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A. E. LINDSTROM
CONTAINER DISPENSER

2,445,958

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2 Sheets-Sheet 1

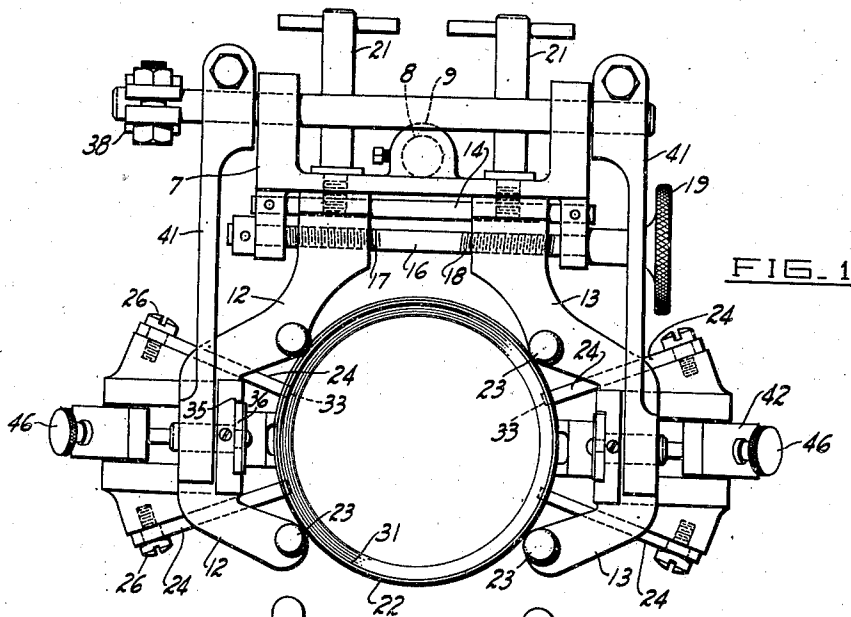


FIG. 1

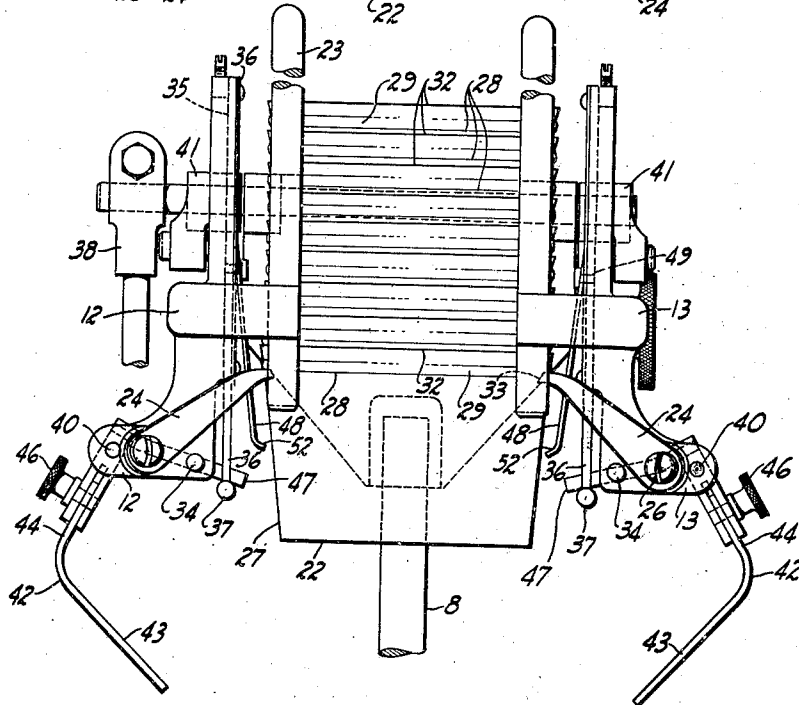


FIG. 2

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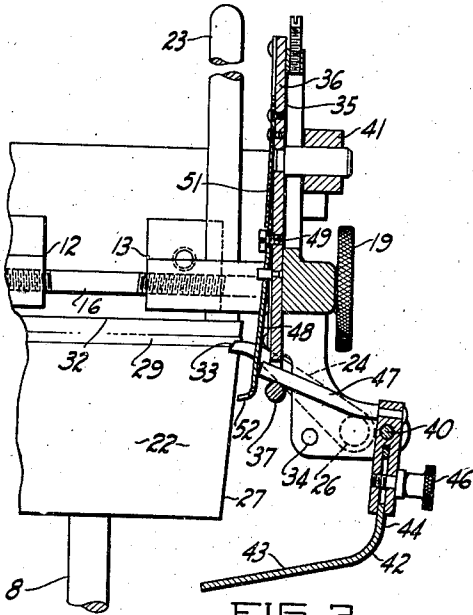


