

Aug. 31, 1965

S. W. AMBERG ETAL

3,203,583

TRAY FOR RECEPTACLES

Filed Oct. 7, 1963

3 Sheets-Sheet 1

Fig. 1.

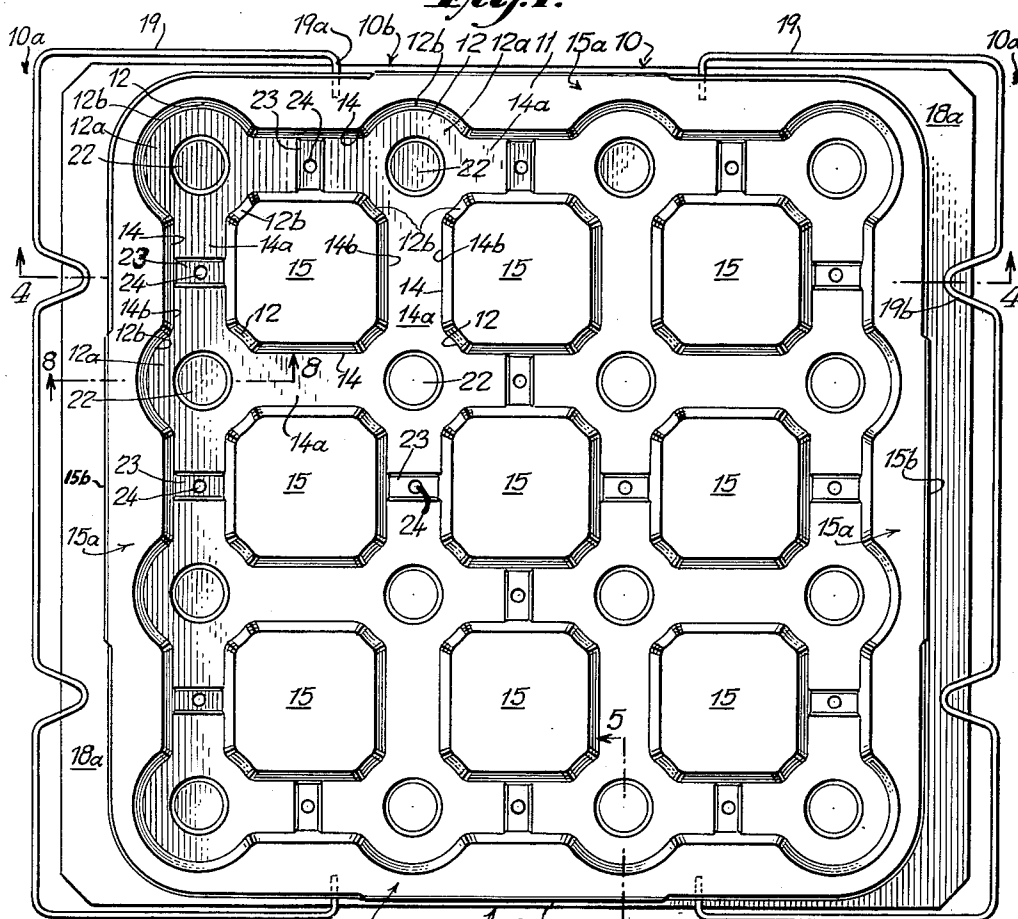
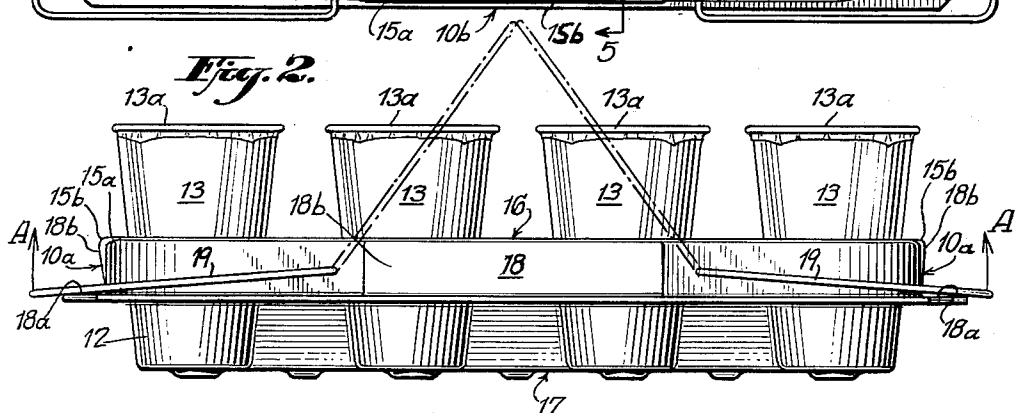


Fig. 2.



