

[72] Inventor **Donald Ernest Liptert**
Woolwich, Maine
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 [73] Assignee **The McCall Pattern Company**
New York, N.Y.

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Primary Examiner—Samuel F. Coleman
Attorney—Edward Halle

[54] **ORDER PICKING SYSTEM**
24 Claims, 8 Drawing Figs.

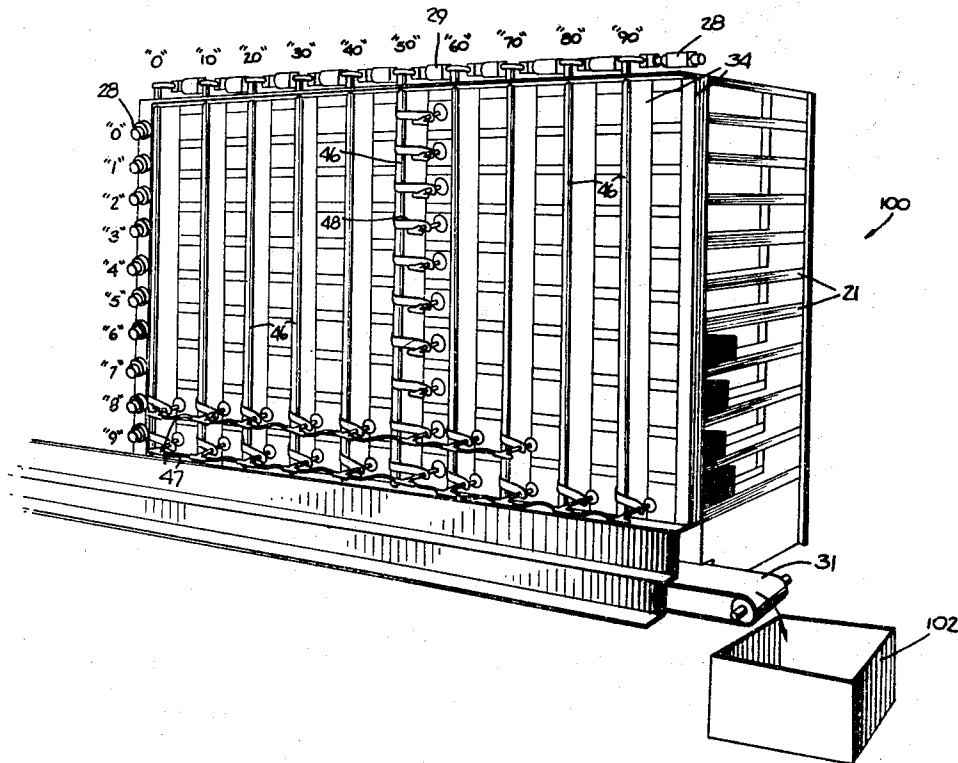
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221/6, 221/41, 221/211, 221/227
 [51] Int. Cl. **B65g 59/00**
 [50] Field of Search. **221/41,**
211, 226-232, 279, 280, 281, 129, 6; 186/1 B

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ABSTRACT: An electromechanical system which can select from a multiplicity of storage compartments any item corresponding to a decimal number input. The storage compartments are arranged in a grid pattern. One portion of the decimal number input triggers a solenoid which activates a picking mechanism along a coordinate axis. The other portion of the number input activates a second picking mechanism along a coordinate axis which intersects with the first coordinate axis. The point of intersection of the two axes occurs at the storage bin form which it is desired to select an article, by the interaction of the two complementary operating mechanisms on a picking mechanism. Picking of an article occurs only at such a point in the grid network. The device may operate on two or more crossed coordinates simultaneously or in rapid succession to provide ultrarapid assembly of a number of items to complete a specific order therefor.