FIG. 3

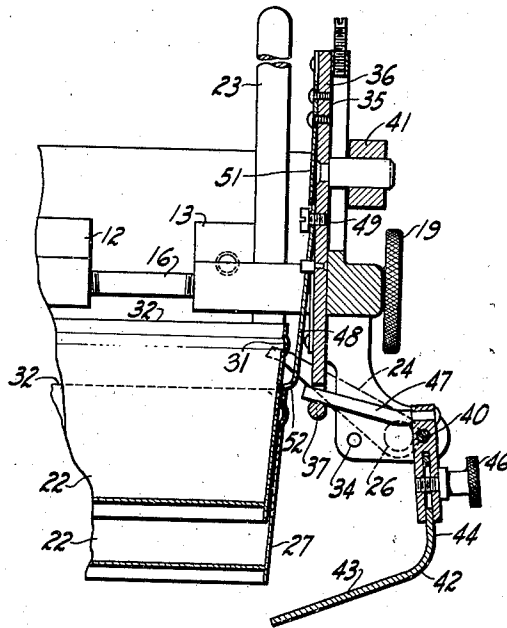


FIG. 5

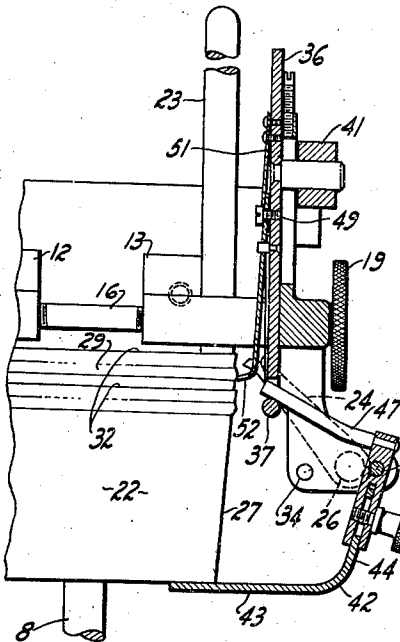


FIG. 4

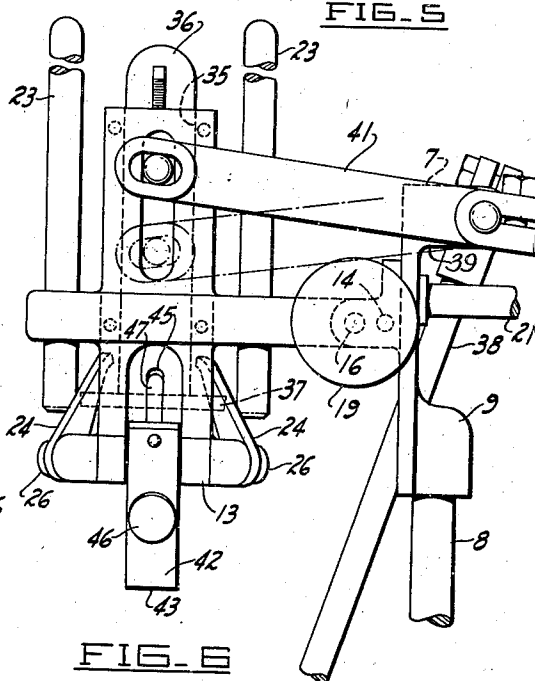


FIG. 6

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CONTAINER DISPENSER

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5 Claims. (Cl. 312-44)

