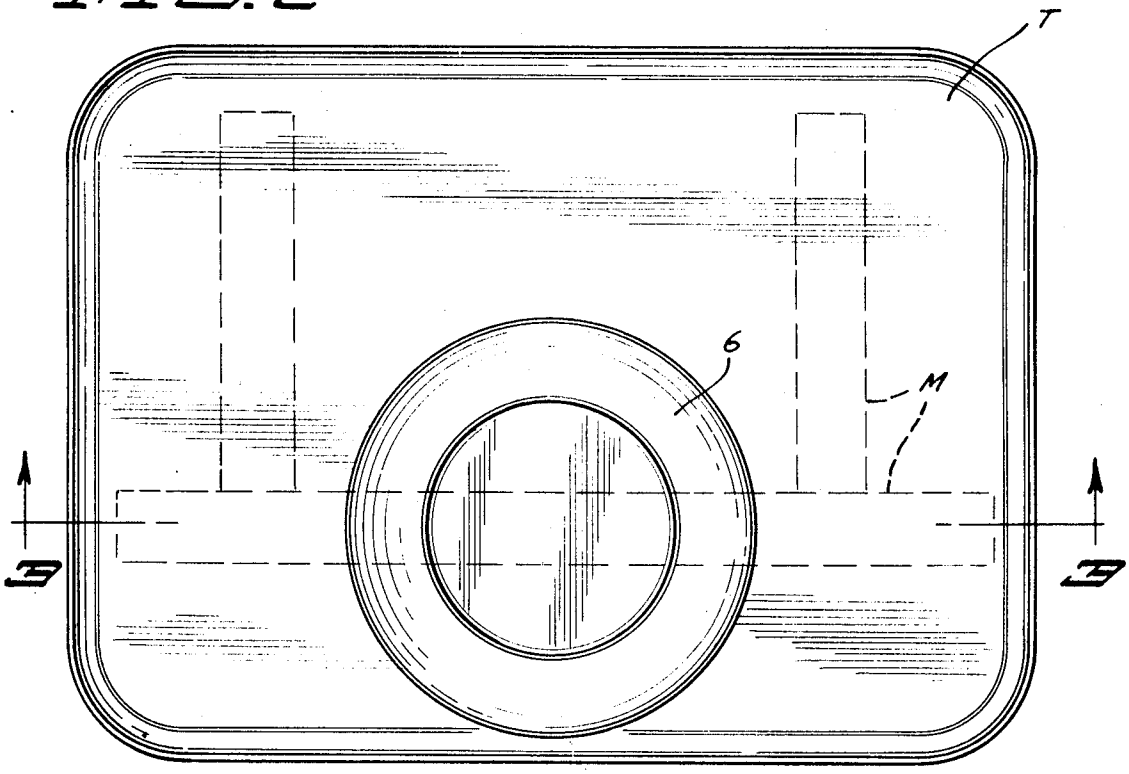


FIG. 2



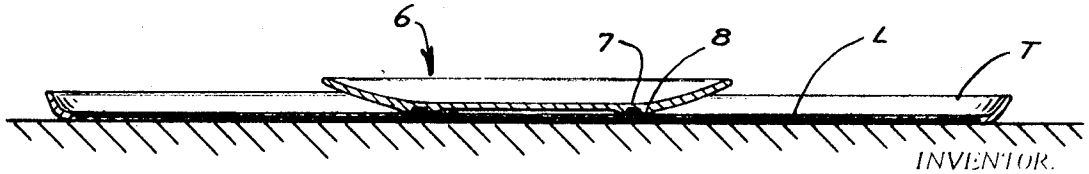


FIG. 3

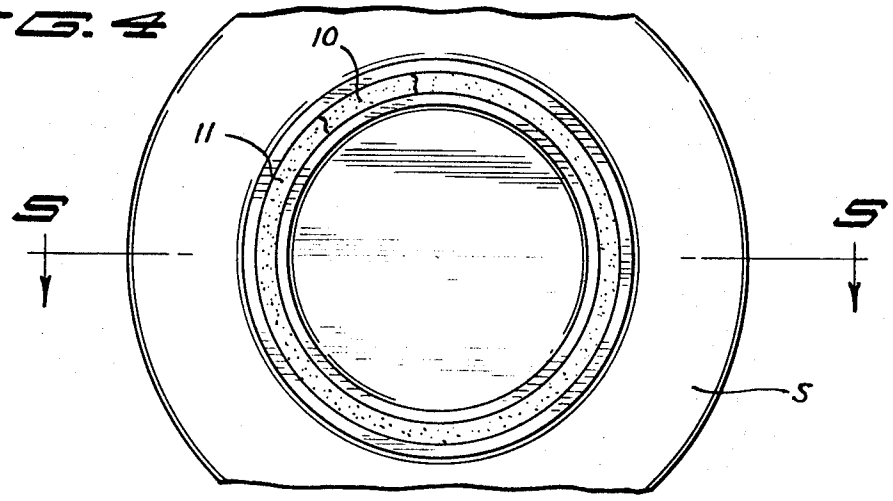
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FIG. 4



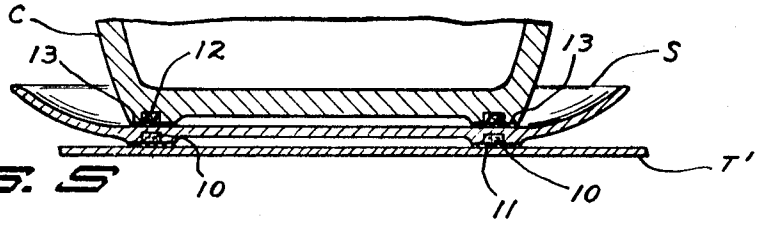
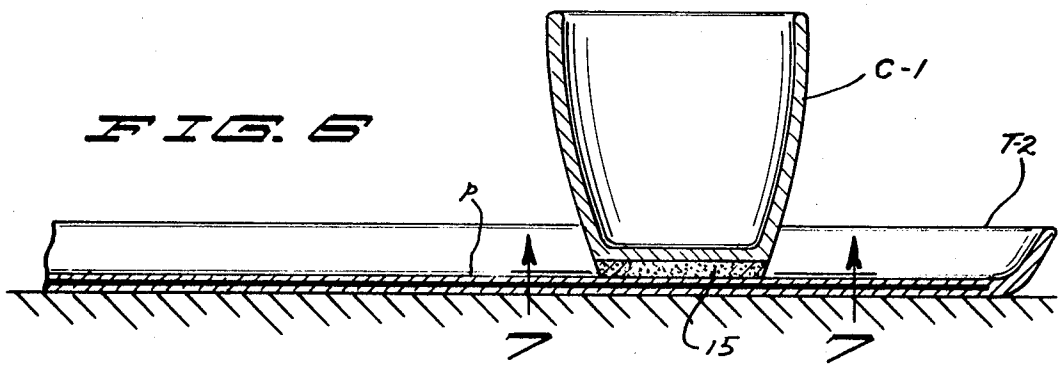


FIG. 5

FIG. 6



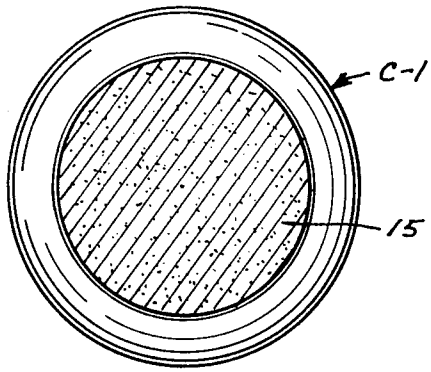


FIG. 7

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MAGNETIC SYSTEM FOR RETAINING DISHES ON A TRAY DURING SERVICE

This invention relates generally to the serving of a number of different dishes on a tray for restaurant, institution, cafeteria and home use; has particular use as a magnetic system or apparatus for retaining a plurality of dishes on a tray while loading the tray with filled dishes, and during transport of the tray to the table.

It is an object of my present invention to provide simple and economic media for use on serving trays and dishes which when carried out within the scope of my invention, will comply with all public health standards and which enable the dishes and tray to be washed and rinsed in conventional apparatus without deterioration thereof; and which in operation will prevent the dishes from sliding, spilling or overturning on a tray during transportation and service.