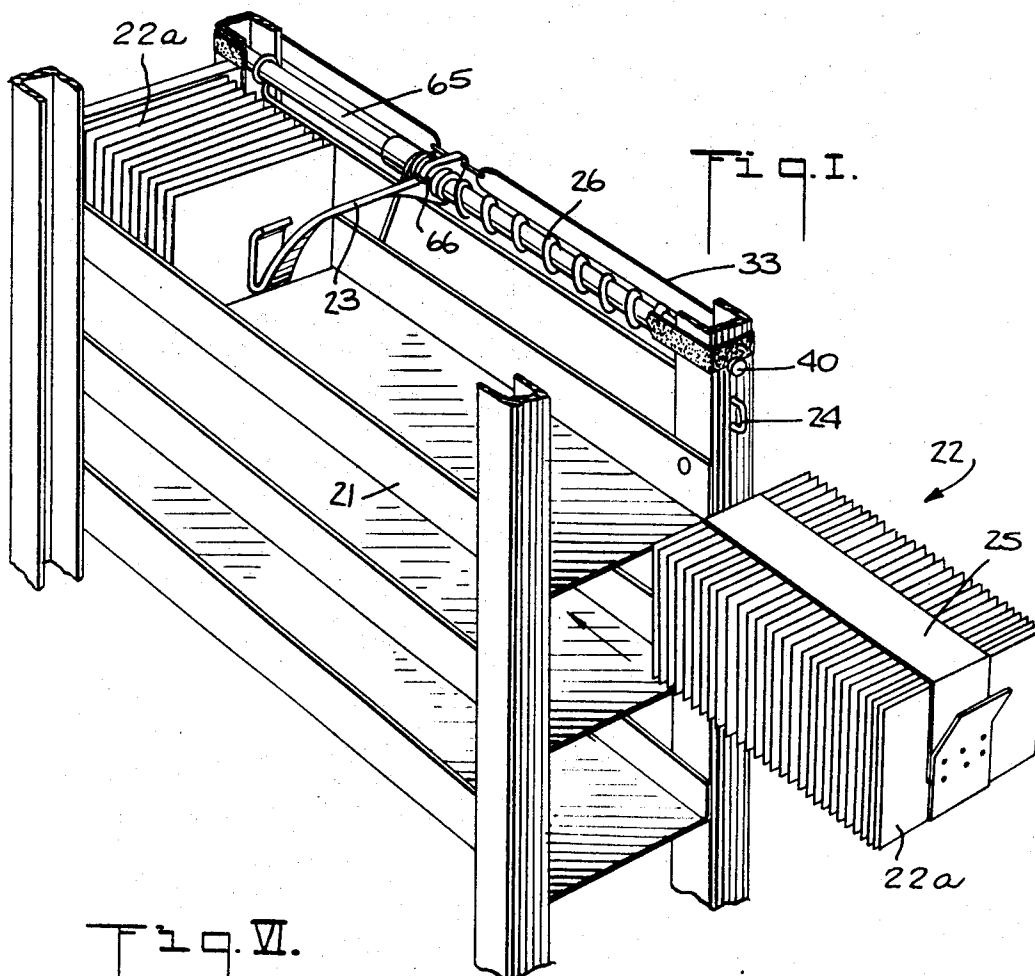
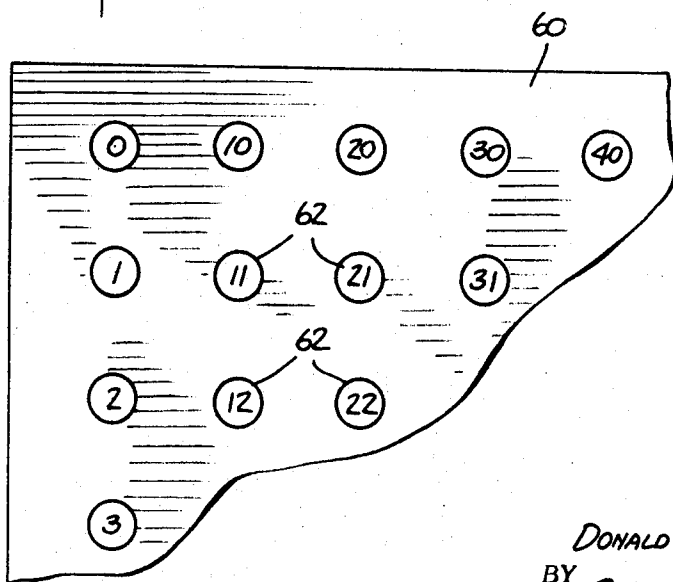


Fig. VI.



INVENTOR.

