United States Patent [19]

House

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[54] **SELF-ADJUSTING PLATE SEPARATOR FOR SELF-LEVELING PLATE DISPENSERS**

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[52] **U.S. Cl.** ..... **221/279**, 221/312 R

[51] **Int. Cl.** **A47f 1/06**

[58] **Field of Search** ..... 221/226, 230, 279, 221/280, 303, 311, 312; 312/71; 211/49 D

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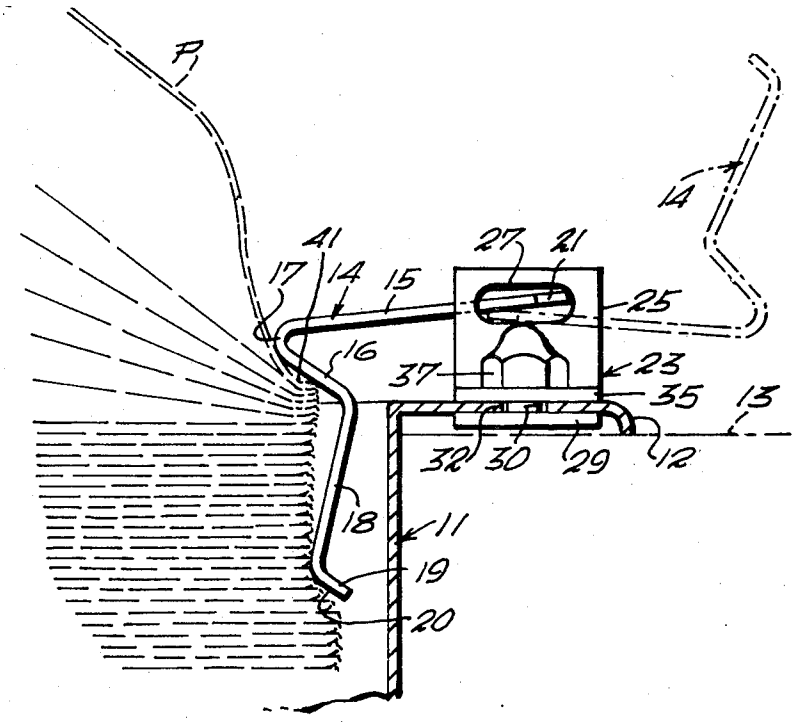
[57] **ABSTRACT**

A plate separator for use with disposable paper or plastic plates being dispensed from a self-leveling well-type plate dispenser and comprising a bent metal body member swingably arranged at one end with respect to one side of the dispensing well opening is described. The bent sheet metal body member is formed along its length into a reversely bent nose portion adapted to abuttingly engage marginal underside portions of up-side-down stacked and upwardly pressed plates at one side of the dispenser well, which nose portion merges into a donwardly extending abutment portion adopted to limit the rotative swinging movement of the body member during the dispensing of plates, while at the same time urging a plurality of uppermost plates in the stack into abutting position against the other side of the well for proper co-operation with the nose portion in "fanning out" a lesser plurality of the uppermost plates for dispensing.

