United States Patent

[11] **3,579,959**

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[45] Patented **May 25, 1971**
Continuation-in-part of application Ser. No. 664,195, Aug. 29, 1967, now abandoned.

[54] AUTOMATIC GROCERY BAG FILLING APPARATUS WITH INNER AND OUTER TRAY

15 Claims, 21 Drawing Figs.

[52] **U.S. Cl.** **53/260,** 53/391
[51] **Int. Cl.** **B65b 5/06,** B65b 39/00, B65b 67/02
[50] **Field of Search** 53/255, 258, 259, 260, 261, 187, 390, 391; 214/84

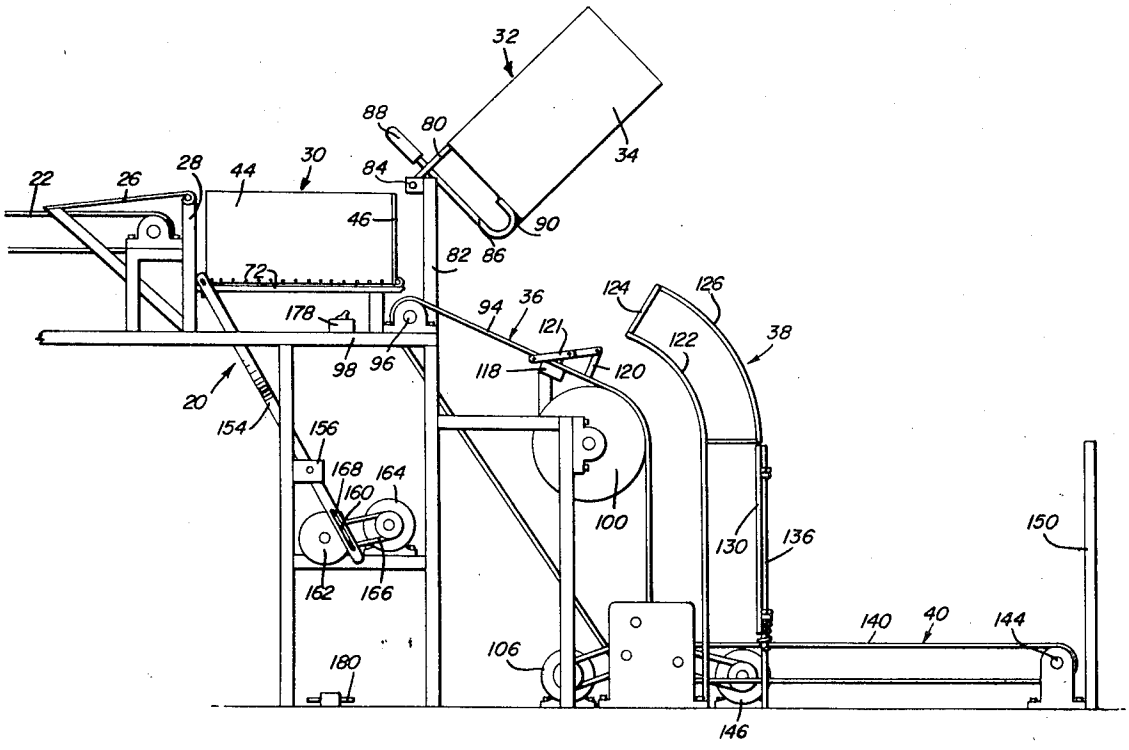
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Assistant Examiner—Robert L. Spruill
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ABSTRACT: An apparatus for automatically filling grocery bags with items purchased by a customer in a supermarket or the like including a tray in which the items are placed as they are registered on the checkout cash register, a bag holder on which an opened grocery bag is placed with the bag holder being movable into a position for telescopically receiving the tray while, the items are discharged from the tray into the grocery bag together with a conveyor structure for removing the grocery bag from the grocery bag holder and storing in an accessible position. In one embodiment of the invention, the tray is supported within a drawer structure which is actuated by a mechanism to first elevate the drawer into an inclined position in aligned relation to the grocery bag bag and then inserting the tray from the drawer into the grocery bag, releasing the items into the bag and then retracting the tray and returning the tray and drawer to its normal position for placing subsequent items in the tray.



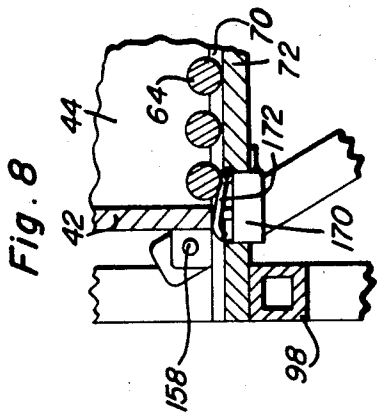


Fig. 8

Fig. 1

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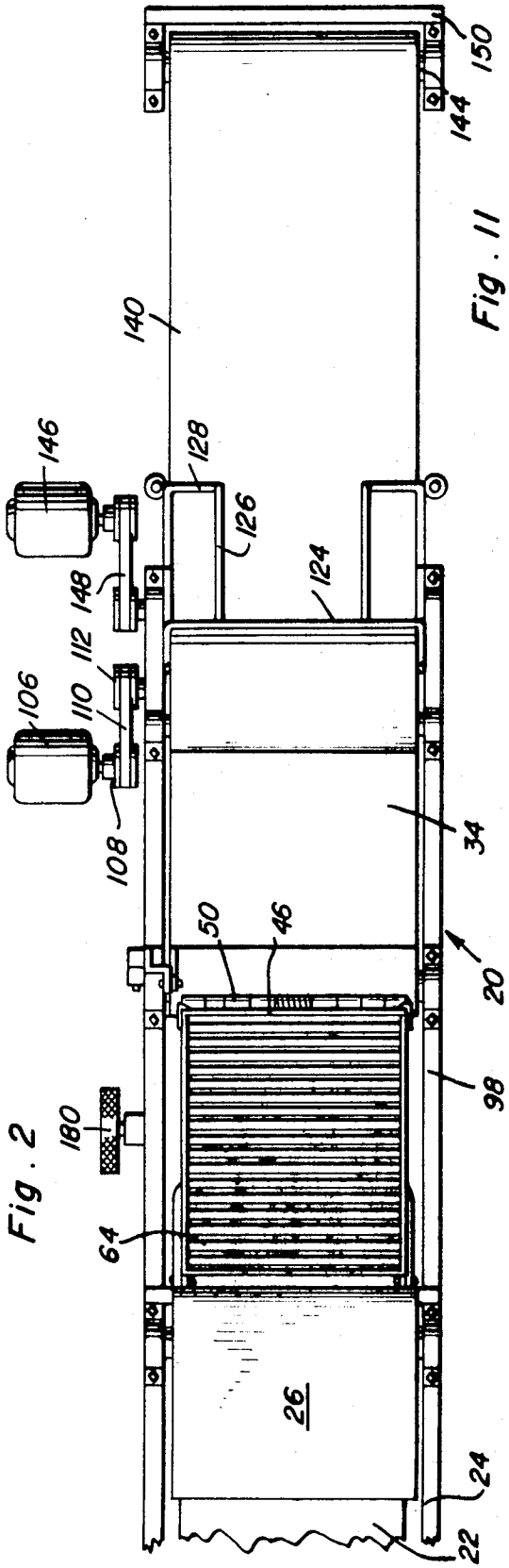