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The invention relates to a means of dispensing containers one at a time from a stack in which the individual containers are nested one within another. Usually in this type of dispenser, the stack is held vertically with the open side of each container uppermost, and release of the containers is from the bottom of the stack for delivery to a filling mechanism or the like. The dispenser of the present invention is particularly designed for dispensing of containers having tapered sides and with the walls thereof of relatively light material such as paper. Frequently the material is impregnated with wax or otherwise provided with a protective coating, and due to the very flexible nature of the containers and the presence of the wax or other coating, some of the containers in the stack will be invariably nested and stuck together. In view of this, with dispensers as designed prior to my invention, quite frequently two or more of the nested containers would be released at one time, thereby not only interfering with the proper and regular delivery of the containers from the dispenser but interfering with the operation of the mechanism to which the containers are conveyed.

It is therefore an object of the present invention to provide a dispensing means of the character described which will positively insure the delivery of the containers singly and regularly regardless of any irregularity in the positioning of the containers or adherence of the containers with each other in the stack.

A further object of the invention is to provide a dispenser of the character described which will not be dependent for its efficient operation, on use with containers provided with protrusions, indentations, etc., affording a ready anchor for engagement with the dispensing mechanism.

A still further object of the invention, is to provide a dispenser of the character described in which the stack of containers will be supported in a positive manner during the repositioning of the container releasing members of the dispenser mechanism.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawings accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawings and description may be adopted within the scope of the invention as set forth in the claims.

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Referring to said drawings:

Figure 1 is a top view of the dispenser of my invention.

Figure 2 is a side view of the dispenser as shown in Figure 1, and with the parts in position on initiation of a cycle of operations.

Figures 3 to 5 inclusive are vertical sectional views of the dispenser as illustrated in Figure 2, but with the parts positioned in different successive stages of the operation.

Figure 6 is a side view of the dispenser taken at right angles to Figure 4.

As illustrated in the drawings, the dispenser of my invention in the preferred embodiment includes a frame 7 on which the various parts of the dispenser are supported for positioning over a conveyor or the like upon which the containers are to be deposited for delivery to a mechanism such as for filling, capping, etc. The frame is supported as here shown by a standard 8 which seats in a socket 9 so as to permit the dispenser unit to be rotated into and out of operative position or readily removed when desired. Included as part of the frame is a pair of sections 12 and 13 arranged in horizontally opposed relation and mounted on parallel rods 14 and 16 for slidable movement toward and from each other. Rod 16 is provided with oppositely progressing screw-threaded portions 17 and 18 which mesh with correspondingly threaded portions in the respective sections 12 and 13. A knurled head 19 is affixed to rod 16 in order to readily rotate the rod and thus move the sections to the desired adjusted position, the rod being held against longitudinal displacement in the frame. Retention of the sections in adjusted position is effected by means of screws 21 extending through apertures, provided in the frame 7, which are elongated in a direction paralleling the axis of the threaded rod 16 and which threadedly engage the sections 12 and 13 so that, when the latter are adjustably positioned by manipulation of the knurled head 19, the screws 21 may be tightened so as to frictionally bind the sections to the frame and thereby prevent subsequent accidental relative displacement of the sections.

Means are provided for holding in vertical position and guiding through the dispenser a stack of the containers 22 for delivery one at a time from the dispenser. As here shown such means is carried by the frame sections and includes pairs of vertical posts 23, one pair being provided with each section. The posts 23 are spaced transversely on the sections and are arranged to loosely engage the sides of the containers so as to retain

the stack in vertical position and provide a guide through which the containers may freely descend.

In the present embodiment of the invention, the containers are arranged to be dispensed from the bottom of the stack and means are provided utilizing the weight of the containers for effectively supporting the stack and for permitting during each complete dispensing operation the release of the lowermost container in the stack while descension of containers thereabove is positively arrested. As shown in the drawings, the means above comprises a plurality of detent arms 24, a pair of which is preferably associated with each of the sections and pivotally connected thereto by means of pins 26 at the outer end of the arms. The arms are positioned to extend radially inward along planes converging toward common intersection with the central longitudinal axis of the containers of the stack, and are of a length to engage the side walls of the containers when the arms are inclined inwardly at an angle of about 30° to the horizontal. The arms 24 are preferably weighted to insure firm engagement with the sides of the container. The arrangement of the detents is such that when the latter are in engagement with the side of a container and the weight of the stack is released, the detents, by such engagement, will be forced inwardly radially of the stack so as to forcibly increase their pressure of engagement with the side of the container. Thus the detents are capable of securely supporting the full weight of the stack.