More specifically it is an object to provide between the base areas of dishes and the upper surface of the tray, thin, permanent magnet elements in predetermined locations with metallic magnetic inserts on the other surfaces, to retain the dishes in predetermined relation on the tray during transportation and service, and which furthermore, readily enables the filled dishes to be removed from the tray. The permanent magnets may be in the form of thin wafer Alnico magnets attached to the upper surface of an ornamental serving tray and covered with a sealed coating or a thin layer of suitable plastic material. In such cases the dishes will have impregnated in the bases thereof, a ring or disc or a magnetic metal such as steel. Conversely the tray may be mainly constructed from a magnetic metal and if desired, covered with a thin coating of plastic and the dishes in the base portions thereof very close to the contact with the tray, will carry very thin, annular, magnetic strips having the properties of a permanent magnet. These magnetic strips or wafers will be covered with a coating or thin layer of suitable plastic sealed within the base of the dishes.

My invention, its uses and advantages, will be more fully apparent from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a small scale, perspective view showing one form of my invention where the tray has a number of permanent magnet strips or wafers secured thereto and covered by a plastic coating;

FIG. 2 is a partial plan view of FIG. 1 with at least one of the dishes removed from the tray, and showing in dotted lines the positioning of the permanent magnets on the tray for maximum efficiency in attracting the metal-impregnated dishes;

FIG. 3 is a cross section taken on the line 3—3 of FIG. 2;

FIG. 4 is a bottom plan view showing another form of my invention where an annular magnetic tape is impregnated in the bottom of a dish for use with a metal tray;

FIG. 5 is a vertical section taken along the line 5—5 of FIG. 4 and showing the dish supported on a tray;

FIG. 6 is a vertical section showing a third form of the invention; and

FIG. 7 is a section taken on the line 7—7 of FIG. 6 showing distribution of magnetic particles in the base portion of a cup or dish.

Referring now to the form of the invention illustrated in FIGS. 1 to 3 inclusive, a tray which for the most part may be constructed of sheet metal or a filled plastic composition or the like, is illustrated as of annular form having an upturned peripheral edge 5. To the upper surface of this tray are secured as by adhesive or plastic bonding, a multiplicity of permanent magnetic wafers M arranged generally in spaced parallel relation with a space between said magnets being preferably less than three-fourths of an inch. Some of the magnets may extend at right angles to others in the general arrangement. The arrangement of the magnets is such that the base of any conventional dish deposited upon the tray will overlie one or more of the magnetic wafers M.

After the permanent magnet strips or wafers M are secured to the upper tray surface, the same are coated, together with the uncovered portions of the tray top, with a lamination or coating L of a suitable plastic material such as polyethylene, vinyl or the like. The coating of course covers and fills the spaces between the magnets and produces a smooth planar upper surface which is completely sealed with the upturned peripheral wall 5 of the tray.

The term "dishes" as used herein, is meant to include all conventional receptacles for holding and containing solid or liquid foods such as plates, cups, tumblers, bowls, and the like.

As shown in FIG. 4, a dish 6 has a circular base which is provided with a shallow circular recess in which an annular or disc insert 7 is contained, constructed of a magnetic metal such as mild steel or sheet iron. The insert is filled and the metal completely covered by a plastic lamination or coating 8. Similarly the other dishes employed are provided with shallow, concentric recesses to receive the magnetic metal inserts which are covered by plastic laminations 8.

In use, when the specially constructed dishes are filled with food and positioned upon the tray T, they are retained by magnetic force from the permanent magnet wafers M and will be held in the said positions while the tray is transported to its destination for service of the food. The magnetic force exerted is not impeded by the thin plastic sealing laminations L and 8, but will function to hold the dishes against sliding even though the tray may be tilted to an angle of 45° from the horizontal. Since the permanent magnets and the metal inserts are sealed by plastic with the surfaces to which they are attached, the dishes and tray may be processed normally in conventional dishwashing machines.

Referring now to the form of my invention illustrated in FIG. 5, the tray T is constructed of a metal having magnetic properties, such as sheet iron or mild steel, and is preferably covered at its upper surface with a layer or lamination of thin plastic material L.