Fig. 2

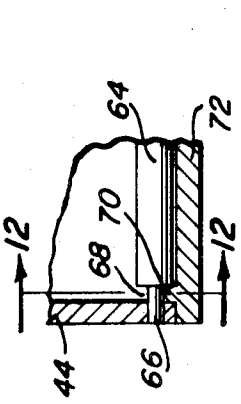


Fig. 11

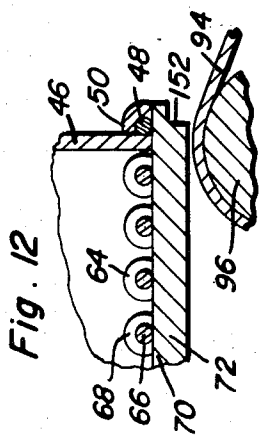


Fig. 12

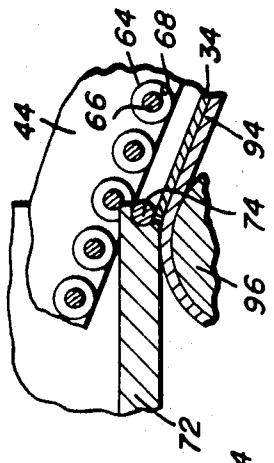


Fig. 10

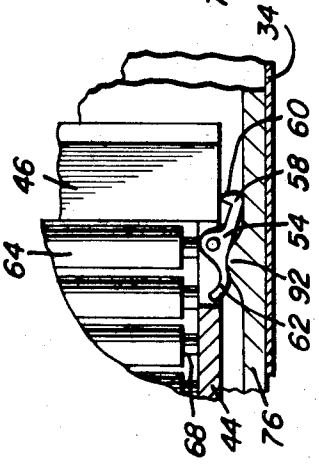


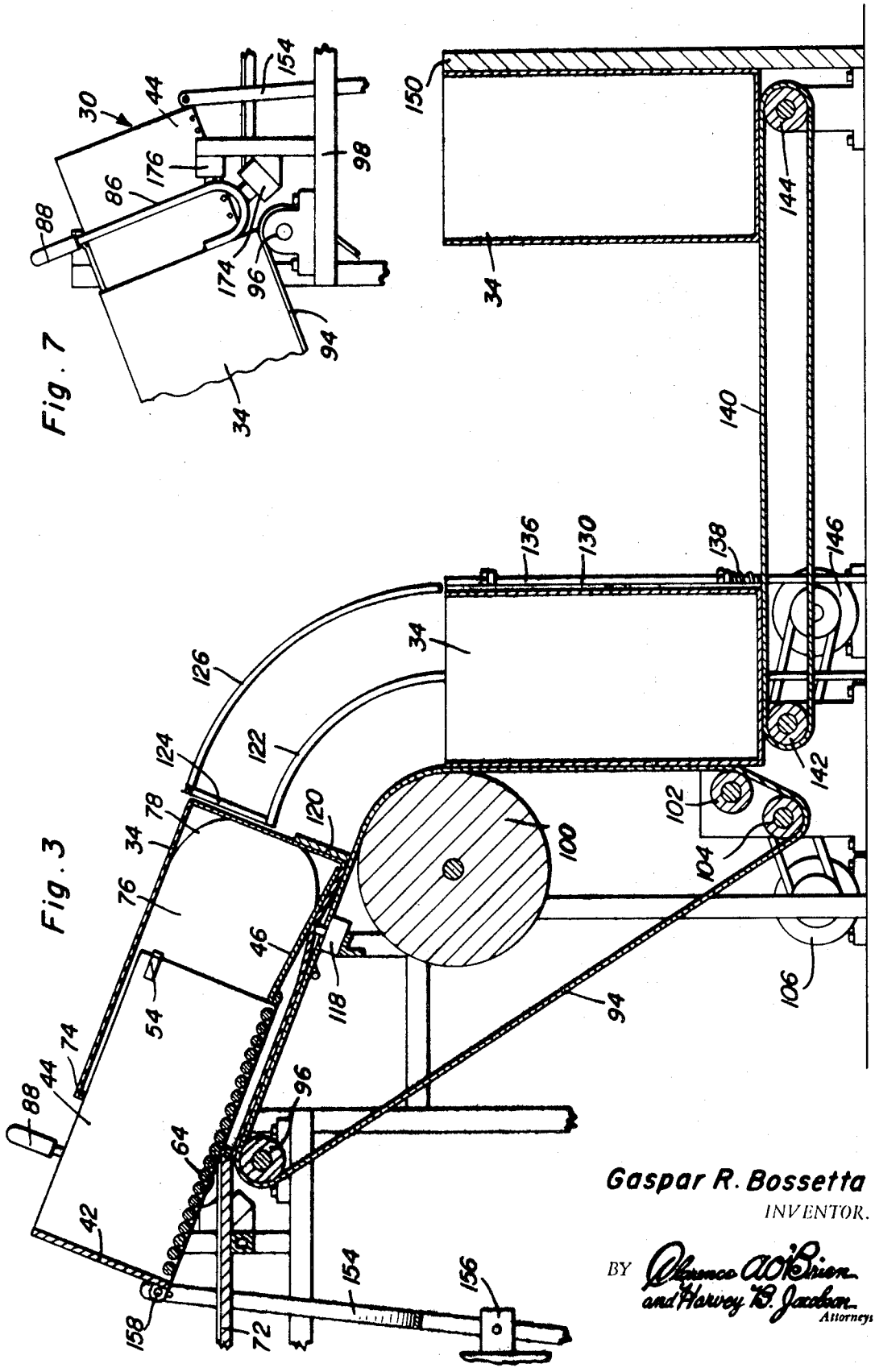
Fig. 9

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Fig. 4

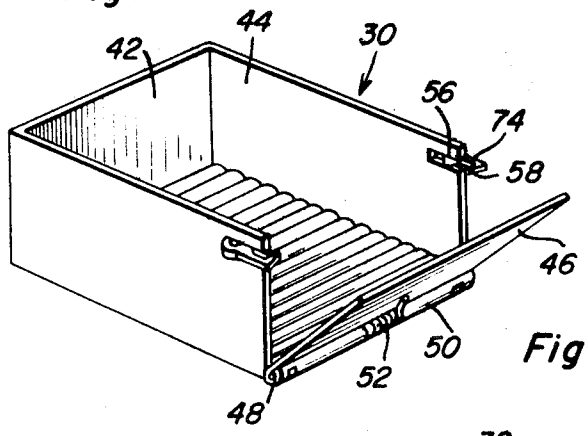


Fig. 5

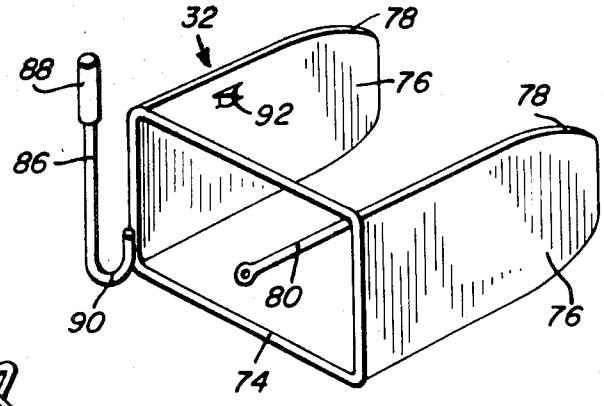
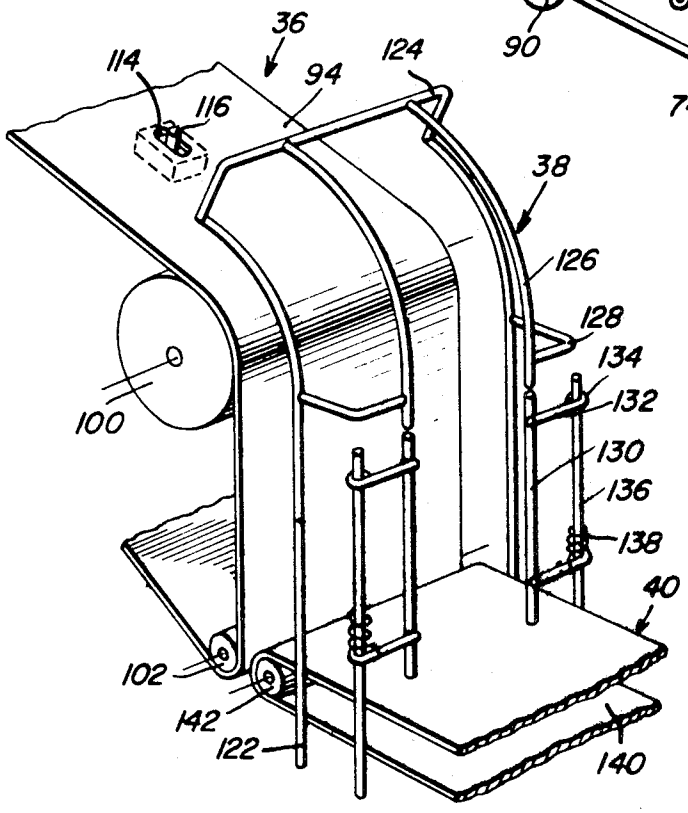


Fig. 6



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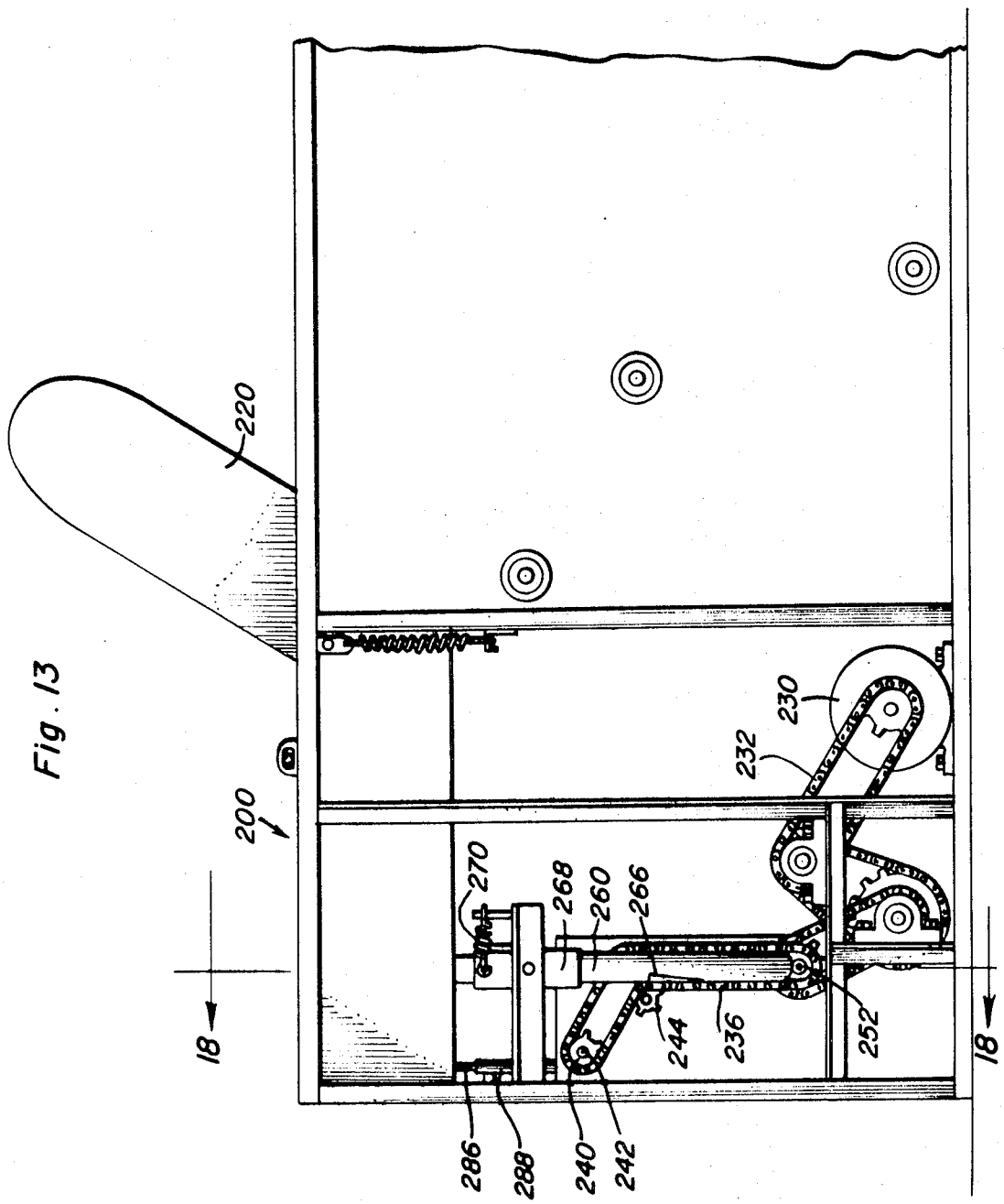