The containers 22 with which the dispenser is illustrated in the drawings are of a conventional design and formed with upwardly tapering side walls 27 which permit relative compact nesting in such manner that a substantial portion 28 of each container will be caused to protrude out of the container therebelow. It is with the protruding portion 28 that the detent arms 24 are arranged to engage, and as will be apparent, owing to the wedging action produced by the weight of the stack tending to force the arms inwardly against the container, a positive stop for holding the stack against descension will be effectively provided when the container is thus engaged. While the detent arms will be effective for supporting the stack, simply by engagement with the smooth side walls of the containers, under some conditions a more positive engagement with the container sides at a predetermined position thereon may be afforded by providing for engagement of the arms with the portion 28 at a part having an offset such as for example the external peripheral bead 29 provided in the containers here illustrated and as the complement of the groove 31 formed on the inner side of the walls near the rim 32 for the reception of a closure cap. When such beaded type of container is used, the inner ends 33 of the arms are designed to preferably engage the lower portion of the bead as well as the wall portion immediately thereunder. Desirably the ends 33 are formed with a blunt or nose-like point readily fitting under the bead. However the design of such ends may be varied to more appropriately fit and engage the special form of offset or surface to be engaged by the arms. Stops 34 are preferably provided on the frame sections to prevent the detent arms from swinging too far downward when no containers are within the guideway.

As will be evident, by causing the detent arms to engage and grip the portion 28 of the container nested within the bottom or lowermost container

in the stack, all the containers above as well as the engaged container will be supported against downward displacement but the bottom container will be free for release from the stack. In order therefore to permit the release of containers one at a time from the bottom end of the stack, means are provided for causing the arms to successively transfer their engagement from a lower container to the container thereabove. Provided on each of the sections 12 and 13 and mounted in slideways 35 therein for vertical reciprocal movement are slide members 36 each having as here shown at the lower end thereof a stud 37 designed to engage the detent arms on the associated section and move them out of operative relation with the containers when the slide member is elevated but to release the arms for engagement with the containers when the member is in a depressed position. Reciprocation of the slide members in unison is effected by a lever 38 fulcrumed in a bearing 39 of the frame and having arms 41 pivotally and slidably connected with the slide members. Oscillation of the lever may be provided for by appropriate driving connection either independently or in association with some cooperating mechanism.

As will be seen, when the detent arms are moved by studs 37 entirely out of engagement with the containers, the entire stack will be free to descend through the guideway defined by the posts 23, and as an important part of the invention in its preferred embodiment, there is provided as a part of the means for effecting the transfer of engagement of the detent arms from one container to the next, a means which will serve to arrest the descent of the stack when, after release by the arms, it has reached a level such that on the subsequent reentry of the arms, they will engage the portion 28 of the container nested in the container previously released. As shown in the drawing said latter means includes a pair of opposed supporting arms 42, one on each of the frame sections 12 and 13, and pivotally connected thereto by a pin 40 so as to permit the arms to move in or out from under the bottom of the stack. Each of the arms 42 as shown in the drawings is formed with angularly related portions 43 and 44, the portion 43 being arranged for insertion or withdrawal under the bottom of the lowermost container in the stack and the portion 44 being adjustably secured such as by means of a clamping screw 46 so as to afford adjustment in the amount of drop permitted the stack on disengagement of the detent arms 24. Oscillation of the supporting arms 42 to move portion 43 inwardly or outwardly is preferably effected by operative connection with the reciprocative slide members 36, the connection being made in such manner that when the members are in a depressed position so that the detent arms will be engaged with the stack, the arms 42 will be withdrawn from under the stack so as to permit the withdrawal of the lowermost cup when unsupported, and conversely when the members are in an elevated position so that the detents 24 are disengaged, the arms 42 will be moved under the stack so as to provide a rest or stop upon which the stack may drop to permit engagement of the detents with the second lowermost container. Connection between the arms 42 and the slide members is here shown effected by means of an extension 47 of the arms 42 engaging in a vertically elongated opening 45 in the member above the stud 37.