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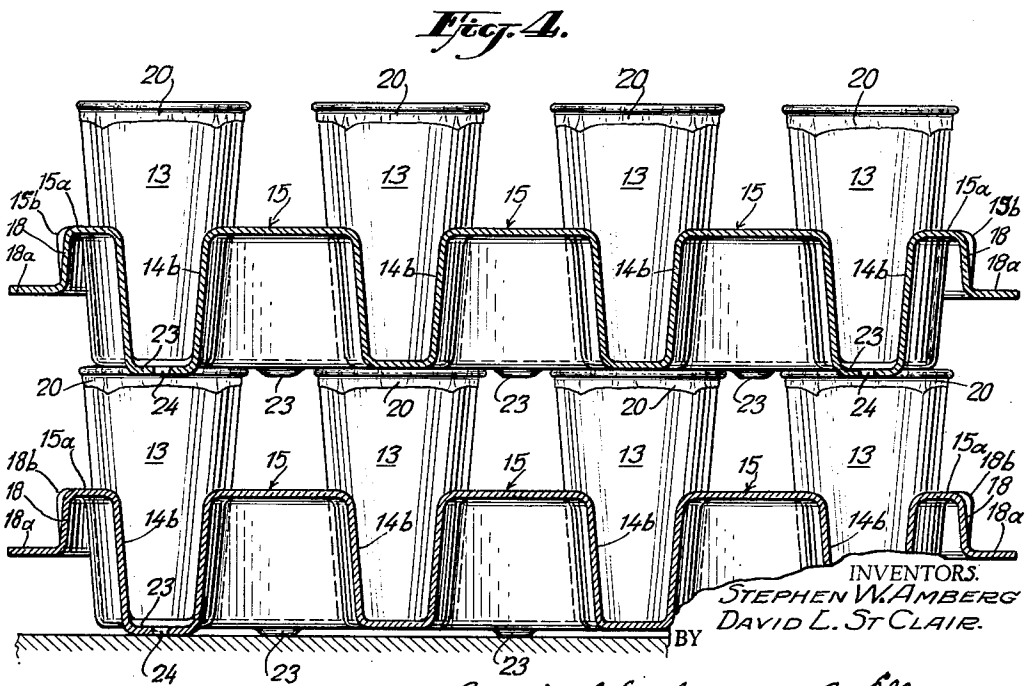
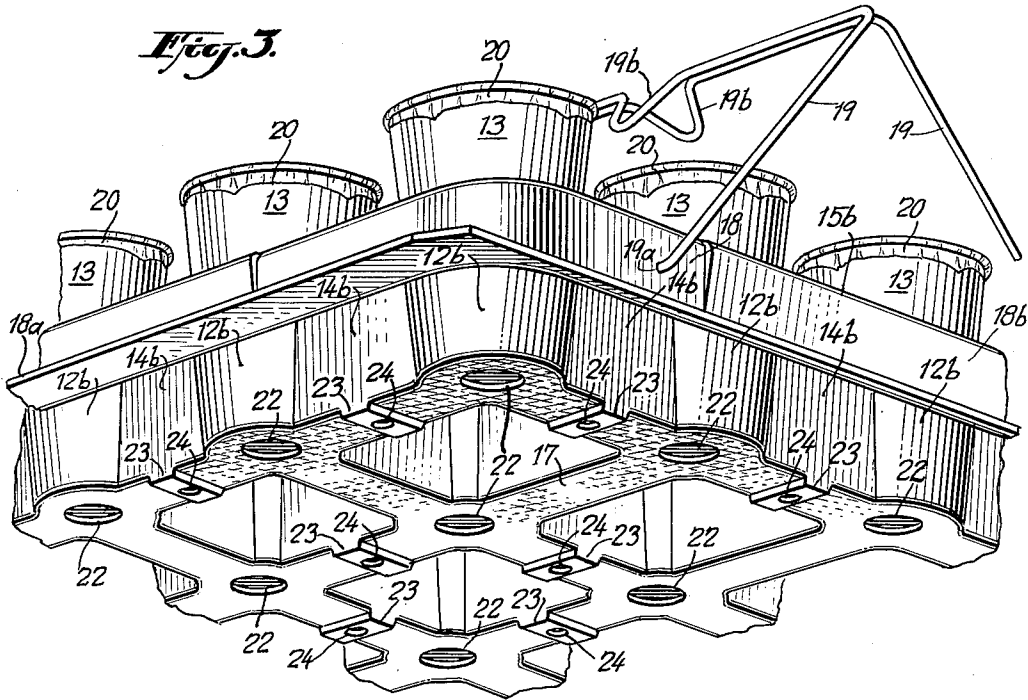
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 5.