DONALD ERNEST LIPFERT

BY

Edward Halle
ATTORNEY

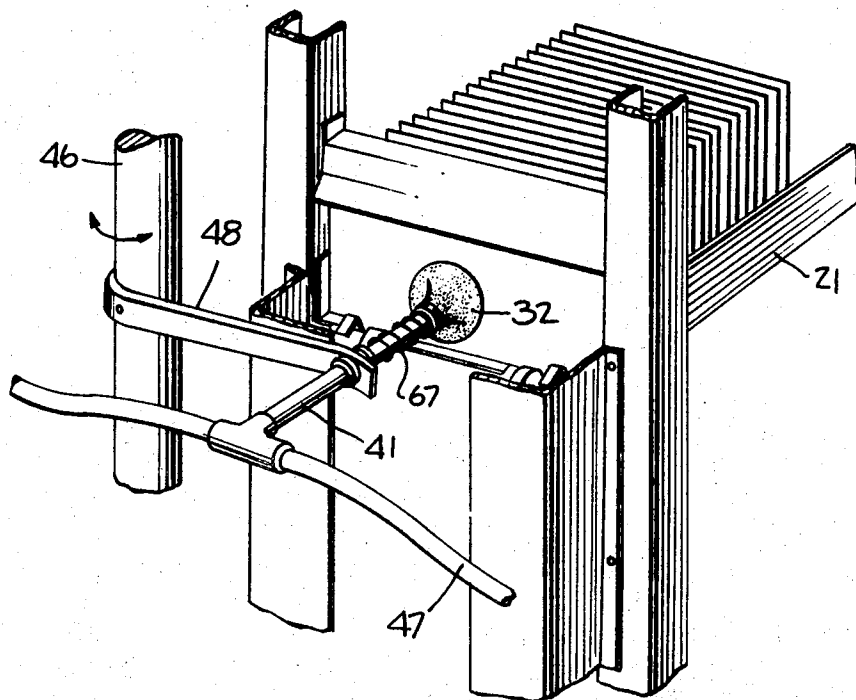


Fig. II.

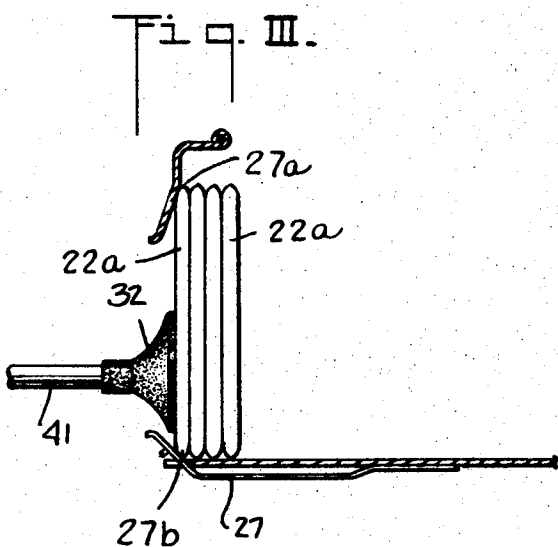


Fig. III.

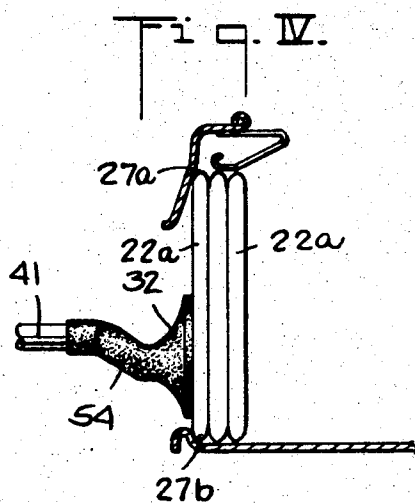


Fig. IV.

INVENTOR.