Fig. 13

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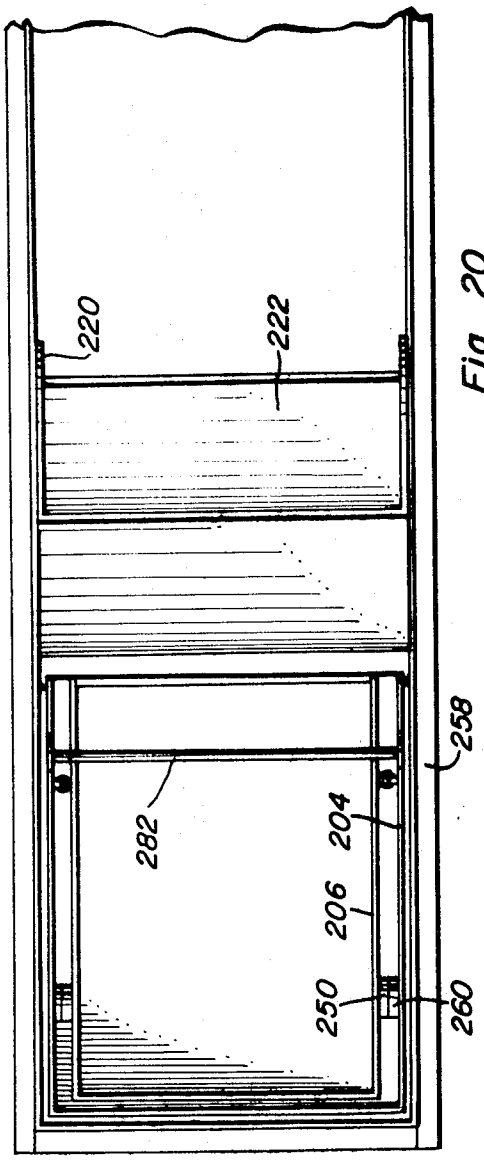


Fig. 14

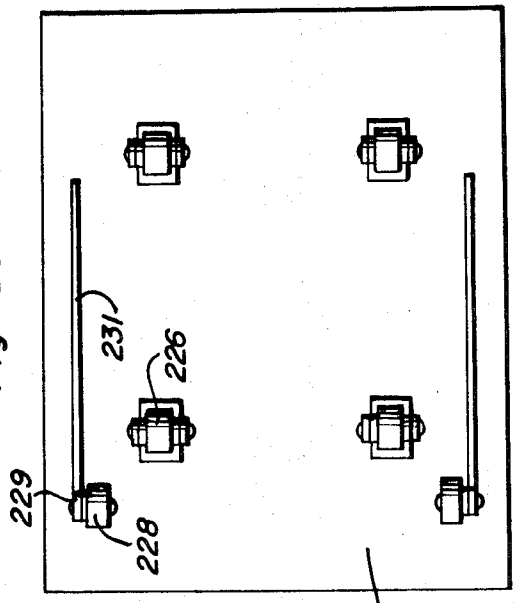


Fig. 20

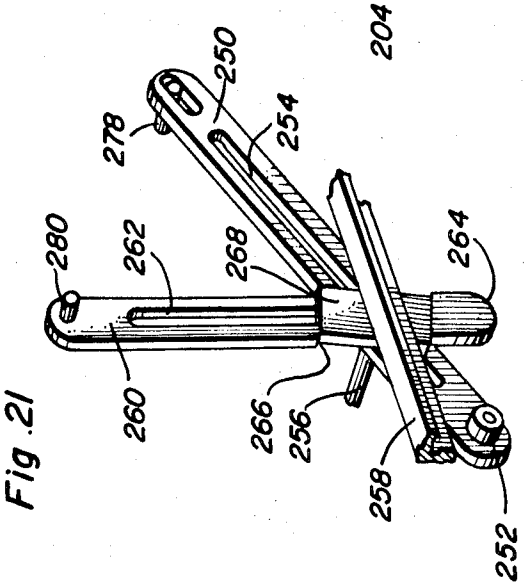


Fig. 21

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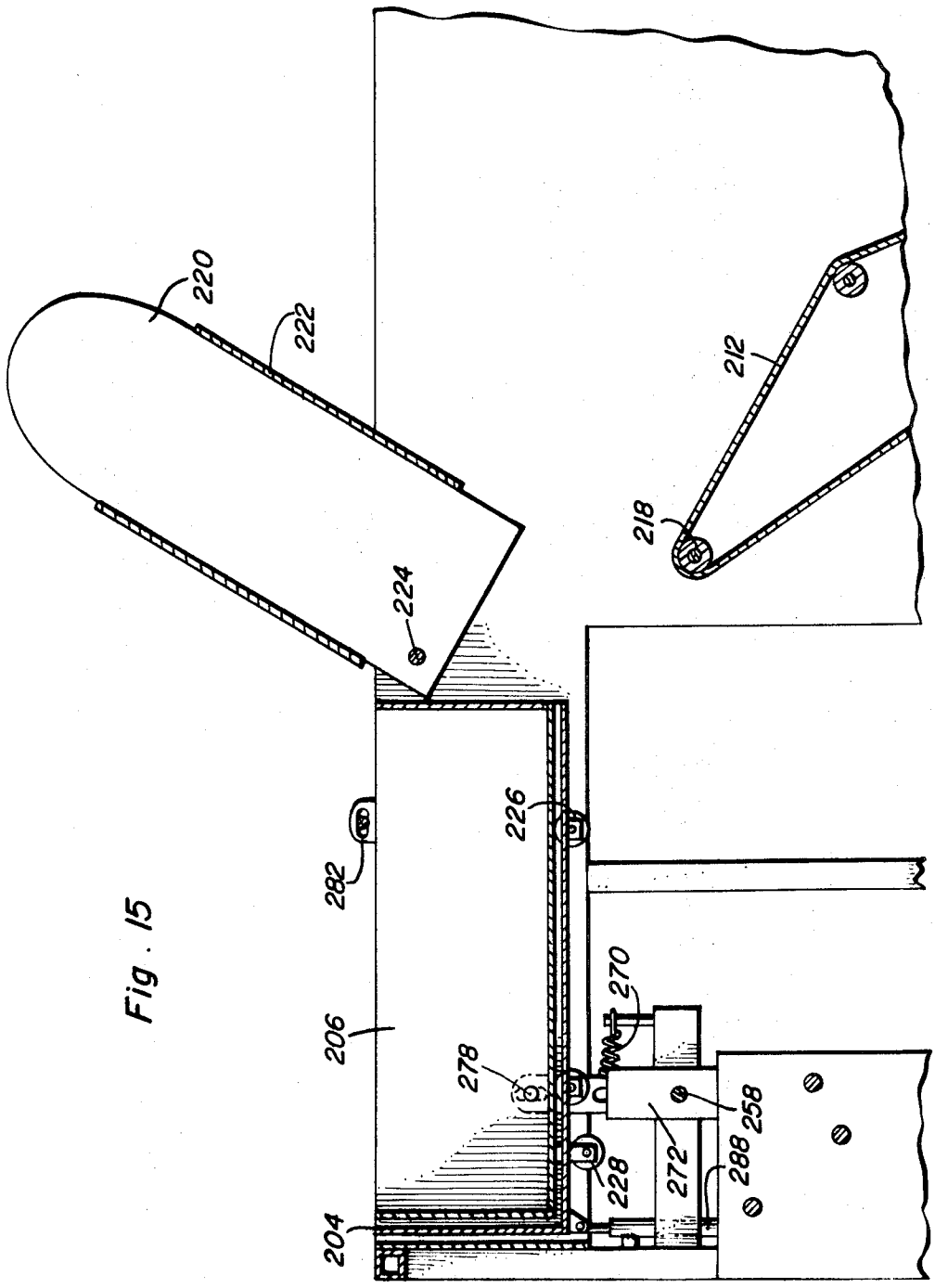


