

- [54] **CUP DISPENSER WITH RECIPROCATING ACTUATOR** 1,907,713 5/1933 Benson ..... 221/223 X  
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[52] U.S. Cl. .... **221/6; 221/223; 221/226**

[51] Int. Cl. .... **B65g 59/10**

[58] Field of Search ..... 221/6, 222, 223, 279, 226

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*Primary Examiner*—Robert B. Reeves

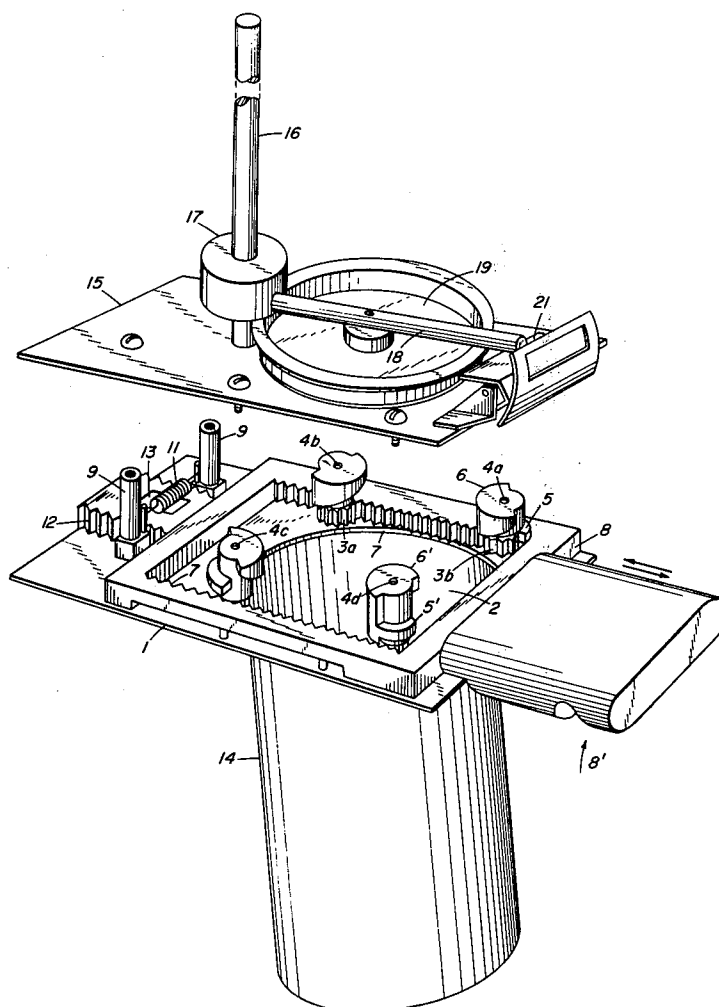
*Assistant Examiner*—David A. Scherbel

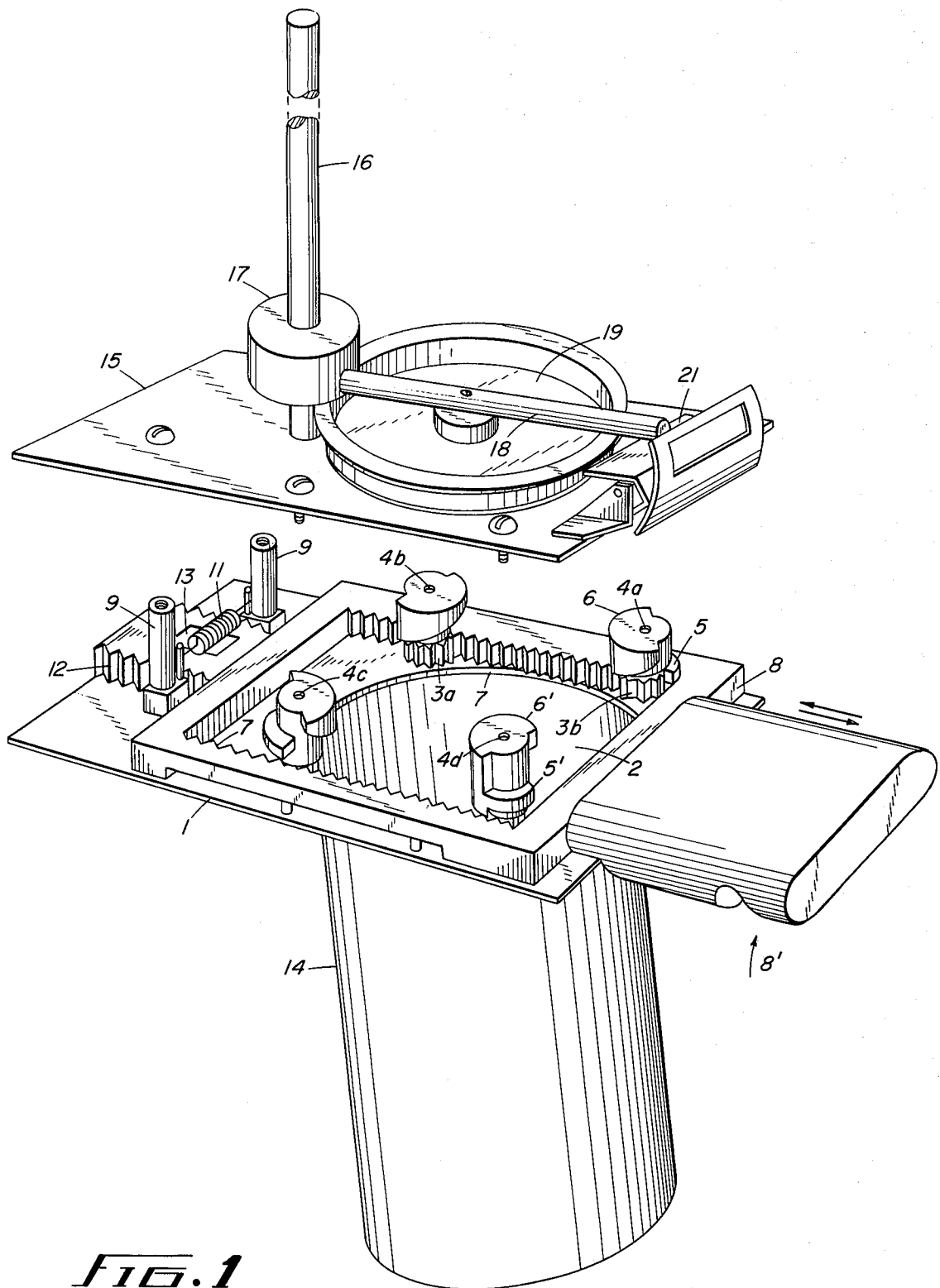
*Attorney, Agent, or Firm*—Howard J. Newby; William J. Speranza; Bruno P. Struzzi

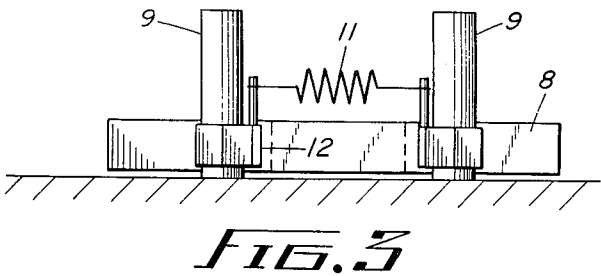
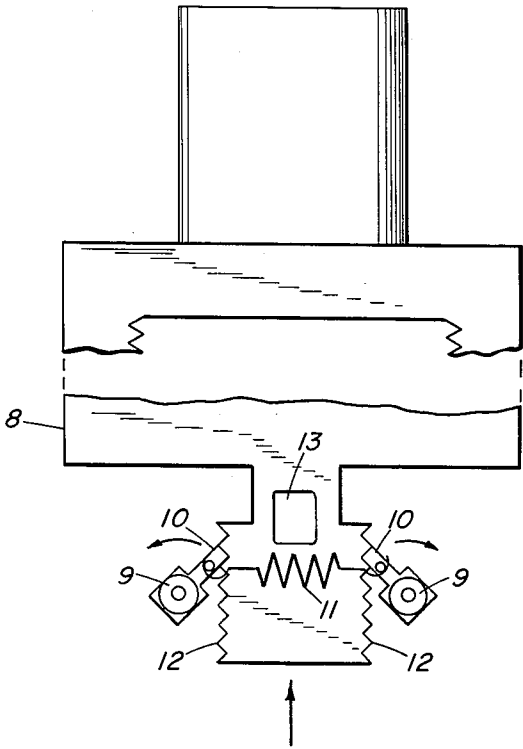
[57] **ABSTRACT**