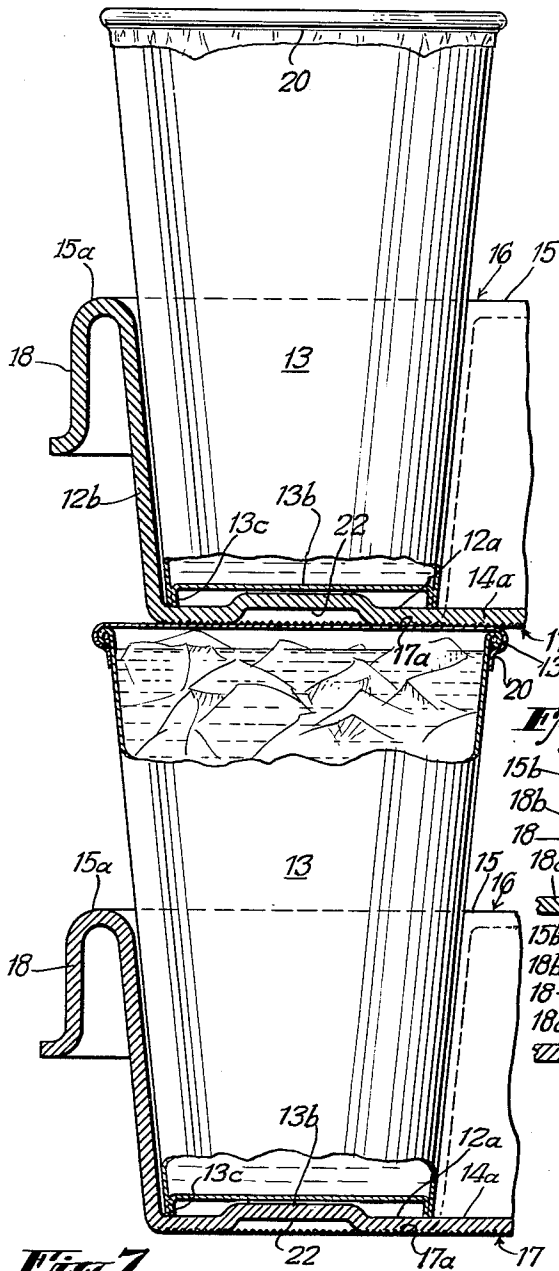


Fig. 6.

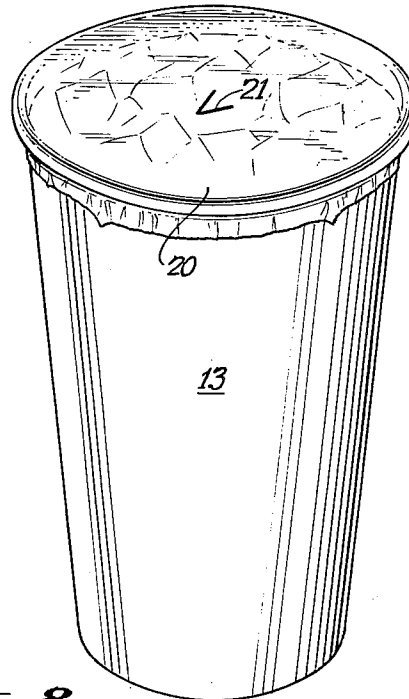


Fig. 8.

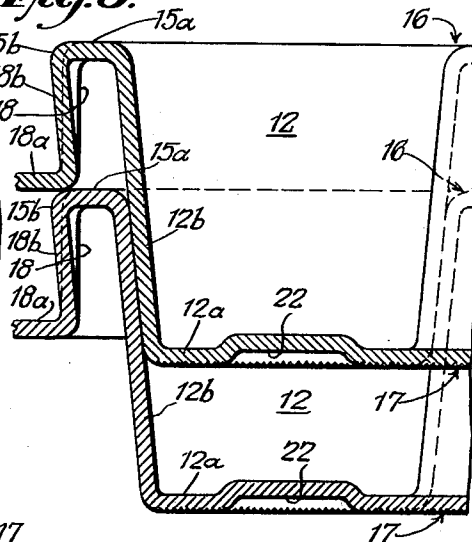
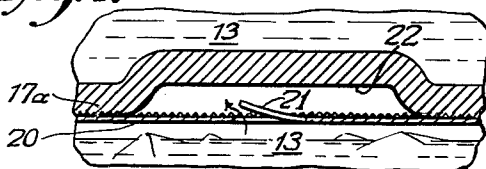


Fig. 7.



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TRAY FOR RECEPTACLES

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10 Claims. (Cl. 220-102)

This invention relates to trays for carrying and stacking a number of paper drinking cups which have been filled with a beverage or the like and preferably capped with individual shrink-film type closures. More particularly, the invention relates to an improved molded plastic tray construction incorporating certain novel features as will be explained.