Fig. 15

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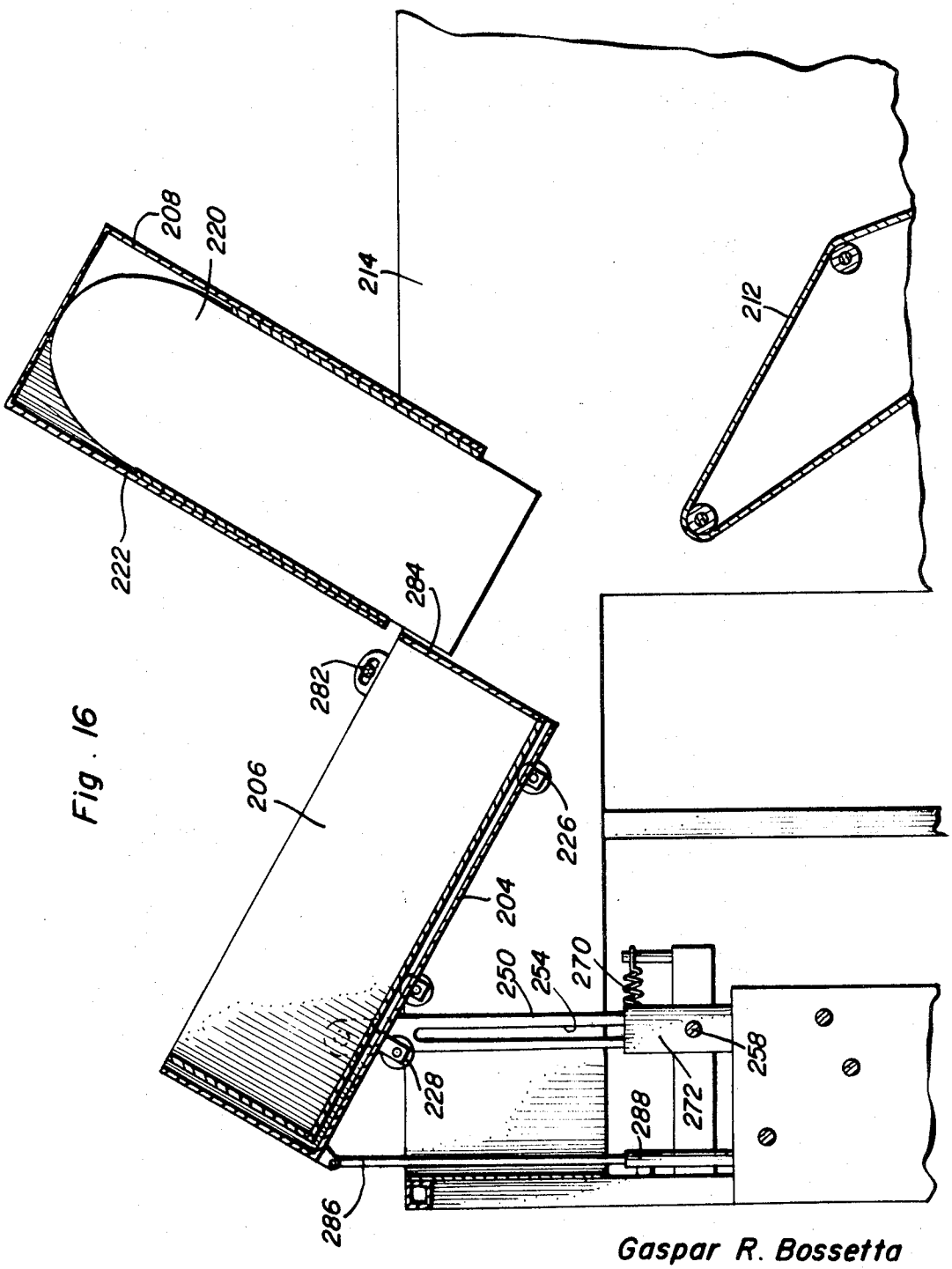


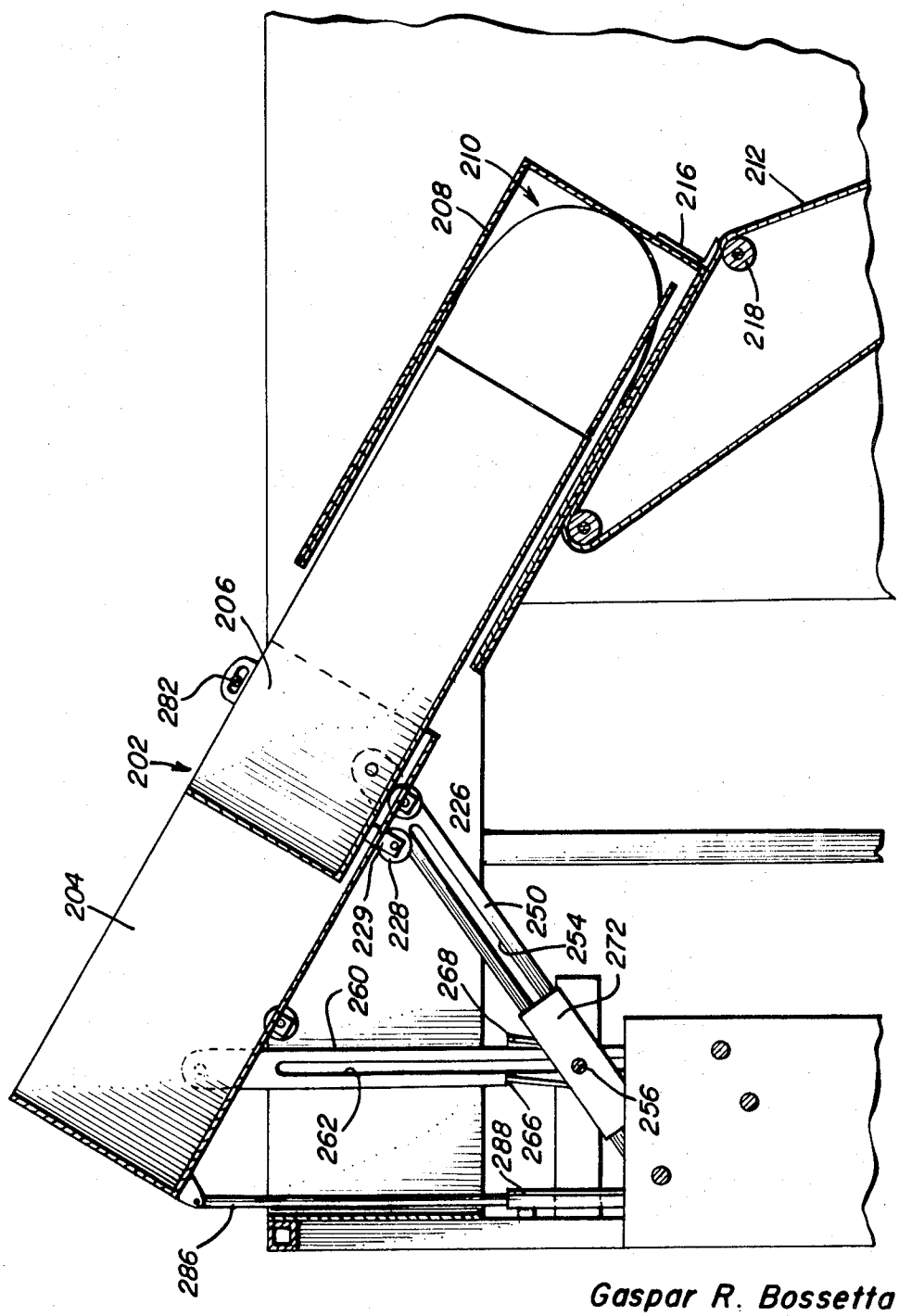
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Fig. 17



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Fig. 18

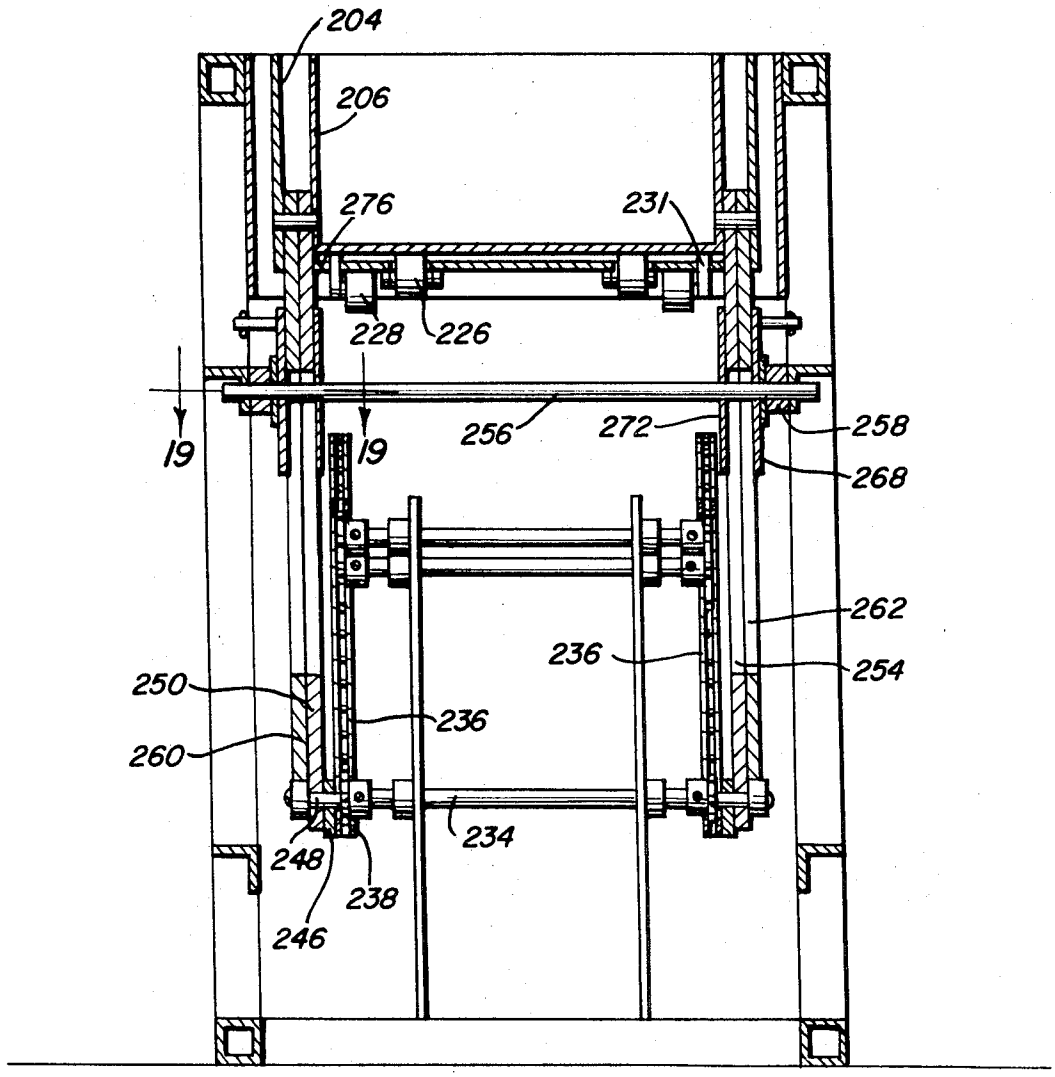
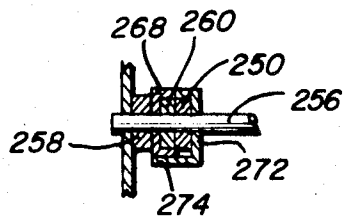


Fig. 19



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AUTOMATIC GROCERY BAG FILLING APPARATUS WITH INNER AND OUTER TRAY

This application is a continuation-in-part of copending application Ser. No. 664,195, for AUTOMATIC GROCERY BAG FILLING APPARATUS, Filed Aug. 29, 1967 now abandoned.