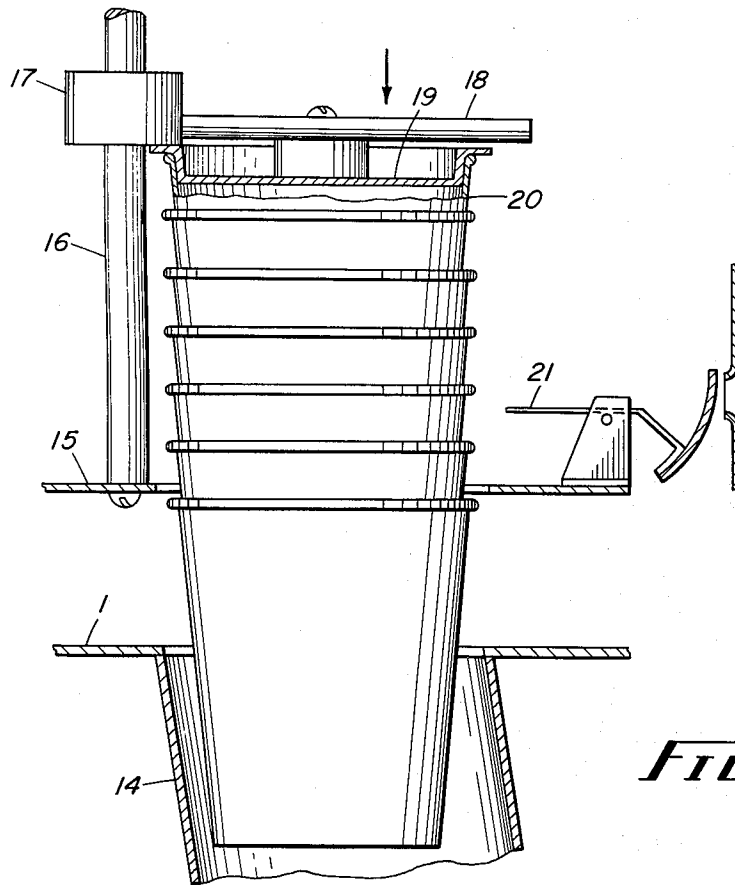
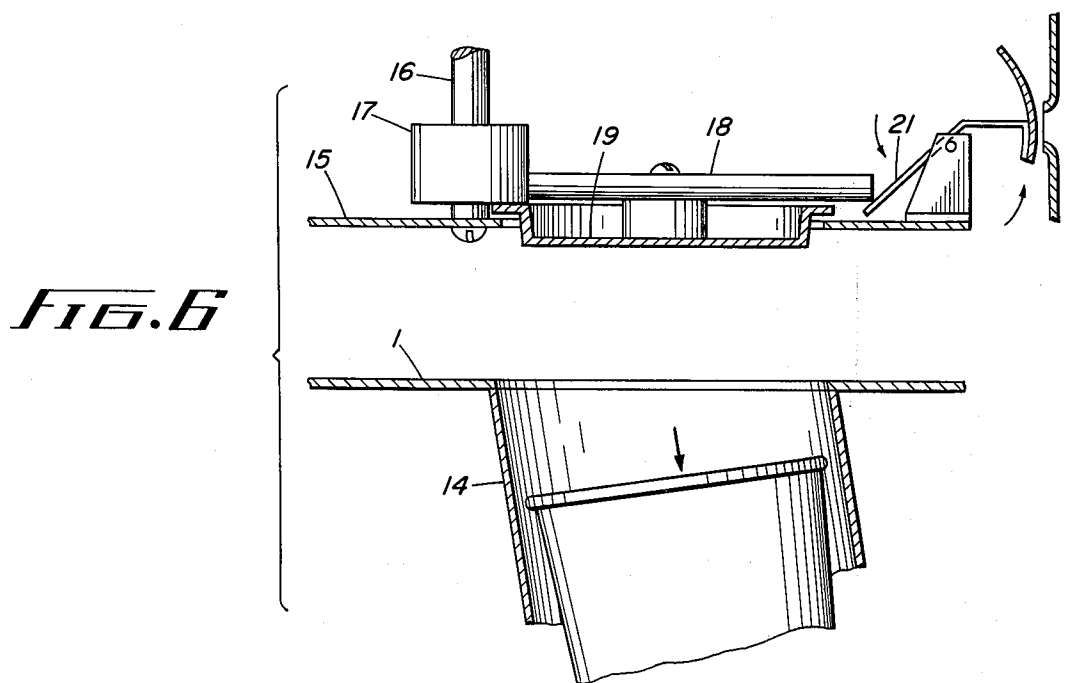
A dispensing mechanism suitable for use in a vending machine having a unique dispensing mechanism as described. The unit is intended for use with stacks of cups or packages having an appropriate lip which can be stripped by the staggered detent.