The tray which is provided by the invention is intended to be particularly useful in connection with the sale and distribution to the public of refreshments, such as carbonated or hot beverages, at stadiums or the like, especially where laws or local ordinances prohibit distribution of such beverages in glass bottles or metal cans. It was conceived and developed in association with an overall program to solve certain problems as have heretofore existed and prevented an economical and integrated series of operations providing at least semi-automatic dispensing, filling, capping and distribution of paper or plastic drinking cups containing such beverages, thereby avoiding the present-day necessity for handling, opening and return by the vendor of the relatively heavy bottles or cans which are in any event withheld from the consumer. Furthermore, the tray is intended to be particularly adapted for receiving and holding a group of filled receptacles in proper manner and arrangement for simultaneously capping all of the same with individual shrink-film type closures using a shrink-film capping machine as described in copending application Serial No. 311,499, filed September 25, 1963.

The trays are intended to be only partially nestable when empty, such facilitating stacking for storage and transporting purposes when not actually in use but readily permitting unstacking thereof. Further, the tray is so constructed and arranged as to provide a particular manner of supporting and protection for the drinking cups when a number of trays are stacked after having been loaded with the filled and capped cups.

It will also be noted that each tray incorporates certain features which automatically serve to maintain its cup contacting surfaces free from contamination by dirt or spilled beverage or the like at times both when empty and when filled with cups. Thus, the tray affords both sanitary protection, and a maximum of protection from spilling, puncturing, crushing, or other injury of the drinking cups and their relatively delicate shrink-film caps, so that the filled cups may survive the somewhat extensive contamination exposure and rough handling as may be expected upon distribution at stadiums or other public places.

Briefly and generally describing the invention in its preferred embodiment, the drinking cup carrying tray is of integrally molded plastic construction, and includes a pair of wire handles which are pivotally collapsible at either end thereof. A grid-like arrangement of cup receiving sockets interconnected by longitudinally and transversely disposed channels is formed by a series of plateau-like, wall forming regions which protrude upwardly from the underside of the tray. The wall portions which define the generally tubular cup receiving sockets are tapered outwardly towards their upper ends and have appropriate diametral size to conform with the tapered body shape of a conventional drinking cup so that the cups will fit snugly

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therein for firm support, yet may be easily removed therefrom. The spaced apart arrangement of the cup receiving sockets is such as will provide a spacing of about an inch or so between the mouth rims of the respective drinking cups, which project above the tray, for applying the individual shrink-film closures thereto in the manner contemplated by the aforementioned copending application. The overall height of the tray is about half that of the contained drinking cups, more or less.

In its preferred embodiment the tray has sixteen cup receiving sockets arranged in four rows of four in each so that the tray, in overall plan view, has generally square configuration. However, the aforesaid plateau-like regions, which together effectively form an upper surface of the tray, include a peripherally disposed flat portion having a downwardly turned flange along its outer edge, which flange is laterally flared at each end of the tray to provide respective handle rests thereat. Thus, in overall dimension, the tray is actually slightly rectangular in shape.

To prevent full nesting of a stack of empty trays, the aforementioned peripherally disposed flat portion is slightly extended along a middle-length portion at each of the sides and ends of the tray and the downwardly turned flange lengths which are adjacent these extended portions are turned inwardly, beyond the vertical and towards the tray body. The spacing between the flange and the tray body at these locations is therefore definitely narrower than the extended width of the flat peripheral portion which overlies such inwardly tapered flange lengths. Thus, when two empty trays are stacked one upon the other, the narrowed spacing at the underside of these flange portions of the upper tray will not pass downwardly into conforming relation with the flange of the lower tray so that the trays will be only partially nested in amount equal to the difference between the height of the tray and the height of its downwardly turned flange portion.

Conventional paper drinking cups have recessed bottoms providing a peripheral ridge upon which the cup stands. Accordingly, in the tray of the present invention the bottom surfaces of the cup receiving sockets respectively include an annular flat area for supporting the underside of such a drinking cup. Moreover, the referred to channels which extend between the respective cup sockets have flat bottoms of substantial width which reside within the plane of the flat annular bottom areas of the sockets so that these areas together provide a flat underside surface of the tray, having substantial area which will rest upon the mouth rims of the cups in the tray below when trays filled with cups are stacked one upon another. Thus, in a stack of filled trays, the weight is supported and transmitted through the receptacles themselves, and no pressure is exerted upon any of their thin, shrink-film type closures as are contemplated to be used as aforesaid.

However, where either carbonated or hot beverages are contained in the cups, the shrink-film closures thereon are punctured to relieve gas pressure or to prevent the formation of a vacuum below the closure. The closure puncture is centrally located and, so as to assure full relieving of such pressure or vacuum when trays filled with the capped receptacles are stacked, the bottom areas of the cup receiving sockets respectively include centrally located, upwardly protruding portions which effect slight, generally cylindrically shaped recesses of the underside surface of the tray at respective locations above the closures on the drinking cups within an underlying tray. In addition, it is contemplated that the plastic from which the tray is molded will provide a stippled texture or the like at its underside surface which will permit leakage

of air into or out of these recessed areas, across the mouth rims of the drinking cups upon which the tray rests. It should be noted, however, that the flat areas surrounding each of these upwardly protruding bottom portions are sufficiently wide so as to always insure that the tray will rest wholly on the mouth rims of the underlying drinking cups.