The present invention generally relates to equipment used in supermarkets and more particularly to a device which will expedite the services to customers by making the bagging of the purchases automatic upon operation of the apparatus by the person operating the checkout register. One of the problems existent in present-day supermarket operations is the delay encountered by customers as they have their purchases checked out at a checkout counter and register. A substantial part of such delay is usually caused by the necessity for the person operating the checkout counter and register to place the purchased items in grocery bags after they have been checked out on the register. In some instances, additional personnel are employed to manually place the purchased items in the grocery bags which increases the cost of operation of the supermarket and is not too successful inasmuch as such personnel usually have other duties and are not always available for placing the items purchased into grocery bags.

Accordingly, it is an object of the present invention to provide an apparatus associated with a conventional checkout counter and register assembly in a supermarket by which the person registering the purchases on the cash register may expeditiously fill grocery bags with the purchased items as they are registered.

Another object of the present invention is to provide an automatic grocery bag filling apparatus in which the person checking out the purchased items will place such items into a tray constructed to be telescopically inserted into an opened grocery bag so that when the tray has been filled with items, the checkout person may operate the apparatus to automatically fill the opened grocery bag, return the tray to a normal position and convey the filled grocery bag to a storage point for subsequent pick up by the customer or by other supermarket employees having the responsibility of placing the filled grocery bags into the customer's automobile or the like.

A further object of the present invention is to provide a grocery bag filling apparatus in which a bag holder is provided for convenient access by the checkout person to enable an opened grocery bag to be placed thereon and pivoted to a position for receiving the filled tray when the apparatus is actuated.

Yet another object of the present invention to provide a grocery bag filling apparatus which is provided with control mechanism to automatically operate the apparatus in a complete cycle and then stop the apparatus in position for a subsequent filling operation so that during the operating cycle, the checkout person may place another opened grocery bag on the bag holder and be ready to immediately place additional purchased items which have been checked out into the tray for a subsequent cycle of operation.

In practicing this invention, one of the objects is to provide a tray movably supported within the interior of the drawerlike structure which confines the tray for reciprocating movement together with a pair of slotted control arms or links associated with a drive chain and with each other in such a manner to elevate the drawerlike structure and the tray at the rear end thereof to align the assembly with an open grocery bag and then eject the tray into the bag, release the items in the tray and retract the tray into the drawerlike structure and then return the drawerlike structure and the tray to a normal horizontal position for receiving subsequent items.

Still another important feature of the present invention is to provide an automatic grocery bag filling apparatus which is simple in construction, efficient in operation, easy to operate, dependable in operation, readily adapted to various conventional checkout installations and relatively inexpensive to manufacture.

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, and in which:

FIG. 1 is a side elevational view illustrating schematically the orientation of the components of the automatic grocery bag filling apparatus of the present invention;

FIG. 2 is a top plan view of the construction of FIG. 1;

FIG. 3 is a longitudinal sectional view of the construction illustrated in FIGS. 1 and 2;

FIG. 4 is a perspective view of the tray forming a part of the grocery bag filling apparatus;

FIG. 5 is a perspective view of the bag holder;

FIG. 6 is a fragmental perspective view of the conveyor structure illustrating the guide mechanism for the filled grocery bag as it reaches the lower point of movement for transfer to the storage conveyor;

FIG. 7 is a fragmental elevational view of the orientation of the tray, grocery bag holder and grocery bag during the grocery bag filling operation;

FIG. 8 is a detail sectional view illustrating the tray and its association with one of the control switches for the apparatus;

FIG. 9 is a detail sectional view illustrating the structure internally of the bag holder for releasing the discharge gate at the forward end of the tray;

FIG. 10 is a detail sectional view illustrating the relationship of the tray, bag holder, bag and conveyor during the bag filling operation;

FIG. 11 is a detail sectional view of a portion of the tray illustrating the track structure for guiding the bottom rollers on the tray during movement of the tray from its normal position to its position for dumping the items therein into the bag;

FIG. 12 is a detail sectional view taken along section line 12–12 of FIG. 11 illustrating further structural details of the track structure for the tray rollers;

FIG. 13 is a side elevational view of another embodiment of the present invention;

FIG. 14 is a top plan view thereof;

FIG. 15 is a longitudinal, sectional view of the embodiment illustrated in FIG. 13 illustrating the structural details thereof and the relationship of components;

FIG. 16 is a sectional view similar to FIG. 15 but with the tray and drawer unit in elevated position;

FIg. 17 is a sectional view similar to FIGS. 15 and 16 but illustrating the tray telescoped into the grocery bag;

FIG. 18 is a vertical sectional view taken substantially upon a plane passing along section line 18–18 of FIG. 13 illustrating the details of the elevating mechanism for the drawer and tray unit;

FIG. 19 is a detailed sectional view taken substantially upon a plane passing along section line 19–19 of FIG. 18 illustrating further structural details of the elevating mechanism;

FIG. 20 is a plan view of the drawer structure; and

FIG. 21 is a perspective view illustrating the lift arms for the drawer and actuating arm for the tray.

Referring now specifically to the drawings, the automatic grocery bag filling apparatus of the present invention is generally designated by numeral 20 and is associated with a conventional checkout counter which includes the usually provided conveyor belt 22 which extends alongside of a checkout cash register and which is controlled by the checkout person. Normally, the conveyor 22 is loaded with the purchased items by the customer at one end thereof and the conveyor 22 is operated by the checkout person to convey such items to an accessible position alongside of the cash register. Suitable supporting members 24 are provided for the conveyor 22 and this particular construction forms no part of the present invention except for its association therewith which enables the grocery bag filling apparatus 20 to be employed with the conventional conveyor 22 without substantial alteration thereof. At the discharge end of the conveyor 22, and inclined ramp 26 in the form of a flat plate is supported with the free edge thereof immediately adjacent the upper sur-

face of the conveyor belt 22 to serve as a stop for items moving along the conveyor belt 22 and to facilitate movement of articles from the conveyor belt 22 into the grocery bag filling apparatus 20. The ramp or plate 26 is also supported by suitable frame members 28 and may be pivotal or adjustable to enable access to the conveyor belt structure 22.

The grocery bag filling apparatus 20 of the present invention includes a tray 30 for receiving the items purchased, a grocery bag holder 32 for receiving an opened grocery bag 34, a belt conveyor structure 36 for receiving the filled grocery bags, a guide mechanism 38 associated with the conveyor 36 for guiding the filled grocery bags during their lowering operation and an off bearing and storing conveyor 40 for receiving and storing the filled grocery bags.

The tray 30 is provided with an end wall 42 and two parallel sidewalls 44 rigid with and perpendicular to the end wall 42. Opposite the end wall 42, there is provided a pivotal front end wall or gate 46 which is the same height as the end wall 42 end the sidewalls 44 and is pivotally attached to the lower edges of the sidewalls 44 by a horizontal hinge pin 48 extending through hinge barrels 50. An axial coil spring 52 is associated with the end wall or gate 46 for spring-biasing the front end wall or gate 46 of the tray 30 to a closed position in abutting engagement with the front end edges of the sidewalls 44. Spring catches 54 are hingedly mounted in notches 56 in the sidewalls 44 for retaining the front end wall 46 in closed position The outer ends of the catches 54 are provided with inturned hooks 58 provided with inwardly inclined cam surfaces 60 on the outer edges thereof so that as the spring 52 urges the front end 46 towards closed position, the edges of the front end 46 engaging the cam surfaces 60 will pivot the catches 54 outwardly to enable the end edges of the front end wall 46 to pass inwardly of the hook ends 58 for securing the front end wall 46 in closed position. The end of the catch 54 remote from the hook end 58 is provided with a curved outwardly projecting actuating cam member 62 for automatically releasing the catches 58 during movement of the tray into the bag holder 32 in a manner described hereinafter.

The bottom of the tray 30 is formed by a plurality of freely rotating rollers 64 having reduced diameter spindles 66 extending axially from each end thereof for journaling in the lower edges of the sidewalls 44 as illustrated in FIg. 11. Also as illustrated in FIG. 11, the spindles 66 are longer than the thickness of the sidewalls 44 to provide a space 68 between the inner surface of the sidewalls 44 and the end edges or shoulders defined by the junction between the spindles 66 and the rollers 64. This structure forms a guideway or groove for receiving a longitudinally upwardly extending rib or track 70 that is formed integrally with a supporting and guiding plate or member 72 which guides and supports the tray 30 during its movement from a horizontally disposed position in alignment with the discharge end of the ramp 26 to its discharge forwardly inclined position as illustrated in FIG. 3.