**1 Claim, 13 Drawing Figures**









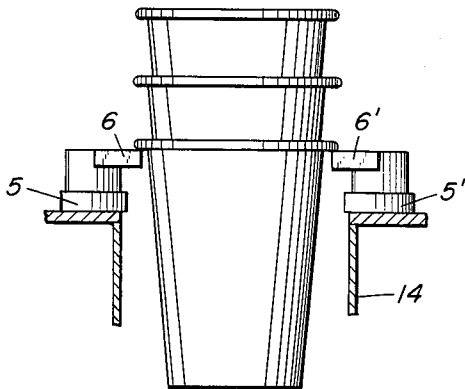


FIG. 2A

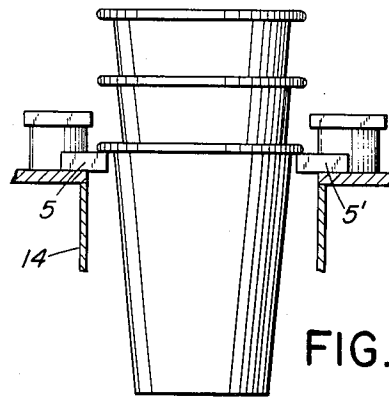


FIG. 2B

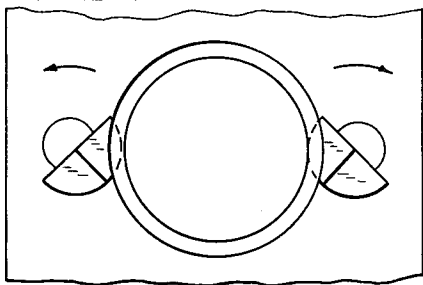


FIG. 2C

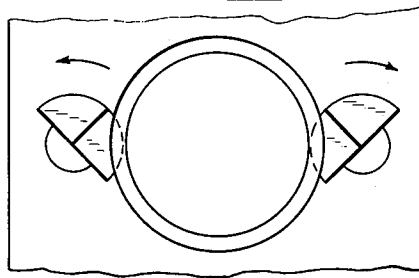


FIG. 2D

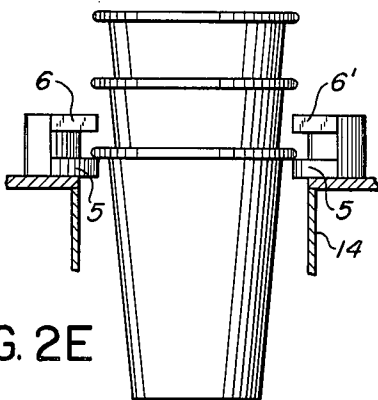


FIG. 2E

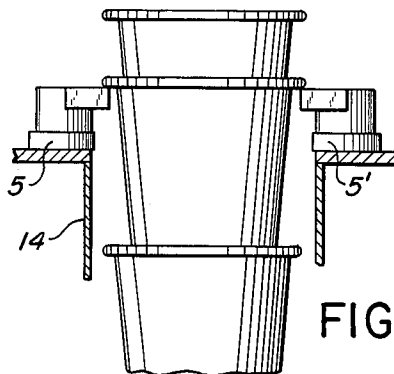


FIG. 2F

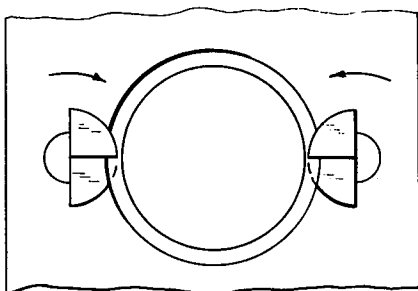


FIG. 2G

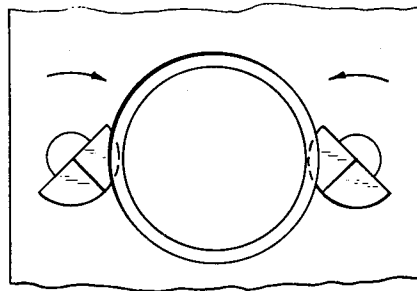


FIG. 2H

## CUP DISPENSER WITH RECIPROCATING ACTUATOR

This invention relates to a dispenser mechanism and more particularly to a mechanism for dispensing individual cups or packages from a stack thereof. Subject to the proviso that any article to be dispensed in a mechanism according to the invention must be provided with an appropriate lip or flange at or around its outer periphery, the mechanism is suitable for dispensing any articles or packages of the appropriate size. Units embodying the mechanism of this invention are particularly adapted to dispense cups for beverages and the invention will be described with reference to this preferred embodiment.

A unit embodying the mechanism of this invention may be incorporated in a dispensing machine having any type of release mechanism, for example a coin-operated release mechanism, and any conventional coin-operated mechanism may be adapted to actuate the dispenser unit.

In accordance with the present invention there is provided a mechanism for dispensing individual cups or packages from a stack thereof, which comprises a base plate having a delivery aperture therein, a plurality of pinions mounted on the base plate around the aperture, a frame member mounted on the base plate for rectilinear sliding movement and having a pair of racks flanking opposite sides of the said aperture which racks rotate the said pinions, each pinion carrying first and second axially spaced and circumferentially staggered detents, the first detents co-operating to retain a cup or package and the second detents co-operating to retain a cup or package.