As previously noted, the undersides of the cup receiving sockets and interconnecting channels together provide a flat underside surface area of the tray which will be in contact with the mouth rims of the cups in an underlying tray when cup-filled trays are stacked together. To maintain this underside surface area free of dirt and other contamination when the tray is placed upon an unclean surface, a series of downwardly protruding portions are provided at the underside of the tray to keep the aforesaid underside surface area in spaced relation to such unclean surface. These downwardly protruding portions take the form of respective and equally protruding rectangular-shaped areas, having significant width for a purpose to be described, disposed transversely with respect to, and situated midway along the length of each of the outermost marginal channels, and of each of the four channels which together surround the centermost of the aforementioned plateau-like regions of the tray.

It will be noted that any beverage spillage as occurs would ordinarily collect within the recessed channel areas and cup receiving sockets of the tray. To drain such spillage, a drainage hole is disposed centrally of each of the aforesaid downwardly protruding portions, and it will be noted that such disposition of these drainage openings at locations midway between the cup receiving sockets avoids drainage of the liquid on to the drinking cups within an underlying tray when filled trays are stacked, or on to the bottom areas of the cup receiving sockets of an underlying empty tray. Thus, a clear and uninterrupted downward course for draining liquid is always provided in a stack of trays, whether empty or filled with drinking cups.

These and other objects, features and advantages of the invention will become more readily apparent from the following detailed description of a preferred embodiment thereof, when taken together with the accompanying drawings in which:

FIGURE 1 is a top plan view of a tray for paper drinking cups made in accordance with the invention;

FIGURE 2 is a side elevation of the tray;

FIGURE 3 is a fragmentary perspective view from the underside of the tray;

FIGURE 4 is a side elevational showing in cross-section of a stack of two of the trays, each filled with capped drinking cups, the section being taken as indicated by lines 4—4 in FIGURE 1;

FIGURE 5 is an enlarged fragmentary view similar to FIGURE 4, but showing a section through the cup receiving sockets of the stacked trays, the section being taken as indicated by lines 5—5 in FIGURE 1;

FIGURE 6 is a similarly enlarged perspective view of a capped drinking cup which the tray is adapted to hold;

FIGURE 7 is a further enlarged and fragmentary cross-sectional showing of a portion of the bottom of a cup receiving socket in the tray; and

FIGURE 8 is a fragmentary cross-sectional view, to the scale of FIGURE 5, of a stack of two empty trays, the section being taken as indicated by lines 8—8 in FIGURE 1.

Referring first to FIGURES 1—4 of the drawings, a tray in accordance with the invention is generally indicated by reference numeral 10. The body 11 of the tray 10 is of one-piece, integrally molded plastic construction having a total of sixteen cup receiving sockets 12 each for holding a paper drinking cup 13. The cup receiving sockets 12 are arranged in a grid-like pattern of four

rows of four each, and are spaced apart such that, when the tray is filled with the cups 13, the mouth rims 13a of the cups will be equally spaced apart a distance of about one inch for a purpose to be described. Each of the cup receiving sockets 12 is interconnected with each longitudinally and transversely adjacent cup receiving socket by a rather wide channel 14 as indicated, the bottom surfaces 14a of the channels residing within the plane of the flat surface areas of the bottoms 12a of the cup receiving sockets.

As perhaps more clearly shown in FIGURES 3 and 4, the cup receiving sockets and channels are formed by a series of plateau-like portions 15 which protrude upwardly from the underside of the tray to provide the arcuately-shaped sidewalls 12b of the sockets and the sidewalls 14b of the channels, the referred to plateau-like portions including a plateau-like portion 15a which is disposed peripherally about the tray. As seen in FIGURES 2 and 4, the plateau-like portions 15, 15a are disposed at the same elevation so as to form a flat upper surface area of the tray, the latter being generally indicated by reference numeral 16. Similarly, the bottoms 12a and 14a of the sockets and channels are disposed at the same elevation to provide an underside surface area, generally indicated by reference numeral 17, of the tray. It will be noted that the height of the tray between the underside surface area 17 and the upper surface area 16 is about one-half that of a drinking cup 13 more or less, depending upon the size of the cup.

The peripherally disposed plateau-like portion 15a has a downwardly turned flange 18, the height of the latter being about one-half that of the tray between the surface areas 16 and 17. At each of the ends 10a of the tray the downwardly turned flange 18 is outwardly flared to provide a pair of laterally projecting handle rests 18a.