DONALD ERNEST LAFERT

BY

Edward Hall
ATTORNEY

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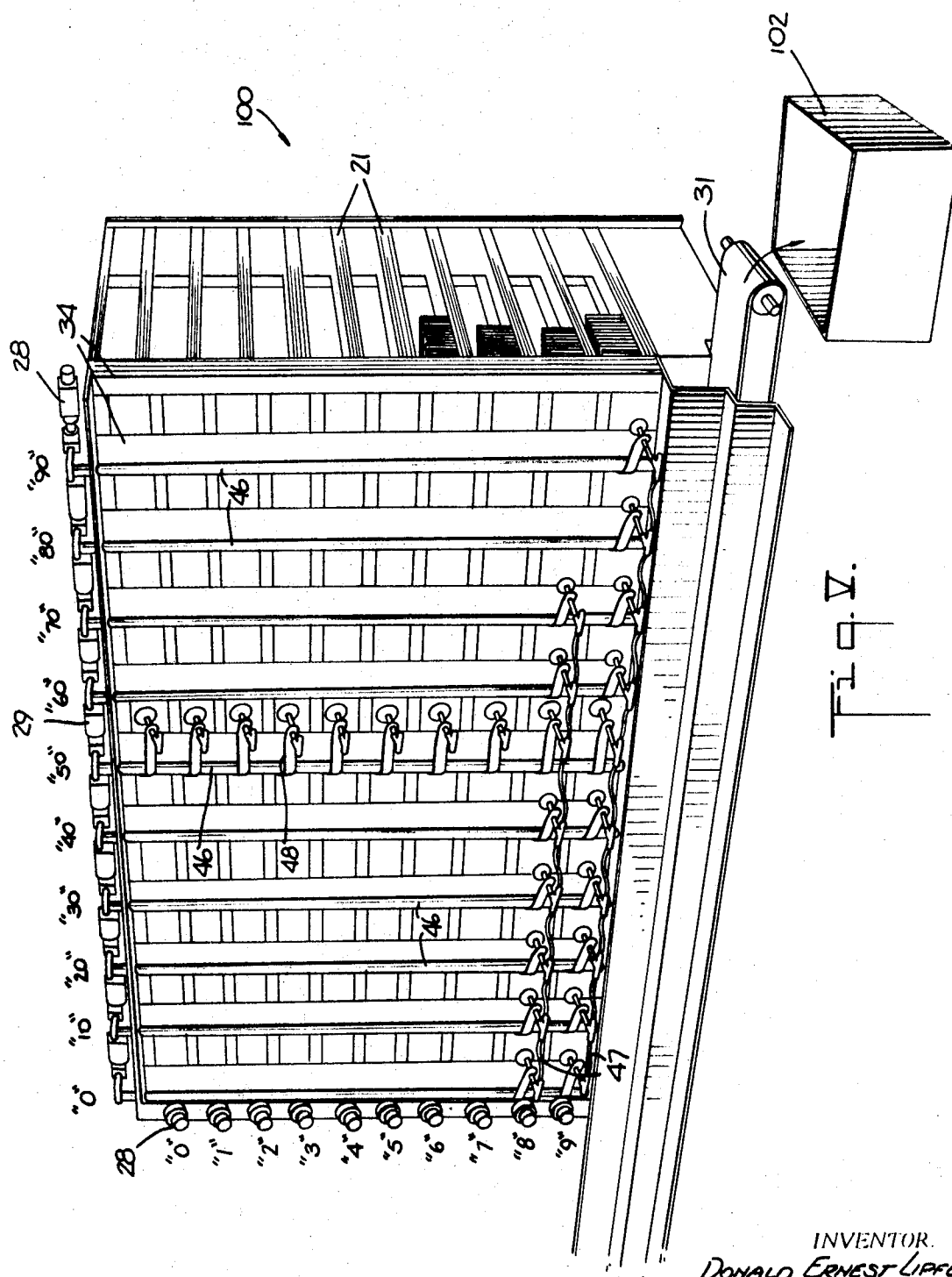


