

[54] COUPON INSERTER

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[58] Field of Search 271/12, 5, 27, 28, 29,
271/14, 75; 53/259, 251

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[57]

ABSTRACT

A mechanism to pick up a coupon, sheet of paper or other similar smooth surface object from a supply source and to transfer the coupon to a predetermined position and feed it into a container or otherwise deposit it in a desired position. The mechanism includes a reciprocatory slide block that is guided for reciprocation and driven by an eccentric crank assembly. Mounted on the slide block is an oscillating shaft having a vacuum pickup cup mounted thereon which is oscillated in response to reciprocation of the slide block due to a pinion gear carried by the shaft in meshing engagement with a rack gear that is stationarily positioned in parallel relation to the path of movement of the slide block for movement of the suction cup or suction tip in a cycloidal path that is continuous and repetitive. The coupon or other object is discharged from the suction tip in a tangential direction of the path of movement of the suction tip by employing a transfer unit, such as an endless belt unit to discharge the coupon into a container positioned under the discharge end thereof.

3 Claims, 5 Drawing Figures

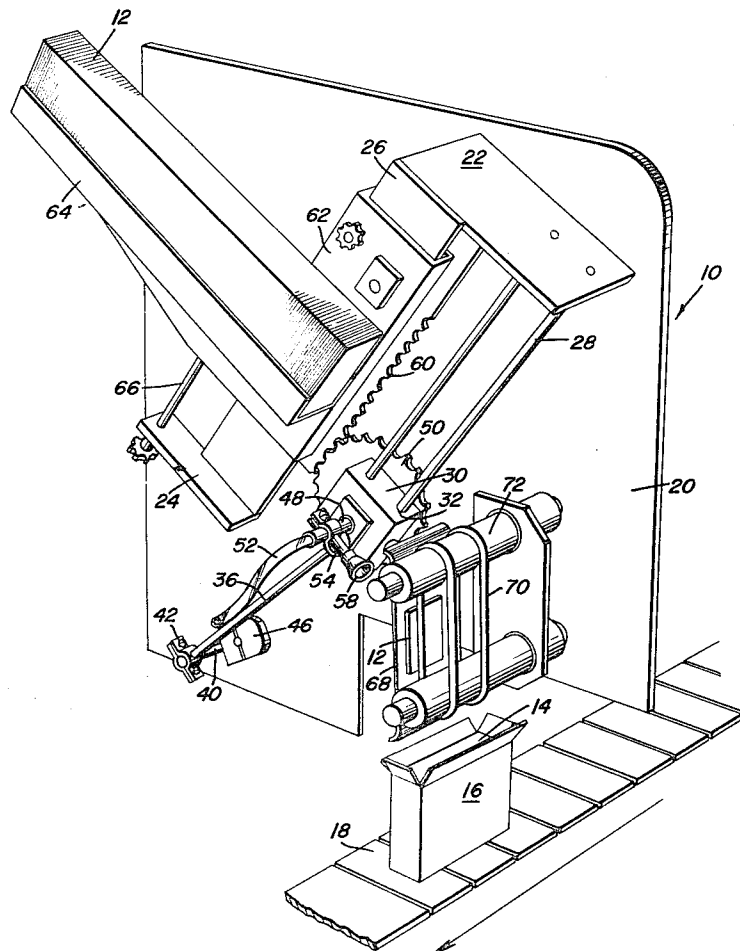


FIG. 1