As previously explained, due to tight nesting of the containers and the adherence of the waxed

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surfaces, the containers will frequently, if not invariably stick together, and in view thereof when the bottom container is left unsupported and free for release from the stack, such container must ordinarily be forcibly depressed in order to separate and release it from the stack. In view of the above, means are provided which will engage the unsupported container and strip it from the container above when the latter is engaged by the detents 24 and while the supporting arms 42 are withdrawn or in an inoperative position. Preferably secured to the members 36 for positioning at opposite sides of the stack, are a pair of container engaging elements here shown in the form of fingers 48 pivotally connected to the upper portion of the members by means of pins 49 and engaged by springs 51 in such manner as to urge the inwardly bent portions 52 of the lower ends of the fingers into engagement with the sides of the containers. It is important to note that the finger portions 52 are so located, that on appropriate relative vertical displacement between the containers and fingers such as by the lowering of the stack with respect to the fingers, the position of the finger portions will be changed from opposite the sides of the lowermost container in the stack when supported by the detents 24 to opposite the portions 28 of the container above when the stack has been dropped upon the supports 42. Thus on the reverse relative vertical displacement such as produced by depression of the members 36 with respect to the stack, the finger portions 52 will engage the rim or other protruding portion of the bottom container so that with the container above engaged by the detents and the supporting arms withdrawn, the fingers will easily and effectively retract and discharge the bottom container from the stack.

The operation of the dispenser is as follows:

Assuming the slide members 36 about to start on the up-stroke, the parts will be positioned as indicated in Figure 2, that is with the detents 24 operatively engaged with the lowermost container, the finger portions 52 inoperatively disposed opposite the sides of the container, and the supports 42 fully withdrawn from under the stack. As the slide members approach the top of the up-stroke as shown in Figure 3, the studs 37 contact the detents, and the supports 42 start moving under the bottom of the container, the finger portions 52 having moved to a position well up on the sides of the container. As the top of the stroke is reached, as illustrated in Figure 4, the detents will have moved out of engagement with the bottom container and the stack will have dropped down with the bottom of the container resting directly upon the inwardly positioned supports 42. Also as will be seen, the finger portions 52 have become disengaged from the bottom container and are disposed directly above the rim of such container and against the exposed portion of the container above. It is important to note that although the detents will have become disengaged from the container, before the completion of the upstroke, no raising of the stack by the arms 42 will be entailed since the latter will reach their uppermost position before the slower moving stack will have dropped into contact with the arms. As the slide members then initiate the downstroke, the corresponding descent of the studs 37 will cause the detents to start moving radially inwardly toward engagement with the container bead, the relationship in the positioning and movement of the detents and the

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studs 37 being such that on withdrawal of the studs from under the detents and the slight descent of the stack due to the lowering of the arms 42, the inner ends of the detents will move into engagement with the exposed portion 28 of the container vertically below the bead 29 nested within the bottom container. As the slide members continue downward, the detents will continue movement into engagement under the bead of the next higher container until at about one-third of the downward movement of the slide members, as shown in Figure 5, the supports 42 will swing radially outwardly, and the portions 52 of the fingers will engage above the edge or rim of the bottom container and start stripping the latter from the penultimate container engaged and held by the detents. As the complete separation of the bottom container from the stack is effected, the supports 42 will have been fully withdrawn and the aforesaid container is allowed to drop free and clear of the stack and the dispenser mechanism. The slide member then reaches the end of its downward stroke, is upwardly retracted and the cycle of operations above described is then repeated to dispense the succeeding container.