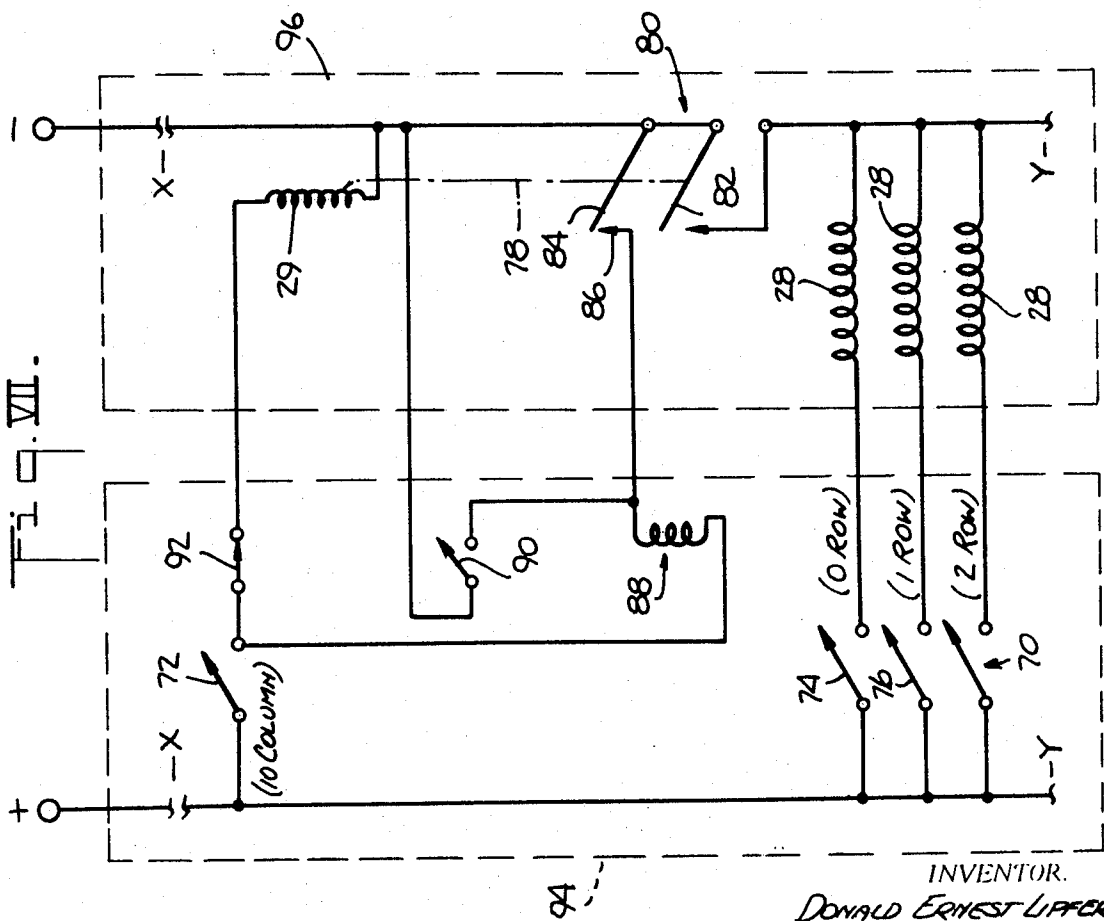
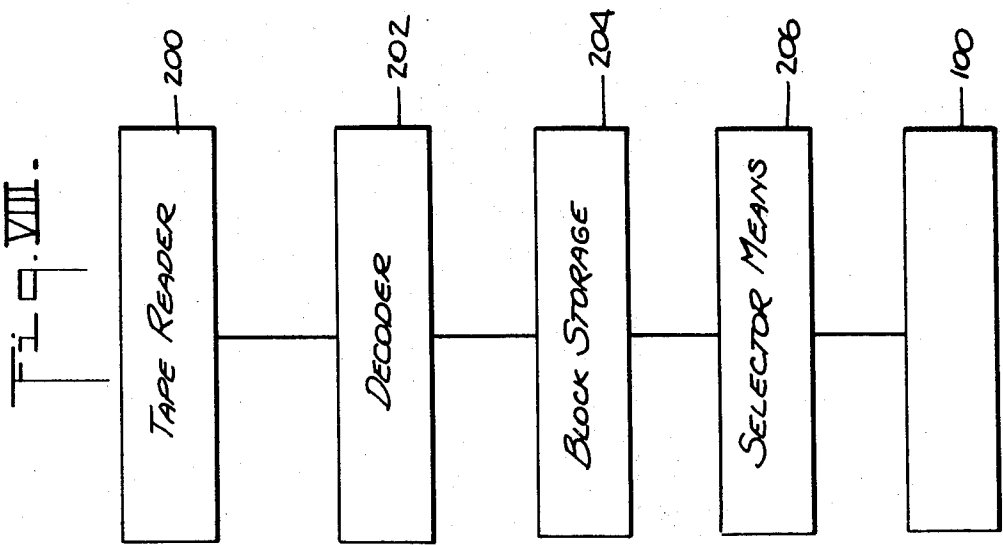
FIG. V.

INVENTOR.