4 Claims, 4 Drawing Figures



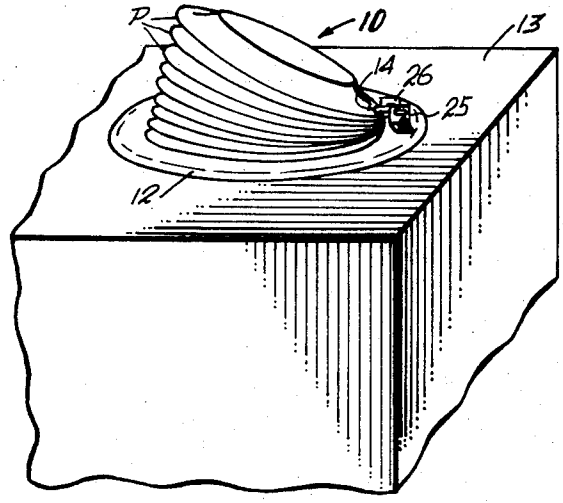


Fig. 1

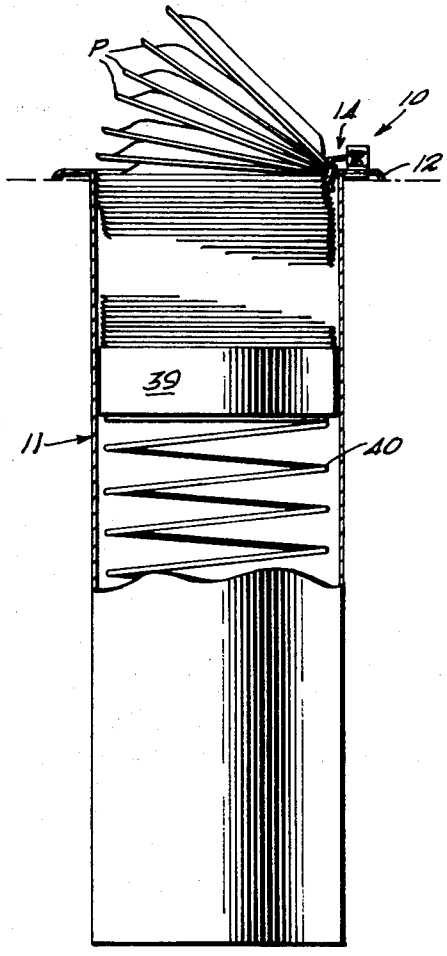


Fig. 2

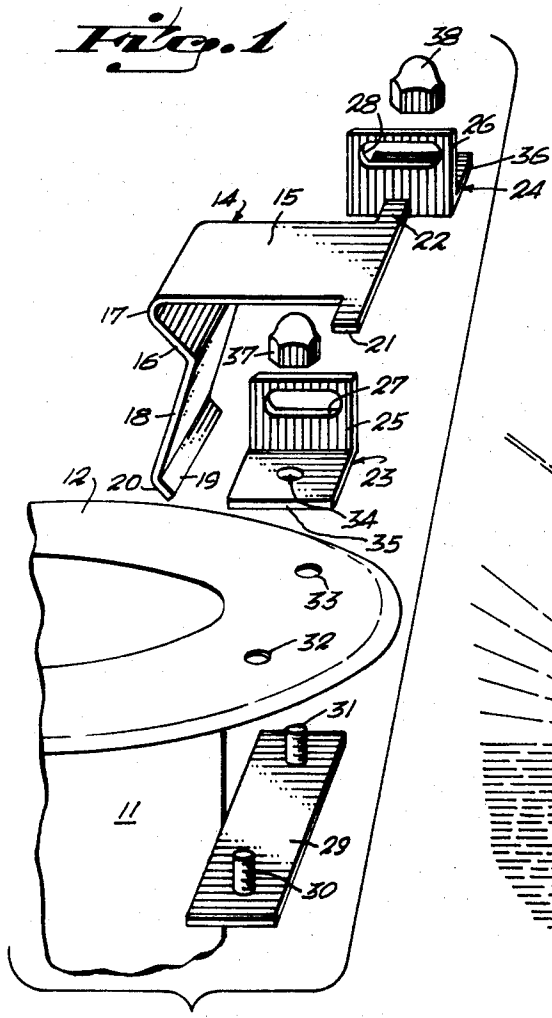


Fig. 4

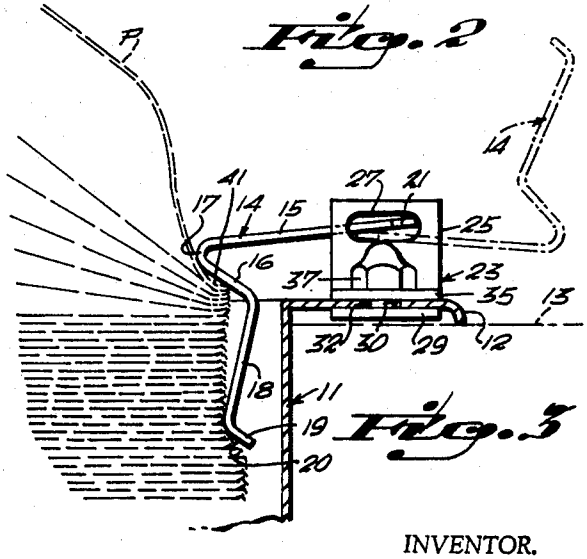


Fig. 3

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SELF-ADJUSTING PLATE SEPARATOR FOR SELF-LEVELING PLATE DISPENSERS

This invention relates to self-leveling dish or plate dispensers of the type used in cafeterias and restaurants, for example, and is directed particularly to a plate separator device for use in such dispensers as an aid in presenting, for convenient withdrawal, the plates being dispensed, particularly disposable formed paper or formed sheet plastic plates.

The use of self-leveling plate dispensers in the form of cylindrical wells for receiving stacked plates to be dispensed and comprising spring mechanism operative to push the stacked plates upwardly in the well to a level at the top of the stack from which the uppermost plate can readily be grasped for use is well known. With the use of china plates, their thickness and rigidity is such that the top plate can readily be grasped and separated from the remainder of the stack in a dispensing operation. However, with the use of comparatively thin, light-weight, disposable plates, such as of pressed paper-board or formed sheet plastic material, it is very often difficult to separate the top plate from the stack. This is due not only to the thinness of the plates, but also because they are so tightly packed that atmospheric pressure tends to make them adhere to one another.

It is, accordingly, the principal object of this invention to provide a plate separator device for plate dispensers which serves to vertically "fan out" or separate paper or plastic plates at the top of the dispenser stack so that the uppermost plate can readily be grasped and removed in a dispensing operation.