A pair of substantially C-shaped wire handles 19 are respectively disposed at each end 10a of the tray, the handles 19 being pivotally connected, as by the inwardly turned ends 19a thereof, to the flange 18 at the respective sides 10b of the tray as shown in FIGURE 1. Thus, each of the handles 19 is pivotable in the direction of arrow A to meet with the other above the tray as shown in dotted lines in FIGURE 2 for convenience in lifting and carrying a single tray. Each of the handles 19 has a pair of inwardly bent handle rest protrusions 19b along the length of the central portion of its C-shape so that, in its downward position, the handle is supported in laterally extending relation on its associated handle rest 18a of the tray body 11.

Referring again to the details of the tray body 11, the side walls 12b of each of the cup receiving sockets 12 are tapered inwardly towards the bottom of the tray to conform with the conventional frusto-conical shape of the drinking cup 13 so that, by the corresponding tapered relation, each of the cups 13 will be somewhat firmly supported by the socket within which it is placed. Referring briefly to FIGURE 5, it is seen that the conventional paper cup 13 has a recessed bottom 13b providing a peripherally extending bottom ridge 13c which rests on the bottom surface 12a of its associated cup receiving socket. The support afforded by the walls 12b of the cup receiving socket, and the height of the cup receiving socket, is such as will prevent tilting and consequent distortion or spilling of the cups in an underlying tray when two or more of the cup-filled trays are stacked one upon the other.

For convenience both in the molding process, and in stacking empty trays as will be hereinafter described, the walls 14b of the interconnecting channels 14 are similarly tapered.

Referring now to FIGURES 3 and 4, it will be understood that the underside surface area 17 as is provided by bottom surfaces 14a of the channels 14 provides a relatively large area of contact with the mouth rims 13a of the drinking cups 13 in an underlying tray when the

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cup-filled trays are stacked together. Thus, the weight of the overlying trays and filled cups is evenly distributed along relatively large portions of the respective lengths of the mouth rims 13 of the cups upon which the overlying tray is placed. Such evenness of weight distribution and large area of support enables as many as one-half dozen or more filled trays to be stacked one upon the other, as indicated in FIGURE 4, without crushing of the underlying cups. It will be noted that the flat and coplanar underside surface area 17 avoids injury to the shrink-film caps 20 as are applied to each of the drinking cups 13, there being no downward protrusions of the tray body 11 in the region of the closed bottoms 12a of the respective cup receiving sockets 12 as might puncture or distort the shrink-film closures 20.

Referring now to FIGURE 6, and considering that the drinking cups 13 will contain carbonated or hot beverages or the like, it is there shown that each shrink-film closure 20 includes a V-shaped slit which forms a valve flap 21 for the escape of gases, or for prevention of the formation of a vacuum within a cup upon cooling, should it contain hot beverage. To permit escape of such gas or permit inflow of air, as the case may be, the central region of each of the cup-receiving bottoms 12a is provided with an upward protruding portion 22, as shown in FIGURES 3 and 5. When the cup-filled trays are stacked one upon the other, the recess formed by the upward protruding portion 22 at the underside of each cup-receiving socket 12 will be disposed over the valve flap 21 of the closure on the underlying drinking cup 13 so as to permit air passage to the latter as more clearly shown by FIGURE 7. Although the volume of the upward protruding portion recess may be adequate for the purpose, it is contemplated that the underside surface area 17 of the tray body 11 will be formed having a stippled texture or similar slightly uneven surface, as indicated at 17a in FIGURE 5, to assure the venting of air or gas across the mouth rims 13a of the cups upon which the tray body rests.

Referring again to FIGURES 1-3, and for the purpose of preventing contamination of the underside area 17 when the tray is placed upon an unclean surface or the like, a downward protruding portion 23 of the tray body is disposed midway along the length of the bottom surface 14a of each channel 14 as shown, excepting that the downward protruding portions 23 may be omitted from certain of the radially inward extending channels 14 as indicated in the drawings. Thus, for facilitating registration between the filled trays during a stacking operation, all of the marginally extending channels 14 are provided with protrusions 23 at their respective undersides, and for firm support of the lowermost tray when other beverage filled trays are stacked upon it the four channels 14 which surround the centermost plateau-like region 15 are also provided with the downward protruding portions 23. As clearly indicated in FIGURE 4, the location of each downward protruding portion 23, and its width, is such that it will not be in contact or interfere with any drinking cup 13 in an underlying cup-filled tray upon which the tray is stacked.

It will be noted that each of the downward protruding portions 23 has generally rectangular shape and is disposed transversely of its associated channels 14, the length of the protruding portion 23 being equal to the width of the bottom surface 14a of the channel. The width of each downward protruding portion is such as will permit ready accumulation and draining, through the drainage opening 24 therein, of any beverage as may be spilled, or of any cleaning liquid as may be introduced into the recessed channels and cup-receiving sockets of the tray. Referring to FIGURE 4, it will be noted that the drainage openings 24 of any two stacked and filled trays are in alignment with each other, midway between the adjacent drinking cups, so that liquid may drain directly downward through all of the stacked trays. The

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rectangular shape of each downward protruding portion has sufficient area to effectively provide a draining well for momentarily accumulating liquid drainage from overlying trays in manner to prevent lateral spreading of such draining liquid within the channels 14 of the tray.