DONALD ERNEST LIPFERT

BY

Edward Hall
ATTORNEY



INVENTOR.
DONALD ERNEST LIPPERT
BY
Edward Hall
ATTORNEY

ORDER PICKING SYSTEM

The system of the invention comprises a main frame having items stored in storage compartments or bins. It is contemplated that a variety of different items can be stored with several of the same items of the variety placed in successive order on support means in each bin.

The invention is illustrated with item storing containers such as envelopes. However, any other container or shape operable within the system may be used. Separate bins will contain packages of envelopes (referred to as items) containing identical items for order selection. For example, envelopes in one bin may have an item such as sheets of a dress pattern for a sport dress and another bin may have an evening dress pattern. Each pattern is usually known by the manufacturer's number, and for the purpose of the invention, such numbers can be coded into decimal numbers according to the system of the invention. For example, a certain dress pattern number 3,475 may be assigned decimal number 37 while another dress pattern of a different number such as 2,045 may be assigned decimal number 50. The preferred grid arrangement of the invention provides basic storage units with 100 bins arranged in substantially parallel, intersecting, perpendicular rows of 10. Thus, number 37 will be third row over, down seven, and number 50 will be in the top bin of the fifth row.

The first bin in the upper left-hand corner would be "0" or "00." This can be coded for 100 if desired or 0. Either way, the basic storage unit will handle 100 items code-numbered either from 1-100 or 0-99. In this specification I will use the 0-99 designation. In FIG. V, it will be seen that "0" is upper left, and "99" is lower right. Any number can be found by first looking for the 10's row or column which in FIG. V would be the vertical column and second, looking for the unit column which in FIG. V would be the horizontal row or rank.

Each bin will have item support means which will comprise platforms or trays, a feed arm on guide means operated by potential energy means, such as a spring, to move the successively stacked items toward the dispensing exits. Other constructions may be used which will provide that the exits are located substantially adjacent or within a common plane associated with the grid arrangement.

The invention also comprises picking means which are provided to pick or pull the items through the exit portions of the bins and drop them by means of chute means onto a conveyor means for transport to a collection station. The picking means comprise several picking means portions which, in a preferred form of the invention, are in the form of vacuum cups. These vacuum cups must be moved toward and away from the exits of the bins so as to provide a picking action. In addition, the air must be at least partially exhausted from a particular vacuum cup to accomplish the picking operation. Operating means are provided for this purpose having operating means portions such as solenoids attached to mechanisms to move the picking means, and other operating means portions such as solenoids to operate valves to provide vacuum effect on the picking means.

The device is also provided with selection means so that an operator can, by pressing a button or throwing a switch, select an item from a particular bin to be placed in the collection station. Various types of selection means, either manual or automatic, may be provided. Some are illustrated in the specification hereinbelow. It is contemplated that any of the usual types of automatic selection by coding such as punch cards or coded tape may be used with or as a combination of the invention, it being well known to the art how such cards or tapes can be translated or decoded into a decimal input system.

The basic unit of the device can be multiplied infinitely to provide for the storage of hundreds or even thousands of different items. This is done by adding a 100's column to the decimal code or a 1,000's column if necessary, the 100's column being used to first select a storage bin with the 10's and units columns to select a particular bin in the basic storage unit, and if more than 10 basic storage units are used, the 1,000's column is used to select the proper group of 10 or less

storage units concerned. It will be understood from the specification hereinbelow that all of such storage units can be connected to a central collection station by means of a single conveyor or any combination of conveyors articulated together.

It is, therefore, apparent that the invention herein can be used to either manually or automatically select an item which has been ordered by a readable digital input.

This invention provides a simple, low cost, easy to install order picking system which is very fast and which is actuated by a digital input. It can be designed to handle a wide variety of items, but preferably is best adapted to handle items of a similar shape and size.

The invention can best be understood by referring to the drawings in which:

FIG. I is a perspective view showing the individual tray units viewed from the loading end;

FIG. II is a perspective view showing the individual tray units viewed from the picking end;

FIG. III is a horizontal sectional view showing the picking end of the tray and the vacuum cup assembly;

FIG. IV is a view similar to FIG. III showing a modified vacuum cup and restraining members;

FIG. V is a perspective view with portions left out;

FIG. VI is a plan view of the selector assembly with parts cut away;

FIG. VII depicts a typical circuit diagram for the invention; and

FIG. VIII is a flow chart showing an automatic tape fed operation.