I claim:

1. In a mechanism for dispensing open containers one at a time from a stack of containers arranged in nested relation with each container having a side portion protruding outwardly from the rim of the container in which it is nested, a frame including means for holding the nested containers in a vertical stack and for vertical displacement, transversely spaced detents mounted on the frame engageable with and to support the containers, at opposed sides thereof, said detents being pivoted to the frame and extending upwardly and inwardly from their pivots into operative engagement with the containers so that the weight of the containers will be exerted to force the detents inwardly against the containers with a pressure proportional to the weight of the containers, means operative to effect release of the detents from engagement with the containers, and means operative to support the containers independently of said detents when the detents are disengaged from the containers.

2. In a mechanism for dispensing open containers one at a time from a stack of containers arranged in nested relation and with a side portion of each container protruding upwardly from the container in which it is nested, means to hold the containers in axially aligned relation and for movement along the axis of the stack to a delivering end of the holding means, detents carried by said container holding means positioned at opposite sides of the containers and movable inwardly to engage said side portions of the containers, said detents being pivoted to the container holding means and extending upwardly and outwardly from their pivots into engagement with said side portions of the containers so that upon movement of the stack toward said delivering end the detents will be urged inwardly into tighter engagement with said side portions under the weight of said stack, means to effect retraction of the detents, means to support the containers independently of the detents when the stack is moved to an advanced position, and means to engage an end container of said stack and separate it from the container nested therein.

3. In a mechanism for dispensing open containers one at a time from a stack of containers arranged in nested relation and with a side portion of each container protruding beyond the

rim of the container therebelow, means to hold the stack vertically and for vertical displacement of the containers, detent arms arranged for positioning about the containers for engagement with said side portions at different points around the periphery and being attached adjacent one end to said stock holding means for pivotal movement to and from the container portions and for engagement at the other end with said portions at points higher than said fixed points, a vertically reciprocable member having parts positioned to lie at opposite sides of said containers arranged to engage the lowermost container in the stack on the downward stroke of the member and thereby separate said container from the container nested therein, means connected for movement with said member operative to retract the arms from engagement with the containers during a portion of the movement of said member, and means movable with said member and operative to support the containers on disengagement of said detent arms therefrom, but with the containers at a lower level than when supported by the arms.

4. In a mechanism for dispensing open containers one at a time from a stack of containers arranged in nested relation and with a side portion of each container protruding beyond the rim of the container therebelow, a relatively fixed frame, guide means in said frame for holding the stack of containers vertically and for vertical displacement in the guide means, detent arms pivoted to the frame for vertical movement at opposite sides of and adjacent the lower end of the guide means and positioned to extend upwardly and radially inward for engagement at their inner ends with said side portions of the containers, supporting arms pivotally carried by the frame movable into and out of a position under the stack to support the same at a height at which the detent arms will operatively engage the side portions of the second lowermost container, a vertically reciprocable member having inwardly pressed and bent parts positioned to lie at opposite sides of the containers and arranged to move upwardly over the rim of the lowermost container on the upstroke and to engage said rim on the downstroke and thereby separate said container from the one above, and means connected for movement with said reciprocable member operative to move said detent arms from engagement with the containers and to move said supporting arms into and out of operative position.

5. In a mechanism for dispensing open containers one at a time from a stack of containers arranged in nested relation and with the opening uppermost and a side portion of each container protruding beyond the rim of the container therebelow, a relatively fixed frame including opposed sections, vertical members carried by said sections defining a guide for the containers at transversely spaced points around the sides thereof, a pair of detent arms pivotally connected to each section and positioned to extend radially inward for engagement at their inner ends with said side portions at transversely spaced points on the containers, supporting arms pivotally carried by said sections movable into and out of a position under the stack to support the same at a height at which the detent arms may operatively engage the exposed side portions of the second lowermost container, a vertically reciprocable member slidably mounted in each section, inwardly pressed and bent fingers carried by said members positioned to engage the containers at opposite sides thereof, means to reciprocate the members to raise the fingers to a position above the rim of the lowermost container when the latter is supported on the second mentioned arms and whereby the fingers will engage over said rim and separate said container from the one above on the descent of the members when the supporting arms are retracted and the detent arms are in engagement with the second lowermost container, means movable with said members operative to effect disengagement of said detent arms and move the supporting arms into position under the containers while the members are in an upper position, and means to move and hold the sections in selected positions radially of the stack to accommodate different sizes of containers.

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