A more particular object is to provide a self-adjusting plate separator device for disposable paper or plastic plates comprising a bent metal body member swingably arranged at one end with respect to one side of the dispensing well opening rim and being formed along its length with a reversely bent nose portion adapted to abuttingly engage marginal underside portions of upside-down stacked plates, thereby to compress such plate portions in clamping relation against the resilient leveling spring pushing the plate stack upwardly from underneath, the reversely bent nose portion merging into a downwardly extending abutment portion adapted to push the uppermost plates against an opposite side wall portion of the dispensing well under the rotative swinging force applied to said nose portion by said leveling spring, whereby a plurality of the topmost plates will be spread out in fan-like disposition in the vertical direction at the side of the dispenser well opposite the body member for ready grasp and removal one at a time.

Another object of the invention is to provide a self adjusting plate separator device of the character described that can readily be swung outwardly from its normal position whereat it projects inwardly of the top opening of the dispenser well to permit refilling of the well with a new stack of plates with minimal effort.

Yet another object of the invention is to provide a plate separator device of the character described which will be simple in construction, compact, easy to install and operate, and fool-proof, effective and durable in operation.

Other objects, features and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals

denote corresponding parts throughout the several views:

FIG. 1 is a partial oblique view, as seen from above, of a cabinet structure housing a self-leveling plate dispenser equipped with a plate separator device embodying the invention;

FIG. 2 illustrates, in side elevation and with portions broken away to show interior structure, a self-leveling plate dispenser equipped with the plate separator device, illustrating the operation thereof in separating the uppermost plates of a stack being dispensed;

FIG. 3 is a partial vertical cross-sectional view, on an enlarged scale, illustrating construction and operational details of the self-adjusting plate separator mechanism; and

FIG. 4 is an "exploded" view of the plate separator mechanism illustrating constructional details of the various parts.