The bag holder 32 includes an open rectangular frame 74 in the form of a rigid rodlike structure. Two of the side portions of the frame 74 are provided with side plates 76 which have tapered free ends 78 for insertion into the grocery bag 34 when the opened grocery bag 34 is installed telescopically thereon with the frame 74 being received rather snugly within the open end of the grocery bag 34 as illustrated in FIG. 1. The upper corner of the frame 74 is provided with a projecting rod 80 which is pivotally supportingly engaged by an upstanding support member 82. The projecting support rod 80 is connected to the support member 82 by a pivot bolt or pin 84. The opposite side of the frame 74 is provided with an operating handle 86 having a handgrip 88 thereon and having one end thereof reversely curved as at 90 rigidly fixed to the bottom corner of the side edge of the frame 74 as by welding or any other suitable means so that by grasping the handgrip 88, the bag holder 32 with the bag 34 thereon can be pivoted from its normal upwardly inclined position as illustrated in FIG. 1 to a position for receiving the items from the tray 30 as illustrated in FIG. 3.

As illustrated in FIG. 9, the side plates 76 are provided with inwardly curved cams or detents 92 which engage the cam projections 62 on the catches 54 thus releasing the catches 54 at a predetermined point of insertion of the tray into the bag holder 32 to release the front end 46 so that the front end 46 may pivot downwardly due to the weight of the articles in the tray 30 thus discharging the articles into the grocery bag 34.

The conveyor structure 36 includes an endless conveyor belt 94 entrained over an upper idler roller 96 supported by suitable framework 98 with the roller 96 being disposed immediately under the forward edge of the supporting and guide plate 72 as illustrated in FIGS. 10 and 12 as well as FIG. 3. A large idler roller 100 is supported from the framework 98 in downwardly inclined relation to the roller 96 with the portion of the belt 94 extending between the rollers 96 and 100 being that portion which receives the grocery bag 34 after it has been filled. Below the roller 100, an idler roller 102 is provided for guiding the belt 94 vertically from the periphery of the roller 100 to the periphery of the roller 102. Below and slightly inwardly of the roller 102 is a drive roller 104 for the belt 94 with the drive roller 104 being driven by a motor 106 through a suitable pulley 108, drive belt 110 and pulley 112 on the end of the roller 104. Suitable gear reduction mechanism may be employed or other speed reduction mechanism may be employed for driving the conveyor belt at a relatively slow linear speed. Suitable means may be provided for adjusting the tension of the belt 94 by movably supporting the roller 104 in order to retain the belt 94 in a taut condition for proper non-slipping operation thereof. Also, the belt 94 is provided with a slot 114 therein for receiving the actuating plunger or finger 116 of a switch 118 for a purpose described hereinafter. Also, the belt 94 is provided with a laterally extending ledge or flap 120 projecting perpendicular thereto for supporting a substantial area of the bottom of the grocery bag 34 during the movement of the grocery bag from the inclined filling position of FIG. 3 downwardly to a vertical position adjacent the roller 102 as illustrated in the lower portion of FIG. 3.

Movement of the filled grocery bag 34 is guided by the guide mechanism 38 which includes side rods 122 which are curved in the same manner as the conveyor belt 94. The upper ends of the side rods 122 are interconnected by a U-shaped rod 124 which combines with the conveyor belt 94 to form a generally rectangular passage approximating the cross-sectional configuration of the filled grocery bag to guide the bag and retain the bag generally on the surface of the conveyor belt. It is pointed out that the dimensional characteristics of the guide 38 are slightly larger than the bag to enable the bag to move from the inclined position to the vertical position without undue bending or flexing of the bag as it proceeds around the curved surface of the roller 100 thus preventing any possible damage to items in the bag. In addition to the U-shaped member 124 and the guide rods 122, there are also provided curved guide rods 126 connected to the uppermost portion of the U-shaped member 124 and the free ends of these guide rods 126 are connected to the guide rods 122 by L-shaped rods 128.

Forming continuations of but separate from the guide rods 126 is a pair of swingable rods 130 which serve as a gate for retaining the bag 34 temporarily in vertical position as it rests upon the conveyor 40. Each of the rods 130 has a supporting rod 132 rigid therewith having an eye 134 thereon journaled on an upstanding support rod 136. An axial coil spring 138 interconnects the rods 126 and the support members 132 for spring-biasing the rods 130 to a position in alignment with the rods 126. Any suitable stop mechanism may be employed for preventing movement of the rods 130 inwardly beyond the point of alignment with the lower end of the rods 126 so that, in effect, the rods 130 form a continuation of the guide structure 38 but enable the guide structure to be opened by force exerted thereon by the filled grocery bag as it is moved outwardly by the conveyor 40, thus retaining the grocery bag 34 in an upright position during the removal of the supporting flap or ledge 120 from under the grocery bag 34 as the flap or

ledge 120 passes downwardly between the roller 102 and the inner end of the conveyor 40.

The off bearing or storage conveyor 40 includes an endless conveyor belt 140 journaled on rollers 142 and 144 and driven by a suitable electric motor 146 through a belt drive assembly 148. This belt 140 is driven at a very slow speed and conveys the filled grocery bags 34 outwardly into engagement with a vertical stop wall 150 which retains the grocery bags in position until they are removed therefrom by either the customer or other supermarket personnel having the responsibility of placing the filled grocery bags into the customer's automobile or the like. The length of the conveyor 40 may be varied and may extend outwardly to an exterior position in the supermarket or any other desired location so that the filled grocery bags 34 may be easily obtained by the customer. The conveyor belt 140 will travel very slowly and the upper surface thereof may be provided with structural features to reduce the frictional engagement with the bottom of the filled grocery bag thereby enabling the conveyor 140 to be continuously operated at a relatively slow speed with no damage resulting to the grocery bag due to the slow speed and low coefficient of friction of the upper surface of the conveyor belt 140.

The forward edge of the guiding and supporting plate 72 is provided with a notch 152 in the lower corner thereof as illustrated in FIGS. 10 and 12 for receiving the lower portion of the bag holder frame 74 when it is pivoted to the inclined position as illustrated in FIG. 3. The tray 30 is insertable into the bag holder 32 and the bag 34 thereon by an elongated operating yoke 154 pivotally attached at an intermediate point on brackets 156 carried by the supporting frame 98. The upper end of the yoke 154 is connected to the lower corner of the rear end portion of the tray 30 by a pivot pin and slot connection 158 which will move the tray 30 forwardly and into a downwardly inclined position as illustrated in FIG. 3 during one cycle of its movement and then retract the tray 30 back to the position illustrated in FIG. 1 when the yoke 154 is returned to its normal position. The particular connection 158 may vary from a simple pivot pin connection to a pin and slot connection depending upon the degree of movement of the tray desired.

The lower end of the yoke 154 is oscillated by engagement with an eccentric pin 160 rigid with a rotating disc 162 driven by an electric motor 164 through a suitable belt drive 166 or the like. The pin 160 is received in an elongated slot 168 which enables the pin 160 to move in a circular path thus oscillating the yoke 154 about the pivot pin supporting the yoke on the bracket 156 thus causing oscillatory swinging movement of the upper end of the yoke 154 where it is attached to the tray 30 thus moving the rear end of the tray 30 in an arcuate pattern or, if desired, initial movement may be more or less in a straight line condition if a slot is provided in the upper end of the yoke 154 with the pivot pin then proceeding to the upper end of the slot when the tray reaches an overbalanced position so that the tray ultimately is in telescoping relation to the bag holder and bag. The tray 30 moves only approximately two-thirds of the way into the bag at which time the catches 54 will be released and the tray stopped. The weight of the items in the tray and the fact that they are supported on rollers will cause the items to open the front end wall 46 and pivot it downwardly to the position illustrated in FIG. 3 so that as the tray returns, the items in the tray will be deposited into the bag and at the same time, the bag 34 will be moved downwardly by the conveyor 94 thus releasing the bag from the bag holder so that the bag holder may return to its normal upwardly inclined position for reception of another opened bag. A switch 170 is positioned on the framework 98 and includes a plunger or finger 172 engaged by the rear end of the tray 30 in order to sense the positioning of the tray in its normal position. An electromagnet 174 is mounted on a support for holding the curved portion of the handle 86 for the bag holder in its depressed position so that the bag holder will be retained in the downwardly inclined position for alignment with the tray 30 as the tray enters the open end of the bag and bag holder. A switch 176 is also provided on the same support structure for engagement by the handle 86 to determine the positioning of the bag holder in the downwardly inclined position. In addition, there is a master switch 178 which supplies or interrupts power to the entire assembly and a foot-operated switch 180 is provided for the checkout person to operate the mechanism once the bag holder has been lowered into operative position and the tray filled with items to be inserted into the bag.

The master switch 178 will actuate the motor 146 for the conveyor 40 as soon as it is turned on and also supply power to the remainder of the system. The switch 176 which is engaged by the handle 86 when the bag holder is moved to the operative position by the checkout person energizes the electromagnet 174 for retaining the bag holder and bag in position. After the tray has been filled with purchased items, the checkout person then operates the foot switch 180 which starts motor 164 which moves the tray into the bag holder. As the tray 30 moves from its position, the switch 170 is actuated, superceding switch 180. As the bag 34 and the conveyor belt 94 begin moving, the switch 118 will be actuated which releases the electromagnet 174 thus allowing the bag holder to return to its upward position. The bag holder is returned to its upward position by the spring hinge which mount it on the support. And at the same time, the tray is retracted to its original position ready to receive another filling. The bag continues to move until it is deposited on the conveyor belt 140 and the belt 94 is automatically stopped with the flap 120 in position for receiving the next filled bag. The belt retains the switch 118 closed or depressed with the front end 46 of the tray actually depressing the switch 118 to start the belt and the imperforate structure of the belt itself keeps it closed until the aperture again reaches the position so that it will receive the plunger or finger 116 thereon. The depression of the switch 118 also releases the electromagnet.