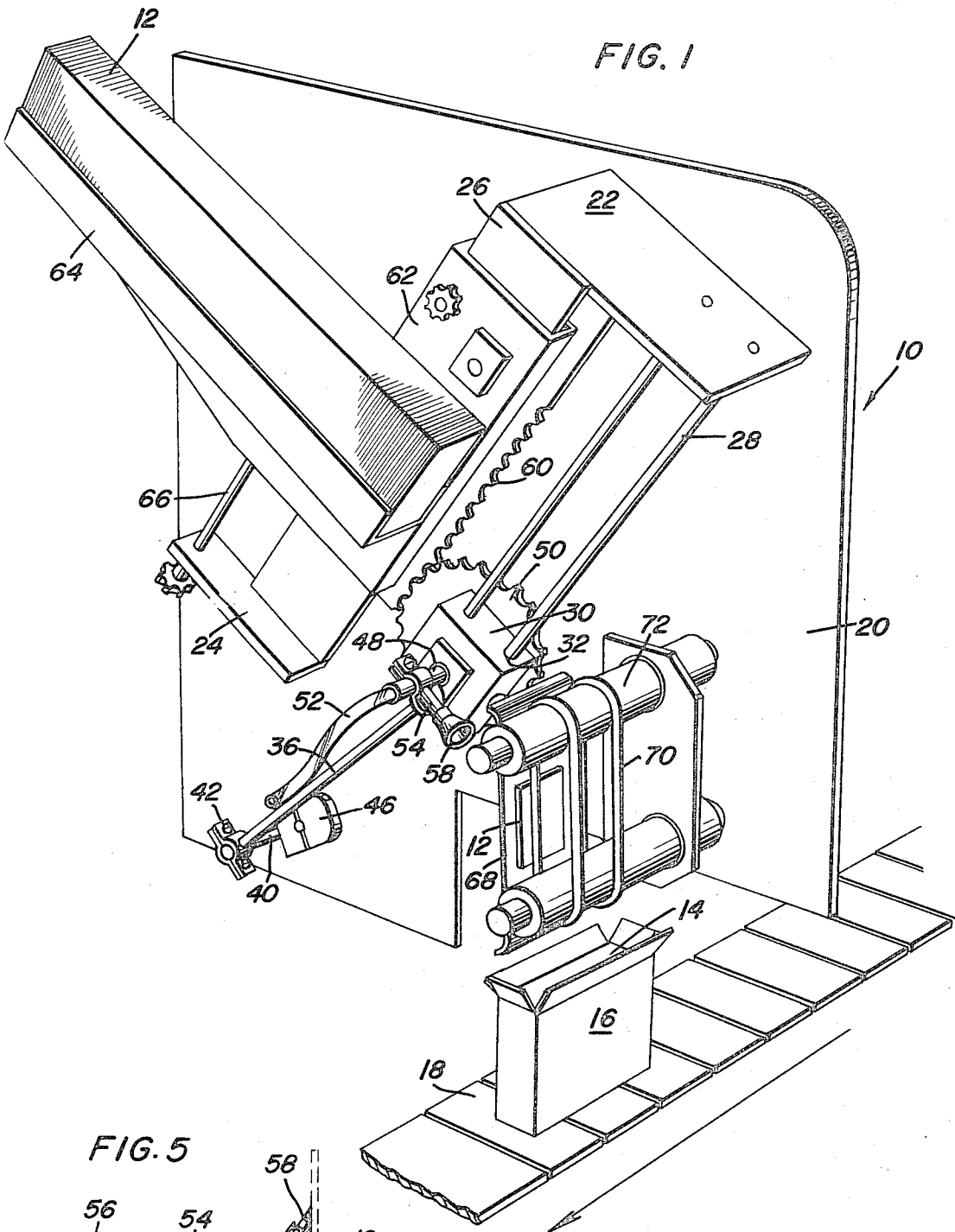


FIG. 5

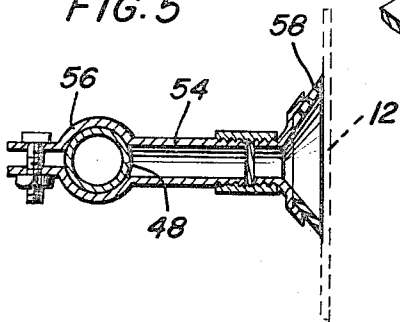


FIG. 2

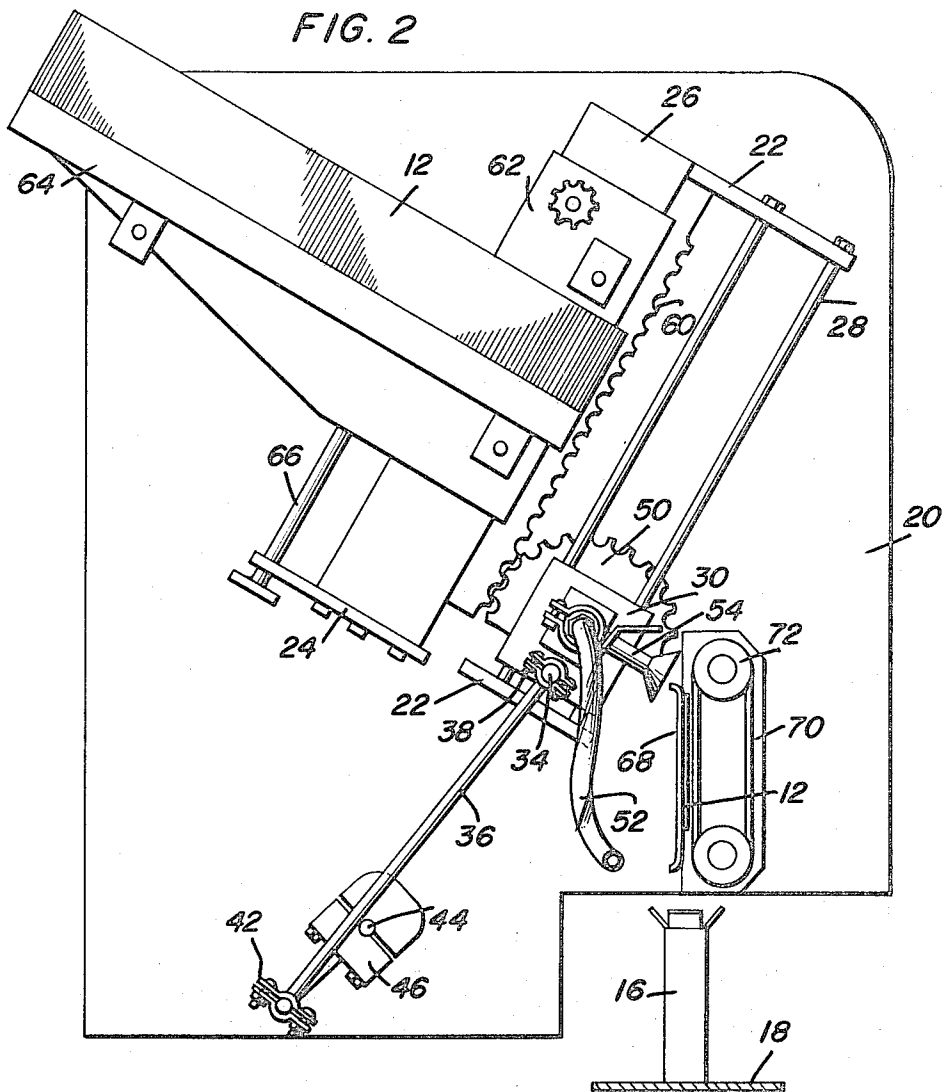


FIG. 3

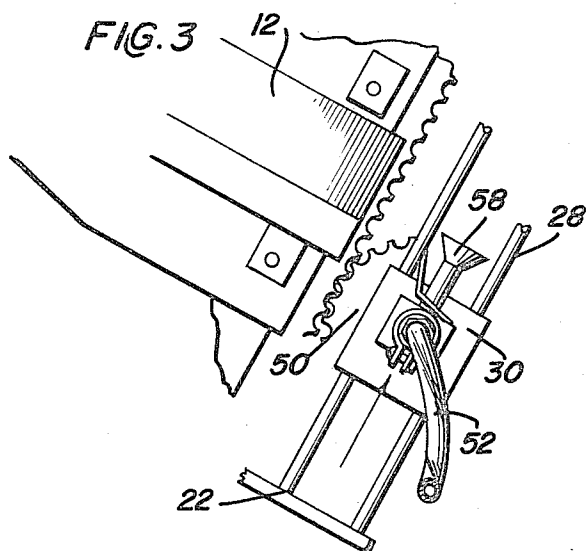
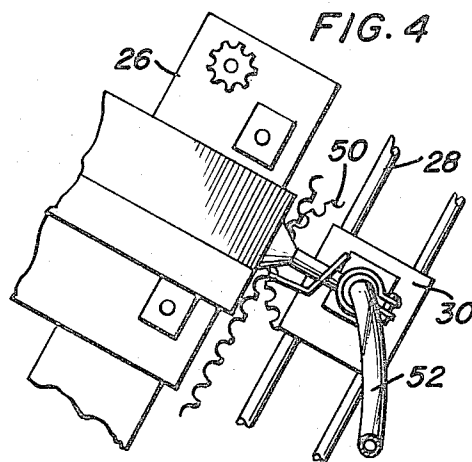


FIG. 4



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COUPON INSERTER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a coupon inserter and more particularly a device for picking up a coupon from a supply source, such as a hopper or magazine, moving the coupon in a cycloidal path and discharging it into a vertically oriented endless belt transfer unit which discharges the coupon into a container positioned under the discharge end of the transfer unit.