Referring now to FIGURES 1, 2 and 8, it is seen that, along the middle third of the length of the peripherally disposed plateau-like portion 15a at each of the ends 10a and sides 10b of the tray body, the plateau-like portion 15a projects laterally, as indicated at 15b, so that the downwardly turned flange portion 18b therebelow is angled inwardly beyond the vertical and towards the tray body, as clearly shown by FIGURE 8. Thus, the width of the peripherally disposed plateau-like portion 15a within this region is greater than the distance of spacing between the lower edge of the flange 18 and the sidewall 12b or 14b of the adjacent cup-receiving sockets 12 and channel 14. As shown in FIGURE 8, such increase in width along certain uniformly distributed peripheral lengths of the plateau-like portion 15a will assure that empty trays, when stacked together, will only partially nest. The trays nest together over only that portion of their height which lies between the outwardly flared handle rest 18a and the bottom of the tray, and it will be understood that such provides convenience in grasping the tray bodies by the handle rests 18a when unnesting the empty trays.

It will also be understood that the downwardly turned flange 18 of the tray body, including its outwardly flared handle rests 18a, facilitates carrying a stack of cup-filled trays as a vendor might be inclined to do when distributing the cups of beverage to customers. Of course, he might also carry separate trays using the handles 19, as previously explained.

The particular arrangement and disposition in equally spaced relationship of the cup-receiving sockets 12 adapts the tray for use in simultaneously capping all of the contained drinking cups 13 with individual shrink-film type closures 20 using the multiple head capping machine described in the aforementioned copending application. In simultaneously capping all of the drinking cups, the tray is placed upon the machine and a single web of shrink-film material is placed across the mouth rims 13a of all of the cups. The machine includes a vertically movable chamber unit which is brought down upon all of the cups in forming the individual closures. The chamber unit includes a grid-like pattern of knives at its underside which severs the web midway between each of the drinking cups to provide individual and oversized shrink-film closure pieces for each of the same. Thus, the firm support and spacing between the individual drinking cups when received within the tray of the present invention is such as to assure that the individual shrink-film closures will be effectively formed by the capping machine of the copending application.

Thus has been described a tray for carrying and stacking a number of paper drinking cups which achieves all of the objects of the invention.

What is claimed is:

1. A tray for receiving a plurality of tapered drinking cups or the like, said tray comprising an integrally molded one-piece body having peripherally and centrally disposed upwardly protruding plateau-like portions defining a grid-like pattern of equally spaced apart cup receiving sockets and longitudinally and transversely disposed channels interconnecting adjacent sockets, the tops of said plateau-like portions being coplanar and sufficiently extensive to provide liberal spacing between said sockets, said protruding plateau-like portions including arcuately shaped and tapered socket sidewall forming portions whereby the shape of each said socket substantially corresponds to said shape of a cup, said sockets having closed bottoms including respective peripherally disposed and flat surfaces of substantial area residing in the same plane, and said channels having respective flat bottom surfaces of

substantial width and extending within the plane of said flat surface areas of the sockets, a plurality of protrusions each of which extends downwardly from the bottom surface of one of a like plurality of those of said channels which are marginally disposed with respect to said tray, each protrusion being situated midway of the length of its respective channel to provide a liquid collecting and draining well, and means defining a drainage opening through each of said draining wells.

2. A tray according to claim 1 wherein each said downward protrusion has rectangular shape and extends transversely of the channel with which it is associated, the width of said protrusion being less than that of said spacing between the tops of said cups.

3. A tray according to claim 1 wherein each of said bottom surfaces of at least a plurality of those of said channels which are disposed centermost with respect to said tray also has a downward protrusion situated midway of the length of the channel to provide a liquid collecting and draining well, and means defining a drainage opening through each of the same.

4. A tray for receiving a plurality of tapered drinking cups or the like, said tray comprising an integrally molded one-piece body having peripherally and centrally disposed upwardly protruding plateau-like portions defining a grid-like pattern of equally spaced apart cup receiving sockets and longitudinally and transversely disposed channels interconnecting adjacent sockets, the tops of said plateau-like portions being coplanar and sufficiently extensive to provide liberal spacing between said sockets said protruding plateau-like portions including arcuately shaped and tapered socket sidewall forming portions whereby the shape of each said socket substantially corresponds to said shape of a cup, said sockets having closed bottoms including respective peripherally disposed and flat surfaces of substantial area residing in the same plane, and said channels having respective flat bottom surfaces of substantial width and extending within the plane of said flat surface areas of the sockets, a plurality of protrusions each of which extends downwardly from the bottom surface of one of a like plurality of those of said channels which are marginally disposed with respect to said tray, each protrusion being situated midway of the length of its respective channel to provide a liquid collecting and draining well, means defining a drainage opening through each of said draining wells, and said closed bottom of each socket having an upward protruding portion providing a centrally disposed recess of substantial area at the underside of the socket.