In the mechanism according to the invention the slidable frame member is adapted to be operated by operating means attached to or integral with an outer side thereof. The operating means is preferably an extension of the frame member itself in the form of a handle with a grippable indentation.

In order to avoid a return movement before the full cup-releasing movement is completed the mechanism preferably also includes a non-return pawl and ratchet mechanism attached to an outer side of the frame member.

The dispensing mechanism as described above preferably forms part of a unit which also includes a top plate mounted above the slidable frame member and having mounted thereon a support for a stack of cups or packages, herein referred to as a cup stack support comprising an elongated rod or tubular member having a weighted disc or cap and arm slidably mounted thereon. In use the disc or cap rests on top of the stack of cups and serves to act as a weighted guide to ensure that the stack moves freely down the unit each time the bottom cup is released, and an extension of the arm operates a hinged indicator plate to indicate when the machine is empty.

In the preferred embodiment of the invention the delivery aperture in the base plate is of circular cross-section just slightly larger than the diameter of the cups to be dispensed, and the mechanism contains four pinions and their associated detents disposed symmetrically around the periphery of the circular aperture.

Such a preferred embodiment is illustrated in the drawings accompanying the provisional specification, in which:

FIG. 1 is an exploded perspective view of a dispensing unit embodying the mechanism of the invention,

FIGS. 2A thru 2H diagram illustrating the cup dispensing sequence,

FIG. 3 is a rear elevation of a non-return mechanism,

FIG. 4 is a plan view of a non-return mechanism,

FIG. 5 is a side elevation of the indicator mechanism in the "loaded" position, and

FIG. 6 is a side elevation of the indicator mechanism in the "empty" position.