The flap 120 on the belt is of flexible construction and may be provided with a folding brace structure 121 to enable the flap 120 to fold upwardly as it passes between rollers 142 and 102 but prevent downward movement thereof so that it will support the bag as it is being lowered by the conveyor 94. The specific details of the wiring diagram are not included inasmuch as this is conventional and forms no particular part of the present invention with it being pointed out that other mechanisms may be employed to render the device automatic or manual in operation, that is, the bag holder may be manually latched in depressed or operative condition and the various motors may be manually actuated by operating separate switches as required.

The tray and bag holder may be constructed of metal such as aluminum or the like or a relatively strong plastic. The tray will be sufficient in size to hold the same capacity as a large grocery bag or approximately 11¾ inches wide, 14 inches long and 6¾ inches deep. The front end of the tray is held closed by by the spring latches which are released when the tray is inserted from two-thirds to three-fourths of the way into the bag holder. At the time that the operator places the opened grocery bag onto the bag holder, she will manually swing the bag holder down into position where a switch is tripped to energize an electromagnet to hold the bag holder in position. Thus, the bag holder is resting and retained in a downwardly inclined position on the belt or conveyor and is held in that position by the electromagnet.

After the operator has placed the bag on the bag holder and pushed it so that the bag is in the downwardly inclined position, the operator then checks out the items on the register and then places them in the tray. When the tray is filled the operator will recognize that the items in the tray will completely fill the bag. Of course, when the operator is filling the tray, the manner in which the articles or items are placed in the tray is controlled, that is, the heaviest objects are placed towards the front gate and the lighter articles closest to the opposite end of the tray. When the tray is full, the operator then operates the foot switch which starts the motor that moves the

tray into the bag holder and bag. As the tray moves into the bag holder and is substantially three-fourths of the way within the bag holder, it passes the release cams which release the latches on the front gate thus permitting the items or articles in the tray, by virtue of their weight and their downwardly inclined position, to move out of the tray into the bag and at the same time, the tray trips the switch **118** which causes the motor **106** to operate the belt conveyor **94** to move the flap **120** away from the bag holder. As the tray pulls out of the bag holder and back to its normal position, the bag moves away from the two sides of the bag holder which was holding it and the weight of the articles which are now in the bag and laying on the belt or conveyor with the bag placed thereon with its bottom end against the flap moves away and starts on its downward trip. As the bag moves away from the bag holder, the bag holder being released from the electromagnet by the front gate of the tray when it pivots downwardly, begins to pull upward by virtue of its spring hinge and as soon as it is released from the bag, the bag holder rises up to the upwardly inclined or vertical position ready to receive another opened bag. At the same time, the tray has already returned to its original position ready to receive another filling or load of articles with the motor which operates the tray being stopped by the return of the tray to its normal position by the switch **170**.

The bag is then resting with its contents and all of its weight on the belt and the flap **120** of the conveyor belt **94**. As it begins to move away, it follows the guide structure in a generally curved path and as it tilts forward, it is retained by the wire guard which holds it in a vertical position as it moves down with the conveyor belt **94** until the lower or bottom end thereof engages the lower belt **140** which takes the grocery bag and moves it out through the spring gates into engagement with the abutment **150** or another bag already in position in engagement with the abutment. As the flap **120** reaches the conveyor belt **140**, it will flex sufficiently to pass between the rollers **102** and **142** depending upon the flexibility and rigidity of the flap **120** and the spacial relation between the belts **102** and **142**. As illustrated in FIG. **3**, it is desirable that the major portion of the bottom of the bag **34** be engaged by the lower conveyor belt **140** for proper support of the bag.

With this construction, the filling of the grocery bags is accomplished with very little additional effort and attention by the checkout person inasmuch as it is only necessary for the operator to place the bag on the bag holder, lower the bag holder to its operative position which may conveniently be manually accomplished or, if desired, suitable power mechanism such as an electric motor or the like may be employed for lowering and also raising the bag holder if desired. In any event, after the bag has been lowered to operative position, the operator then only has to step on a treadle switch once the tray has been filled with items purchased by the customer. The operation then is automatic and the tray is automatically returned to its initial position with the front gate latched in closed position, the bag holder is returned to its position for reception of another bag and the belt conveyor **94** continues to operate until the supporting flap or ledge **120** passes the switch **118** and the aperture in the belt **94** receives the plunger or finger thereon to enable the switch to open thus stopping the belt **94** in position for receiving another bag when the bag holder is again lowered.

The embodiment of the invention illustrated in FIGS. **13—21** is generally designated by the numeral **200** and operates generally in the same manner as that embodiment of the invention illustrated in FIGS. **1—12** with the conveyor belt receiving a grocery bag in substantially the same manner. In this embodiment of the invention, there is provided a drawer and tray assembly generally designated by the numeral **202** which includes an open top and open-ended drawer **204** and open top tray **206** which has a pivoted door at the forward end thereof together with an operating mechanism for first elevating the rear end of the drawer and tray assembly **202** into an inclined position in alignment with a grocery bag **208** positioned on the grocery bag holder **210** after which the tray **206** is moved forwardly into telescopic relation to the grocery bag and items on the tray are discharged into the grocery bag **208** and the tray **206** then retracted back into the drawer **204** and the drawer and tray assembly **202** is then lowered back to its horizontal position. The normal horizontal position of the drawer and tray unit **202** is illustrated in FIG. **15** with the elevated position of the drawer and tray unit **202** being illustrated in FIG. **16** and the tray unit telescoped into the grocery bag **208** as illustrated in FIG. **17**.

The conveyor belt **212** is supported on a suitable framework **214** and includes flaps **216** thereon to engage the bottom of the grocery bag **208** with the belt **212** including rollers **218** for retaining it in position and there is an off-bearing conveyor at the bottom of the assembly similar to the conveying assembly in FIGS. **1—12**. The angular position and orientation of the belt may be varied so that the bag may pass within the guide structure in an effective manner as illustrated in FIGS. **1—12**. The bag holder **210** is also substantially the same as that illustrated in FIG. **12** and includes two side plates **220** interconnected by top and bottom plates **222** which are pivotally supported for movement from an upwardly inclined position to provide access by the person using the device after which the bag holder **210** is lowered to a downwardly inclined position against the upper surface of the conveyor belt **212** as illustrated in FIG. **17**. The bag holder **210** is pivotally supported for pivotal movement about a shaft or rod **224** and a spring structure is provided for biasing the bag holder to the upwardly inclined position so that the bag holder may be lowered into operative position by the manual operation of the person employing the device by grasping a handle attached to the rod or to the bag holder with a latch structure holding the bag holder in position. The latch structure may be a spring-biased latch or an electromagnetic operated latch mechanism may be employed. The operation and function of the bag holder is substantially the same in this embodiment of the invention as that illustrated in FIGS. **1—12**.

It is pointed out that the tray **206** is smooth bottomed and due to the inclination thereof, articles placed thereon will slide out of the open end of the tray. The tray **206** is movably supported within the drawer **204** by rollers **226** with corresponding rollers **228** being employed to engage the bottom of the drawer to retain the tray **206** captive in relation to the drawer **206** but yet permit rolling movement thereof. The number and orientation of the rollers **226** and **228** may be varied for facilitating support of the tray and facilitate positioning thereof during inward and outward movement of the tray **206** in relation to the drawer **204**.

The mechanism for operating the drawer and tray unit **202** includes a drive motor **230** and a chain drive **232** through a reduction assembly to a shaft **234** which drives a pair of drive chains **236**. The drive chains **236** are entrained over sprocket gears **238** on the shaft **234**, upper sprocket gears **240** on an offset upper shaft **242** and over a pair of idler sprockets **244** engaging the chain **236** where it is offset to guide the chain in a vertical path and then in an inclined path as illustrated in FIG. **13**. Attached to the chain **236** is a pair of lugs **246** having a stub shaft **248** attached thereto which extends out through and is connected to actuator arm **250** and terminates on the exterior thereof with a roller **252**. Thus, as the chain **236** moves around the sprocket gears over which it is entrained, it will carry the lower end of the actuator arm **250** in its same path of movement, that is, from the position illustrated in FIG. **13**, it will move upwardly and then in an inclined path rearwardly, back along the inclined path and then downwardly back to the position illustrated in FIG. **13**.

The actuating arm **250** is provided with an elongated slot **254** therein which receives a transverse rod or shaft **256** therethrough supported by suitable blocks **258** connected with the frame structure to enable longitudinal movement of the actuating arm **250** and also pivotal movement about an axis defined by the rod **256**.

A lift arm **260** is disposed alongside of the arm **250** and is also provided with an elongated longitudinal slot **262** which is

engaged on the rod 256 to form a guide for the arm 260. The lower end of the arm 260 is provided with a surface 264 which will engage the roller 252 as illustrated in FIG. 13 when the arms 250 and 260 are in alignment so that the lift arm 260 is elevated by the roller 252 so that the arms 250 and 260 will move vertically together. Intermediate the length of the arm 260, a pair of notches 266 are provided which form a latch structure for a pivotal channel-shaped sleeve 268 which is pivotally mounted on the rod 264 and is spring-biased into a position to engage the notches 266 by a tension spring structure 270. As the arm 260 moves vertically upwardly, the sleeve 268 will engage the notches 266 when the upper notch passes the top edge of the sleeve 268 at which time the diagonally opposed bottom edge of the sleeve 268 will engage the lower notch to limit the upward movement of the arm 250 thus locking the arm 260 in an elevated position so that as the roller proceeds rearwardly and upwardly in an inclined path with the chain 236, it will become disengaged from the lower end surface 264 of the arm 260 so that the actuating arm 250 will extend and retract the tray 206 in a manner described hereinafter.