5. A tray according to claim 4 wherein said flat bottom surfaces of said sockets and channels have stippled texture at the underside of said tray.

6. A tray for receiving a plurality of tapered drinking cups or the like, said tray comprising an integrally molded one-piece body having peripherally and centrally disposed upwardly protruding plateau-like portions defining a grid-like pattern of equally spaced apart cup receiving sockets and longitudinally and transversely disposed channels interconnecting adjacent sockets, the tops of said plateau-like portions being coplanar and sufficiently extensive to provide liberal spacing between said sockets said protruding plateau-like portions including arcuately shaped and tapered socket sidewall forming portions whereby the shape of each said socket substantially corresponds to said shape of a cup, said sockets having closed bottoms including respective peripherally disposed flat surfaces of substantial area residing in the same plane, and said channels having respective flat bottom surfaces of substantial width and extending within the plane of said flat surface area of the sockets, a plurality of protrusions each of which extends downwardly from the bottom surface of one of a like plurality of those of said channels which are marginally disposed with respect to said tray, each protrusion being situated midway of the length of its respective channel said peripherally disposed plateau-like

portion including a downwardly turned flange extending peripherally around said tray, said flange having height substantially equal to one-half that of said tray and being laterally flared at its lower edge to provide handle rest portions at respective opposite ends of the tray, and a pair of substantially C-shaped handles connected at their respective open ends for pivotal movement to said downwardly turned flange at the sides of the tray in inwardly spaced relation with respect to said respective opposite ends of the tray, whereby the central portions of the respective handles normally rest on said handle rest portions and are pivotable to a common location above said tray.

7. A tray according to claim 6 wherein the central portion of each said handle includes at least one inwardly projecting portion normally resting on said associated handle rest portion, the remaining length of said central portion being spaced away from said associated handle rest portion when said handle is resting thereon.

8. A tray according to claim 6 wherein said peripherally disposed plateau-like portion further includes a laterally projecting length thereof at each of the sides and ends of the tray, said downwardly turned flange at respective locations adjacent said laterally projecting lengths being additionally turned inwardly beyond the vertical and towards said tray.

9. A tray for receiving a plurality of tapered drinking cups or the like, said tray comprising an integrally molded one-piece body having peripherally and centrally disposed upwardly protruding plateau-like portions defining a grid-like pattern and equally spaced apart cup receiving sockets and longitudinally and transversely disposed channels interconnecting adjacent sockets, the tops of said plateau-like portions being coplanar and said peripherally disposed plateau-like portion including a downwardly turned flange extending peripherally around said tray, said sockets being extensively spaced apart along the channel, said protruding plateau-like portions including arcuately shaped and tapered socket sidewall forming portions whereby the shape of each said socket substantially corresponds to said shape of a cup, said sockets having closed bottoms including respective upward protruding portions providing centrally disposed recesses of substantial area at the underside of the respective sockets and further including respective peripherally disposed and flat surfaces of substantial area residing in the same plane, and said channels having respective flat bottom surfaces of substantial width and extending within the plane of said flat surface areas of the sockets, a plurality of protrusions each of which extends downwardly from the bottom surface of one of a like plurality of those of said channels which are marginally disposed with respect to said tray, each protrusion being situated midway of the length of its respective channel to provide a liquid-collecting and draining well, and means defining a drainage opening through each of said draining wells.

10. In combination, two trays in stacked relation to each other, each of said trays containing a plurality of beverage-filled drinking cups having individual shrink-film type closures thereon, each of said closures being centrally pierced to permit the passage of gas there-through, each said tray having height substantially equal to one-half the height of said drinking cups and having a corresponding plurality of cup receiving sockets arranged in longitudinal and transverse rows and receiving the respective of said cups in firm supporting relation, said sockets having closed bottoms and being interconnected along their said longitudinal and transverse rows by channels having substantially flat bottom surfaces, said bottoms of the sockets and channels being within the same horizontal plane thereby providing an underside surface area of the tray, and said sockets being spaced apart such that a liberal spacing is provided between adjacent tops of said cups, said underside surface area of the uppermost tray resting upon said tops of the

5 cups in the underlying tray, the underside surface of each of said sockets being formed with a centrally located upwardly protruding recess for accommodating the flow of gases from the centrally pierced closures of the cups of the lower tray in register therewith, and a plurality of downwardly protruding portions disposed midway along the length of each of a corresponding plurality of the channel bottom surfaces of each of said trays each of said downward protruding portions having means defining a liquid drainage opening therethrough, and said 10 downward protruding portions of said uppermost tray being disposed within respective of said spacings between the tops of said cups in the underlying tray.

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