The cup dispenser unit illustrated in FIG. 1 comprises a base plate 1 having a circular aperture 2. Four pinions 3 are mounted through axel pins 4 on the base plate symmetrically around the periphery of the aperture. Each pinion carries a first detent 5 or 5<sup>1</sup> and a second detent 6 or 6<sup>1</sup>. The first detent is axially spaced from and circumferentially staggered with respect to the second detent. The respective detents 5 and 5<sup>1</sup> and 6 and 6<sup>1</sup> are positioned to face inwardly or outwardly, as the case may be, with respect to the aperture, so that they are adapted to co-operate with each other to retain a cup. This is illustrated more fully in FIGS. 2A thru 2H which shows the sequential position of the detents, only two being shown for simplicity. The sequences illustrate a full cycle of operation, as follows:

- A. Operating handle fully in, bottom cup retained on second detents 6 and 6<sup>1</sup>;
- B. Handle fully out, cup drops to and is retained by first detents 5 and 5<sup>1</sup>;
- C. Handle in halfway position, cup about to drop; and
- D. Handle again fully in, bottom cup now falls free, next cup in position on second detents for next operation.

Returning to FIG. 1 the pinions 3 are rotated by movement of racks 7 flanking opposite sides of the aperture 2 and mounted on a frame member 8 to which is attached an operating handle 8<sup>1</sup>. In FIG. 1 the handle is shown in the fully in position and operation of the handle moves the frame member rectilinearly over the base member. At the far (inner) end of the frame member is a non-return mechanism comprising two pivot pins 9 on which are mounted rotatable pawls 10 (see FIG. 4) connected by a spring 11. The pawls act on a double-sided ratchet 12 in such a manner that the frame member can only complete a full movement in an outward or inward direction and cannot return until the movement is completed. This part of the mechanism also includes an aperture 13 adapted to receive a lever actuated by a conventional coin-operated mechanism (not shown).

Attached to the base plate beneath the aperture is a delivery tube 14 through which the cups pass after release by the dispensing mechanism.

The dispensing mechanism is included in a unit which also comprises a top plate 15 having a cup stack support comprising a tubular rod 16 having a slidable member 17 to which is attached an arm 18 carrying a weighted disc 19. This disc rests in or on the top cup 20 of a stack of cups (see FIG. 5) and ensures that the stack moves freely and straightly each time the bottom cup is dispensed. The arm also has an extended end which tips a pivoted tongue 21 to indicate when the dispensing machine is empty. The indicator mechanism is further illustrated in FIGS. 5 and 6.

The dispensing mechanism according to the invention occupies less space than previously known cup ring mechanisms consequently allowing the dispensing

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machine to be either narrower for the same number of dispensing points or to contain more dispensing points than prior machines. Also the frame member and base member, which are usually metal castings, may be made to any size desired, simply by altering the setting of the relevant jigs, without any expensive retooling.

What we claim is:

1. A mechanism for dispensing individual cups which comprises:

- a. a base plate, said base plate having a delivery aperture therein, said delivery aperture being of circular cross-section just slightly larger than the cups to be dispensed;
- b. four pinions mounted symmetrically on the base plate around the periphery of the aperture, each of said pinions having first and second axially spaced and circumferentially staggered detents, the first detent cooperating to retain a cup and the second detent cooperating to retain a cup;
- c. a frame member mounted on said base plate for rectilinear sliding movement, said frame member having

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a pair of racks flanking opposite sides of the aperture, each of said racks engaged with two of the pinions for rotation thereof during rectilinear sliding movement of the frame member;

- d. means for providing rectilinear sliding movement to the frame member, said means comprising:
  1. an extension of the frame member in the form of a handle with a grippable indentation; and
  2. a non-return pawl and ratchet mechanism attached to an outer side of the frame member;
- e. a top plate mounted above the slidable frame member; said top plate having an indicator plate hinge mounted thereon;
- f. a cup stack support mounted on said top plate, said cup stack support comprising:
  1. a vertically disposed elongated rod;
  2. an arm slidably mounted on said elongated rod, said arm having an extension adapted to operate the hinged indicator plate; and
  3. a weighted disc mounted on said arm.

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