Referring now in detail to the drawings, reference numeral **10** in FIG. **1** designates, generally, a self-adjusting plate separator embodying the invention applied to the cylindrical well **11** of a typical self-leveling plate dispenser. The self-adjusting plate separator device **10** is attached to the peripheral flange **12** at the upper end of the dispenser well **11**, which flange, as best illustrated in FIG. **3**, seats down upon a marginal annular portion about a receiving opening in the top wall of a housing **13**, (see FIGS. **1** and **3**), within which the well **11** is supportingly suspended. As best illustrated in FIGS. **3** and **4**, the self-adjusting plate separator device **10** comprises a bent metal body member **14**, preferably of stainless steel, for example. The body member **14**, which is preferably cut and formed of flat metal plate, is provided with a straight, outwardly extending portion **15** the outer end of which merges into a comparatively short, downwardly and inwardly reversely bent portion **16** defining, with the outer end of said outwardly extending portion, a nose **17**. The outer end of the reversely bent portion **16** extends into a downwardly and outwardly extending portion **18** of comparatively greater length, the outer end of which terminates in a short, inwardly curved terminal portion **19**. The outer face of the inwardly curved portion **19**, indicated at **20**, serves as a cam-like slide surface urging the uppermost plates to be dispensed against the opposite side of the dispenser well, as is hereinbelow more particularly described. The free or inner end of the outwardly extending portions **15** of the body member **14** is integrally formed with a pair of opposed, sidewardly outwardly extending lug portions **21** and **22**.

Means is provided for swingably securing the body member **14** with respect to the peripheral flange **12** of the dispenser well **11**. To this end, a pair of right-angular brackets **23, 24** are provided, the upstanding arm portions **25** and **26** of which have struck or otherwise formed therein elongated, horizontally extending slots **27, 28**, respectively, within which respective lugs **21, 22** of the body member **14** are loosely received. As means for securing the right-angular brackets **23, 24** in place against the upper surface of the well flange **12**, a rectangular stud plate **29** is provided, said stud plate having a pair of spaced, parallel, upstanding machine-screw-threaded studs **30, 31** receivable from underneath through openings **32, 33** in the peripheral dispenser well flange **12** for passage through openings **34**, (only one illustrated in FIG. **4**), of the respective horizontal arms **35** and **36** of right angular brackets **23, 24.**

Cap nuts 37 and 38 threaded down on the upstanding end portions of the screw-threaded studs 30 and 31 serve to securely clamp the right-angular support brackets 23, 24 in place.

Considering now the operation of the self-adjusting plate separator device, it will be noted that the stack of disposable plates P to be dispensed from the dispenser well 11 is supported from underneath by a pusher head 39, constrained between the underside of which and the bottom of said well being a stressed compression spring 40. The plates P are stacked in upside-down position, and the underside of the nose 17 of the body member 14 of the plate spearator device extends just far enough inwardly of the top circular opening of the well as to abuttingly engage the concavely arcuate peripheral edge underportions 41 of the plates P being dispensed. This squeezing or clamping engagement of the stacked plates between the plate separator device 10 and the vertically stressed pusher head 39 in the well 11 has the effect of "fanning out" or vertically separating a plurality of the uppermost plates in the stack at the side opposite said separator device so that they can readily be grasped one at a time from the top in dispensing operations. In this connection, it is to be noted that the spring rate of the helical spring 40, which is governed by the characteristics of the spring wire, the number of coils per unit length and the diameter of the coils; and the head load, which is governed by the overall length of the helical spring, will be such as to apply a substantially constant force at the bottom of the stacked plates P in the dispenser no matter how many plates remain in the stack. With such operation the "fanning out" or spreading of the uppermost plates will always remain substantially uniform. It will be understood, of course, that the spring rate and head load in a given size dispenser will be substantially greater than that in an ordinary self-leveling dispenser, the extra spring pressure being required in the present invention to provide the above-described clamping or squeezing at one side of the stack resulting in the desired "fanning out" at the opposite side.