2. Description of the Prior Art

Many devices have been provided for picking up sheet material from a supply source and depositing it into another position for subsequent use. In present day packaging techniques for various commodities, premium coupons are inserted into the package so that the consumer may use the coupon for whatever purpose intended. Various prior patents exist which discharge or position a single coupon or similar object in each of a plurality of containers which are movable along a conveyor and are positioned in a particular relationship to the mechanism involved. Such devices, while they perform satisfactorily under certain circumstances, are somewhat bulky and expensive to manufacture, operate and maintain.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a coupon inserter which is extremely simple in construction and operation and will effectively pick up a coupon from a supply source and deposit it into a transfer unit for positioning into the open upper end of a container with the mechanism for moving the suction tip or cup in a cycloidal-type movement forming an essential portion of the invention.

Another object of the invention is to provide a coupon inserter in accordance with the preceding object in which the coupon inserter includes a slide block mounted on a pair of parallel guide rods oriented in an inclined position for guiding reciprocatory motion of the slide block together with an eccentric crank mechanism drivingly connected to the slide block for reciprocating the slide block.

Still another object of the invention is to provide a coupon inserter in accordance with the preceding objects in which the slide blocks have an oscillating shaft mounted thereon with the shaft having a vacuum cup attached thereto for oscillatory movement about the rotational axis of the shaft with the shaft also including a pinion gear affixed thereto and in meshing engagement with a stationary rack gear positioned alongside of and parallel to the path of movement of the slide block for causing oscillation of the shaft as the slide block is reciprocated thereby causing the suction cup or tip to move in a cycloidal-type of motion as it picks up a coupon at one extreme position of its movement, transfers it across the axis of rotation of the shaft and discharges it tangentially of the path of movement into a transfer unit for discharge into a container underlying the transfer unit.

Yet another important feature of the present invention is to provide a coupon inserter in accordance with the preceding objects in which the transfer unit is in the form of an endless belt assembly disposed vertically in

opposed relation to a plate for gripping the coupon between the plate and the endless conveyor for discharging the coupon downwardly and into the open upper end of a container positioned under the transfer unit.

Yet another significant object of this invention is to provide a coupon inserter which is quite simple in construction, easy to operate, dependable and long lasting and effective for rapidly inserting coupons into the open upper end of a container.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the coupon inserter of the present invention illustrating the structural details of the coupon pickup and transfer mechanism.

FIG. 2 is a front elevational view of the construction of FIG. 1.

FIG. 3 is a fragmental elevational view of the mechanism with the pickup mechanism in an intermediate position.

FIG. 4 is a fragmental view similar to FIG. 3, but illustrating the pickup mechanism in its pickup position.

FIG. 5 is a detailed sectional view of the pickup suction tip illustrating its association with a coupon.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now specifically to the drawings, the numeral 10 generally designates the coupon inserter of the present invention for picking up a single coupon 12 and inserting it into the open upper end 14 of a container 16 that is supported by a suitable conveyor mechanism 18 which does not form any particular part of the present invention. Also, various mechanisms may be provided for stopping the container 16 in alignment with the coupon inserter with this particular structure also forming no particular part of the invention since the structure would vary depending upon the type and size of container involved. For example, if the cylindrical containers, such as glass bottles, tin cans, or the like, are involved, a rotating index table assembly may be provided for proper orientation of the containers in relation to the coupon inserter. If rectangular cardboard containers, or the like, are employed, then the conveyor mechanism may be automatically stopped with the containers in alignment with the coupon inserter by the use of various conventional techniques.

The coupon inserter includes a support plate or base 20 of any suitable construction and configuration having mounted on the face thereof a pair of projecting brackets or plates 22 that are substantially perpendicular thereto with the lower of the plates 22 being shorter than the upper of the plates as illustrated in FIG. 2.

Mounted on the plate 20 alongside of but slightly spaced below the short bottom plate 22 is a bottom plate 24 having a plate 26 attached thereto and extending between the upper plate 22 and the bottom plate 24. The plates 22 and 24 are secured to the vertical mounting plate 20 in any suitable manner and the plate 26 which is parallel to the plate 20 is secured to the

plates 22 and 24 in any suitable manner, the details of which are not shown.