The actuating arm 250 also is slidable in a sleeve guide of channel-shaped configuration as at 272 which is also pivotally supported on the shaft 256. The channel-shaped sleeve 272 has an extending flange 274 on the forward edge thereof which will contact the forward edge of the sleeve 268 to move it into alignment with the arm 260 and thus release the sleeve 268 from the notches 266 when the actuating arm 250 is returned to its vertical position as it proceeds back down the inclined path of the chain 236 thus releasing the arm 260 so that it may move down vertically with the arm 250 to the at-rest position illustrated in FIG. 13.

The upper end of the arm 250 extends through a slot 276 in the bottom of the drawer 204 and is connected to the tray 206 by a pin and slot connecting 278 with the length of the slot being sufficient to enable reciprocatory movement of the tray 206 as the arm 250 pivots arcuately as the lower end thereof moves in substantially a straight line path along the inclined path of the chain.

The upper end of the lift 260 extends through the same slot 276 in the bottom of the drawer and is pivotally connected to the drawer 204 by a pin connection 280 which also may have a horizontal slot provided therein or the forward edge of the drawer 204 may be supported for slight rectilinear horizontal movement inasmuch as the arm 260 moves in a substantially vertical path. Thus, as the arms 250 and 260 move upwardly from the position of FIG. 13, both the drawer 204 and tray 206 are elevated at the rear end thereof to the position illustrated in FIG. 16. At that point, the latch sleeve 268 latches the arm 260 in elevated position and the roller 252 disengages from the surface 264 on the arm 260 and moves rearwardly and upwardly with the chain 236 thus pivoting the arm 250 with the upper end thereof connected with the tray moving forwardly thus telescoping the tray 206 into the grocery bag 208. As the lower end of the arm 250 progresses to the upper end of the path of movement of the chain and then moves forwardly with the chain, the upper end of the arm 250 will then move rearwardly thus retracting the tray 206 within the drawer 204. The rollers 226 mounted on the bottom of the drawer and supporting the bottom of the tray 206 and the rollers 228 mounted on the bottom of the tray and supported from brackets 229 extending through slots 231 in the bottom of the drawer 204 will retain the tray and drawer in parallel assembled relation for reciprocal movement of the tray 206 in relation to the drawer 204. The forward end of the drawer is supported by a transverse pivot rod or shaft 282 which may also be a pin and slot connection and the forward end of the tray 206 is normally closed by a closure door 284 which is automatically released when the tray 206 is inserted into the bag 208 for releasing the items into the bag. Also, the rear of the drawer 204 is guidingly supported by vertical guide rods 286 to further stabilize the rear end of the drawer 204 during its vertical movement with the horizontal shifting of the drawer being accommodated by the pin and slot connection at 282 in FIG. 16.

As illustrated in FIG. 16, the guide rods 286 are telescopically and slidingly received in guide tubes 288 to assure vertical movement of the rear end of the drawer 204 which combined with the sleeve guide structure will properly orient the components of the door elevating and lowering mechanism.

The control mechanism for this embodiment of the invention is substantially the same as that illustrated in connection with FIGS. 1—12 in that once the cycle of operation has been started after items have been placed in the tray and the grocery bag lowered to its aligned position with the tray, the complete cycle will be automatic with the cycle of operation being stopped when the drawer and tray assembly returns to a normal horizontal position.

The specific structural details of the latch mechanism for permitting the front door 284 of the tray to open will be substantially as described in FIGS. 1—12 or any other suitable mechanism may be employed for automatically releasing the door on the tray when the tray approaches the inner end of its movement into the bag and when the tray is retracted, any suitable means may be provided for automatically returning it to its vertical position to form a closure for the open end of the tray. Also, side rollers may be provided between the tray and drawer to further guide the tray in relation to the drawer and in relation to the bag holder inasmuch as the tray must be properly aligned with the opening defined by the bag holder in order to have the tray properly telescoped into the bag.

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.

I claim:

1. A bag filling apparatus comprising bag holding means for supporting an open bag in an inclined position, a tray means of a size to telescopically enter and exit from the bag for receiving items to be placed in the bag, means moving said tray means into an inclined position into the open bag supported by the bag holding means, said tray means including means to release the items therein when the tray means enters the bag on the bag holding means, and means movably supporting said bag when on the bag holding means and moving the bag with the items therein away from holding means to enable a subsequent open bag to be placed on the bag holding means, said tray means being an open top rectangular tray having rollers journaled between the sidewalls thereof to form a bottom to enable items to move out of the tray when the tray is inclined, said means on the tray means for releasing the items including a pivotal front gate, said pivotal front gate being pivotally connected to the tray at the lower front edge thereof, spring means biasing the gate to closed position, and releasable latch means retaining the gate in closed position, said bag holding means including an open frame defining the open end of the bag and receiving the tray therethrough, a pair of partial sidewall members connected to the frame for supporting the sidewalls of the bag, and means on said partial sidewalls for engaging the latch means for the front gate for releasing the same when the tray enters the bag holding means and bag a predetermined distance.

2. The structure as defined in claim 1 together with spring hinge means supporting said bag holding means for pivotal movement from an inoperative upwardly inclined position for receiving an open grocery bag thereon to a downwardly inclined operative position in alignment with the tray.

3. The structure as defined in claim 2 wherein said means for supporting and moving the filled grocery bag includes an endless conveyor belt having an inclined portion underlying and supporting the grocery bag when positioned in operative downwardly inclined position.

4. The structure as defined in claim 3 wherein said conveyor belt includes a laterally extending supporting flap thereon which underlies a portion of the bottom of the bag.

5. The structure as defined in claim 4 wherein said apparatus includes a storage conveyor comprising a horizontally disposed conveyor belt receiving grocery bags from the supporting flap for storing the bags in vertical position alongside of each other, and a vertical wall surface forming a stop for limiting movement of the filled bags on the horizontal conveyor.

6. In a bag filling apparatus, a tray having dimensional characteristics enabling the tray and a bag to be telescopically related, means on said tray for releasably retaining material thereon to enable release of the material when the tray and bag are telescopically related, and means in the bottom of said tray for movably supporting the material to facilitate movement of the material out of the tray when the retaining means is released, a bag holder including an open frame receiving the mouth of an open bag, means supporting said frame for alignment with said tray, and means on said bag holder for releasing said retaining means when the tray and bag on the bag holder are telescopically related.

7. The structure as defined in claim 6 wherein said supporting means for the bag holder supports the bag in downwardly inclined position, and means moving said tray into and out of a bag on the bag holder when in downwardly inclined position for gravity discharge of material from the tray into the bag.

8. In a bag filling apparatus, a tray having dimensional characteristics enabling the tray and a bag to be telescopically related, means on said tray for releasably retaining material thereon to enable release of the material when the tray and bag are telescopically related, and means in the bottom of said tray for movably supporting the material to facilitate movement of the material out of the tray when the retaining means is released, said means in the bottom of said tray including a relatively smooth surface on which material may slide, said means on said tray for releasably retaining material thereon including a pivotally supported door, latch means releasably retaining the door in closed position and being released automatically when inserted into the bag, said tray being reciprocally supported in a drawer for longitudinal reciprocation, means connected with the drawer for elevating it into alignment with a bag.

9. The structure as defined in claim 8 wherein a lift arm is connected to said drawer adjacent one end thereof, means supporting the other end of the drawer for rocking movement about a horizontal axis whereby the drawer and tray may be oriented in inclined relation for alignment with a bag.

10. The structure as defined in claim 9 wherein said means for elevating the drawer and tray includes a pair of lift arms, a pair of actuating arms attached to the tray and extending alongside of the lift arms, means pivotally and slidably interconnecting the lift arms and actuating arms for moving the tray inwardly and outwardly of the drawer when the actuating arms are oscillated, and drive chain means connected to said actuating arms to cause elevation thereof and oscillatory movement thereof.

11. The structure as defined in claim 10 wherein each of said actuating arms is releasably connected to the lift arm for elevating the lift arm during initial movement of the actuating arm after which the actuating arm is detached from the lift arm to move the tray inwardly and outwardly of the drawer.

12. The structure as defined in claim 11 wherein said lift arm is slidable in a pivotally supported sleeve and includes a pair of notches engaging the ends of the sleeve for locking the lift arm in elevated position, spring-biased means engaging the sleeve for urging it into locking engagement with the notches in the lift arm to retain the lift arm elevated while the actuating arm for the tray is being pivoted, and means interconnecting the actuating arm and lift arm to release the latch means for the lift arm when the actuating arms return to a position alongside of the lift arms so that they may also move vertically.

13. In a bag filling apparatus, a drawer and tray assembly including an inner tray telescopically received in an open ended drawer, means interconnecting the drawer and tray for guiding the tray during its movement in relation to the drawer, lift means connected with one end of the tray to elevate the tray into a position in alignment with a bag, and means connected to the tray for moving the tray longitudinally of the drawer to telescope the tray into a bag and retract the tray back into the drawer.

14. The structure as defined in claim 13 wherein said means for elevating one end of the drawer and reciprocating said tray includes an endless chain having a vertical portion and an inclined portion, an actuating arm attached to the chain for movement vertically and in an inclined path for actuating the tray, and a lift arm interconnecting the drawer and the actuating arm for initial elevation of one end of the drawer along with the actuating arm, and latch means retaining the lift arms in elevated position while the actuating arm is being pivoted for insertion and retraction of the tray.

15. A bag filling apparatus comprising bag holding means for supporting an open bag in an inclined position, tray means of a size to telescopically enter and exit from the bag for receiving items to be placed in the bag, means moving said tray means into an inclined position into the open bag supported by the bag holding means, said tray means including means to release the items therein when the tray means enters the bag on the bag holding means a predetermined distance, said bag holding means including a frame means defining the open end of the bag, and means on said frame means for actuating said release means on the tray means, and means supporting the bottom of the bag when the bag is on the bag holding means in an inclined position with the closed end of the bag below the open end, said bag bottom supporting means being movable for removing the bag off the bag holding means due to the weight of items therein.