With reference to FIG. 3 it is to be noted that the compressional force exerted by the plate stack against the underside of the nose 17 of the body member 14, in addition to effecting the "fanning out" of the uppermost plates, also serves to rotate or swing said body member in the clockwise direction, (as seen in FIG. 3), with respect to the fulcrum or journalling axis provided by the supporting brackets 23, 24. Such rotary or swinging movement is limited by the lower end of the downwardly and outwardly extending portion 18 of the body member 14 abutting peripheral outer edge portions of upper ones of the stacked plates P. The resilient sideward abutment and urging of the plates thus afforded pushes them laterally against the opposite side wall of the dispenser well 11, whereat they will be in correct position for "fanning out" in their subsequent abutment with the nose 17 of the body member 14, as hereinabove described. In this connection it will be noted that the outer face 20 of the inwardly curved portion 19 of the plate separator body member 14 serves as a slide surface guiding the uppermost plates against the opposite side wall of the dispenser well 11. It will be noted that the free swinging action of the body member 14 automatically adapts to a range of plate diameter sizes in moving stacked plates into proper position against the opposite side wall of the well in "fanning out" and dispensing operations.

With further reference to FIG. 3 it is to be noted that whenever it becomes necessary to fill the dispenser with a new stack of plates to be dispensed, the body member 14 can readily be swung upwardly and outwardly of the dispenser well 11, as illustrated by the broken-line representation thereof.

While I have illustrated and described herein only one form in which my invention can conveniently be embodied in practice, it is to be understood that this form is presented by way of example only and not in a limiting sense. The invention, in brief, comprises all the embodiments and modifications coming within the scope and spirit of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. A self-adjusting plate separator for self-leveling plate dispensers of the type having a vertically extending, open-top well for receiving vertically stacked plates to be dispensed and including mechanism normally resiliently constraining the stacked plates therein in the upward direction from underneath for dispensing, comprising, in combination; a body member having an elongated top portion, means for pivotally securing one end of said elongated top portion with respect to the top opening of the dispenser well so that its other end extends radially into said opening and is swingable in the vertical direction, said other end of said elongated top portion defining a coaxially extending, outwardly projecting, rounded nose portion, said body member further comprising a downwardly directed body portion extending from said nose portion at a position inwardly of the outer extremity thereof, said nose portion being operative to clampingly engage with marginal edge portions of the stacked plates being dispensed with respect to the plate constraining mechanism for separating a plurality of uppermost plates in the stack in fan-like fashion at a position opposite said body member, said downwardly directed body portion, in its swinging movement about said pivotal axis resulting from the constraining force being applied upwardly against said nose portion being operative to urge uppermost ones of said stacked plates sidewardly into abutting engagement against well side wall portions opposite said body member, and an inwardly curved body portion extending from the outer end of said downwardly directed body portion for guidingly constraining said uppermost ones of said stacked plates in the sideward direction, said means for pivotally swinging said top portion being so arranged that the underside of said nose portion is disposed below the horizontal plane including the swinging axis of said pivotal securing means upon said downwardly directed body portion reaching the limit of said sidewardly urging position in its urging of said uppermost ones of said stacked plates sidewardly into abutting engagement against well side wall portions opposite said body member.

2. A self-adjusting plate separator as defined in claim 1, wherein said body member is integrally formed of bent sheet-metal stock.

3. A self-adjusting plate separator as defined in claim 1, wherein said pivotal securing means comprises a pair of upstanding bracket members, means for securing said bracket members with respect to said well flange, said bracket members having laterally opposed openings, said elongated top portion being formed at said one end with laterally opposed, outwardly extending lug portions received one each in said bracket openings.

4. A self-adjusting plate separator as defined in claim 3, wherein said bracket openings are in the form of laterally extending slots.

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