Extending between the upper and lower plates 22 is a pair of rigid, parallel guide rods 28 which are inclined as illustrated in FIG. 2 with the angle of inclination being 30° from vertical. Mounted on the guide rods 28 is a slide block 30 having parallel bores 32 extending therethrough slidably receiving the guide rods 28. The specific structure of the guide block is not illustrated in detail and any various bearing structures or bushings may be provided for providing an accurate path of movement for the guide block. For example, the guide block may be constructed of a single piece of material or may be of split construction to facilitate assembly thereof with the essential function of the block being to reciprocate on the guide rods 28. The lower end portion of the slide block 30 is provided with a projecting stub shaft 34 connected with a connecting rod 36 through a suitable bearing structure 38. The opposite ends of the connecting rod 36 is connected to the outer end of an eccentric crank 40 by a suitable connecting assembly 42 which includes a bearing structure. The eccentric crank or arm 40 is connected to a drive shaft 44 by a suitable clamp-type mechanism 46 or the like which may be counterbalanced if desired. The shaft 44 is driven by a suitable motor or other power source (not shown) so that upon rotation of the shaft 44, the crank or arm 40 and connecting rod 36 will cause the slide block 30 to reciprocate longitudinally along the guide rods 28 with the length of the movement of the slide block 30 being determined by the dimensional characteristics of the crank arm 40. The specific details of the eccentric driving mechanism for the slide block 30 may be varied with suitable bearings, lubrication features and the like incorporated therein.

The slide block 30 also includes a shaft 48 that is journaled in the block 30 and extends transversely thereof. The end of the shaft 48 inwardly of the slide block 30 is provided with a pinion gear 50 secured thereto in any suitable manner so that as the pinion gear 50 oscillates, it will cause oscillation of the shaft 48. The end of the shaft 48 which projects outwardly from the slide block 30 is hollow and connected to a flexible tube 52 that is communicated with a source of vacuum (not shown). Secured to the hollow shaft 48 is a tubular member 54 attached in any suitable manner, such as by a clamp 56. The tubular member 54 has a flexible vacuum cup 58 on the outer end thereof which engages a coupon 12 for picking up the coupon 12 from a supply area and discharging the coupon 12 when the vacuum cup or tip 58 moves to a discharge position.

The pinion gear 50 is in meshing engagement with a rack gear 60 supported from plate 20 and plates 22 and 26. The rack gear 60 parallels the slide rods 28 and is stationarily supported in relation to the slide block 30 so that as the slide block 30 reciprocates, the pinion gear 50 will be oscillated, thus oscillating the shaft 48.

Mounted on the plate 26 is a slide member 62, generally in the form of a sleeve, that is capable of sliding movement on the plate 26. Carried by the sleeve 62 is a tray structure 64 forming a supply source or magazine for the coupons 12 to be inserted. This entire assembly can be adjusted in relation to the plate 26 by an adjustment device 66 to enable the orientation of the components to be varied depending upon the size and other

characteristics of the coupons 12 so that a proper relationship may be obtained between the coupons 12 and the vacuum cup or tip 58 when the vacuum cup is in the pickup position as illustrated in FIG. 4. From the pickup position in FIG. 4, the slide block 30 moves downwardly along the guide rods 28 with the suction cup or tip 58 rotating with the shaft toward the discharge position generally indicated in FIG. 2. As the coupon moves with the suction cup, it will be deposited between a vertically disposed plate 68 and endless belts 70 forming a conveyor entrained over upper and lower pulley assemblies, rollers, or the like, 72 with the upper and lower ends of the plate 68 being flared for guiding the coupon into the package 16. As illustrated, the entrance between the belts 70 and the plate 68 is generally tangential to the path of movement of the suction cup and if the lower edge of the coupon engages the belts 70, it will be moved into and guided between the belts 70 and the plate 68. The belts 70 may be driven by any suitable drive motor or drive assembly (not shown) so that the speed may be properly adjusted for quickly and rapidly moving a coupon downwardly for a discharge vertically into the open upper end 14 of the container 16. Depending upon the speed of the conveyor and the containers, the conveyor may be stopped with the container under the belt conveyor assembly or if moving relatively slow, the coupon may be inserted without stopping the conveyor.