As shown, a cup and saucer C and S respectively, are supported upon a portion of the tray. The saucer S has a circular base which has a shallow recess of circular concentric form, in which is attached a permanent magnet 10 preferably of annular shape, which may be constructed from Alnico permanent magnet material, or from a magnetic tape. This magnet 10 is secured in the recess portion of the base by bonding or adhesive, and is then covered, together with the filling of the recess within the annular magnet, by a thin layer of plastic material 11.

The cup C has its base shallowly recessed and in this recess is secured a disc or annulus of metal 12, such as sheet iron, having magnetic qualities. The metal and recess are then covered and coated with a layer of plastic material 13 which acts as a seal for the recess and the metallic material therein. Cup C is held in concentric relation with saucer S by the annular permanent magnet 10 of the saucer S.

It will of course be understood that a somewhat similar cup and saucer relation may be utilized with the form of my invention first described, where however the saucer S is merely provided in its recess base portion with a metallic annulus and the cup is of the same structure as shown in FIG. 5. The cup and saucer in this instance of course will be magnetized and then retained due to the permanent magnets M of wafer form in the first-described tray T.

In FIGS. 6 and 7, still another form of the invention is illustrated wherein the tray T-2 may be identical with the tray T-1 shown in the form of FIGS. 4 and 5, being basically metal from magnetic metal such as steel, preferably coated at top and bottom with a suitable smooth plastic. The dishes utilized in combination with this tray, such as the plastic cup C-1 have their base portions in the actual molding of the plastic cup impregnated with magnetic particles of permanent magnet strength, such as is utilized in the so-called permanent magnet tapes. In the sectional view of FIG. 6, the periphery, upper edges, and upper portion of the bottom of cup C-1 is molded by injection, preferably from a central sprue from plastic

alone. When these portions of the mold cavities are filled, a plastic material in powdered or semiliquid form is injected in the remaining and bottom portion of the mold to form the bottom proper **15**, having embedded therein a multiplicity of minute, permanent magnet particles *p*. The procedure and method described is perfectly feasible and may be successfully and commercially utilized for producing dishes of various types with bottom portions molded from an intimate admixture of the plastic ingredients with the finely divided, very small discrete magnetic particles.

It is to be understood where in the appended claims the terms "impregnated with permanent magnet material" are used, such is meant to include material such as wafers, rings, sheets, permanent magnets of wafer or shaped type, as well as fine permanent magnet particles which are carried by, sealed within, and in fact impregnated in either the tray or the dish base.

From the foregoing it will also be seen that I have discovered and provided simple but highly efficient magnetic media interposed between the base portions of dishes, and a generally conventional type of tray, which through magnetic attraction cause the dishes to remain in place after they are deposited in filled condition upon the tray, and when the tray is moved for transportation. The drawing power of the magnets selected, will be such as to retain the filled dishes in place during transportation of the tray, even though the tray may be angled from 20° to 45° from the horizontal. However, the magnet effect is sufficiently mild to enable the filled dishes to be readily lifted from the tray during serving.

It will be understood that various changes in the shape, arrangement and equivalencies of the parts may be made, provided the same are within the combinations defined in the claims of this application, all within the scope of the invention.

What is claimed is:

1. In combination with a serving tray having at least a substantial supporting area constructed of a magnetic metal and two types of dishes to be supported thereon, conventionally having in use concentrically stacked relation when served, such as cups and saucers,

cooperating magnetic dish-retaining means comprising,

for each saucer-type dish, an annular upwardly extending recess formed in its base, and a dual-functioning, permanent annular magnet element embedded in the said annular recess in he base of the saucer-type dish and being substantially concentric with the configuration thereof, and having a diameter somewhat less than the diameter of the base of said saucer-type dish, and comprising for each of said cup-type dish a similar annular recess in the base portion thereof and a magnetic metal annular element embedded in the annular recess in the base portion of the cup-type dish and of substantially similar diameter to said permanent magnet element and disposed concentrically above said permanent magnet element when said saucer-type and cup-type dishes are conventionally stacked and supported upon said tray,

the coercive force of said permanent magnet element being adequate to retain said saucer-type dish upon said metallic area of said tray and being also adequate to retain said cuplike dish against slippage or displacement upon said saucerlike dish when stacked as set forth.