With the construction, the motion of the pickup of the coupon and the subsequent insertion is continuous, that is, from the time the coupon is picked up until the time it is inserted, there is no disruption in the movement of the coupon. Also, this device employs two distinct motions that are combined to form a resultant motion. The combined reciprocating or translatory motion and the rotational motion results in the suction cup or tip travelling in a cycloidal path of movement.

Various types of mechanisms and control mechanisms may be provided for correlating the movement of the containers in relation to the coupon inserter depending upon the requirements of each individual installation. Essentially, it is the continuous motion, the type of motion and the mechanism for picking up, moving and depositing the coupon which constitute the essential features of this invention which enables efficient insertion of coupons with a mechanism which is not complex nor complicated.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A coupon inserter for picking up a coupon from a source of supply and depositing it into a container comprising a tray structure receiving a supply of coupons, a reciprocating member supported for linear reciprocation, means drivably connected with the reciprocating member for causing reciprocation thereof, coupon pickup means mounted on said reciprocating member for oscillatory movement from a coupon pickup position to a coupon discharge position, means connected with said coupon pickup means for causing movement thereof between its positions in response to reciproca-

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tion of the reciprocating member, said reciprocating member being in the form of a slide block, guide means guidingly supporting said block for movement in a path substantially parallel to the face surface of a coupon to be picked up from the tray structure, and means adjustably supporting the tray structure for orientation of the coupons in proper relation to the pickup means when in its pickup position, said coupon pickup means including a shaft mounted on the slide block for oscillation with respect thereto, a laterally extending arm connected to the shaft, a suction cup mounted on the end of the arm for engaging the face of the coupon and picking up the coupon for movement to a discharge position, and means disposed tangentially of the path of movement of the coupon adjacent its discharge position for transferring the coupon from the pickup means to a container, said transfer means including a substantially vertically disposed plate, endless belt conveyor means disposed in opposed relation to the plate and defining an upper entrance area for a coupon and a lower discharge area for a coupon for receiving a coupon from the coupon pickup means and conveying it downwardly for discharge into a container.

2. The structure as defined in claim 1, wherein the means for moving the coupon pickup means includes a pinion gear rigid with said shaft, a rack gear stationarily mounted parallel to the path of movement of the slide block with the pinion gear in meshing engagement therewith whereby movement of the coupon from the point of pickup to the point of discharge is continuous and repetitive with the coupon moving in a cycloidal path.

3. A coupon inserter comprising a substantially vertically disposed support plate, a pair of brackets projecting from one side of said plate, a pair of parallel, vertically inclined guide rods supported from said brackets, an inclined guide plate supported by the brackets in spaced parallel relation to the guide rods, an inclined rack gear supported from said brackets in spaced parallel relation to the guide rods and guide plate, a slide sleeve slidably received on the guide plate, means adjustably securing the sleeve on the guide plate, a tray

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structure carried by said sleeve for movement therewith and for receiving a supply of coupons, a slide block mounted on said guide rods for reciprocation in parallel relation to the face surface of a coupon at the discharge end of the tray structure, a shaft journaled on said slide block for oscillatory movement, a pinion gear mounted on said shaft along one side of the slide block in meshing engagement with the rack gear whereby longitudinal reciprocation of the slide block will cause the shaft to be oscillated about an axis substantially parallel to the face surface of a coupon at the discharge end of the tray structure, a laterally extending arm mounted on said shaft alongside of the slide block in opposed relation to the gear on the shaft, said arm including a suction cup on the outer end thereof for swinging movement from a pickup position with the suction cup engaging and picking up a coupon at the discharge end of the tray structure and swinging it in a cycloid manner to a discharge position in response to reciprocation of the slide block whereby the gear and slide block are disposed laterally of the path of movement of the coupon from the tray structure to a position where it is discharged from the suction cup, means drivingly connected to the slide block for reciprocating it along the guide rods whereby the spaced guide rods stabilize the slide block during its movement, means disposed tangentially of the path of movement of the suction cup at the point of discharge of a coupon for receiving a coupon therefrom and discharging it downwardly into an upwardly open container, said last named means including a substantially vertically disposed plate having a laterally curved upper end, endless conveyor belts disposed in opposed relation to the plate for guiding and moving the coupon downwardly therebetween with the upper end portion of the conveyor belts and the curved upper end of the plate defining an entrance area for receiving the lower end of a coupon being transferred from its pickup position to its discharge position by the suction cup, said plate and conveyor belts being supported from said vertical support plate.

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