Similar numerals refer to similar parts throughout the several views.

FIG. I shows the basic tray-holding member which is designed to support and hold items that are to be dispensed. The basic element is a tray 21 which has an open loading end into which items 22a may be loaded in strapped bundles 22. When a bundle 22 is pushed into the open end of the tray 21, it will contact the curved surface of pressure feed arm 23 mounted on guide rod 65, and will swing this arm out of the way against the bias of torsion spring 66. Once the inserted bundle is placed against other items that are already in the tray, the pressure feed arm 23 is manually pulled back by means of pullback rod 24 to engage the rear of the inserted bundle 22. At this point the bundle strap 25 may be removed and disposed of. Each of the trays 21 may be loaded in this manner without interfering with the picking operation which occurs at the front end of the tray as will be described in more detail hereinbelow.

As the items or envelopes 22a are removed from the tray during the picking operation, a feed spring 26 cooperates with the feed arm 23 to advance the items or envelopes 22a toward the front of the tray. A colored band 33 having both ends secured to the feed arm 23 indicates when the tray needs refilling. In a preferred embodiment, the band 33 may be colored one or more different colors to indicate the amount of open space that is contained within the tray and which may be used to hold additional items. The frame of the tray has a guide 40 attached thereto upon which the indicator band 33 may ride.

FIG. II illustrates the picking operation as it would be performed by a vacuum mechanism. This type of mechanism is preferred in applicant's invention although other mechanisms may also be used if desired. As can be seen in FIG. II of the drawings, the item or envelope 22a which is at the forward end of the array of items in the feed tray 21 is in position to be picked from the tray and deposited in chute 34. This operation is accomplished by movement of vacuum cup 32 against the surface of the envelope 22a by means of the actuating shaft 46 and connector arm 48. An overtravel spring 67 is also provided to prevent overtravel of connector arm 48. The vacuum which is impressed upon the flexible vacuum line hose 47 and also upon the vacuum cup 32 supplies the necessary picking force to move the envelope or item 22a into the chute 34.

As can be seen in the alternate stop schemes as shown in FIGS. III and IV respectively, the envelopes or items 22a are restrained on two edges 27a and 27b so that vacuum cup 32 will bow the item to release only it rather than other envelopes that lie behind it. This ensures that only one item at a time will be removed for each operation of the vacuum-picking mechanism. For more rigid items, deflecting elements 27 may be provided to restrain the item and yet provide the necessary egress for release from the tray 21.

FIG. III shows an embodiment having a vacuum cup 32 which is not offset with respect to the connecting means 41 to the vacuum line 47.

FIG. IV shows a vacuum cup 32 having a flexible offset 54 that provides for impression of an upward lifting force to the envelope or item 22a when it is being removed from the tray 21. This upward lifting force enables the envelope or item 22a to clear the fixed stop 29 that is located on the bottom surface of the tray.

FIG. V shows a multiplicity of trays 21 arranged in a grid pattern so that each individual tray may be located by suitable coordinates. The applicant has illustrated in FIG. V a 100-bin assembly 100. It should become apparent to those skilled in the art that either a greater or a lesser number of trays may be arranged in the type of grid pattern illustrated without departing from the spirit and scope of this invention.

In applicant's illustrated assembly, each tray can be located by referring to numbered coordinates at the top of each vertical column and at the end of each horizontal row. By combining any one of the 10 vertical ordinates and 10 horizontal ordinates in coordinate fashion, it is possible to select any tray for the picking operation. In physical terms, one solenoid valve 28 is placed at the end of each horizontal row of trays 21.

Input of a decimal number such as number "69" will trigger the appropriate valve, for example the solenoid valve 28 on rank 9. When this valve is actuated, it will open the vacuum line 47 along the entire length of the horizontal row 9. For the sake of simplicity, the applicant has chosen, in FIG. V, to show only one complete vacuum line extending along the horizontal row. It is to be understood that each horizontal row has its associated vacuum line. When the 10's and unit decimal number input is used, the other portion of the number will activate one of 10 solenoids 29 that is situated at the top of a vertical row or column. In a preferred embodiment, the solenoid 29 will turn the actuating shaft 46 and will move the vacuum cup assembly 32 toward the exit portion of each of the bins in the vertical column in which the solenoid lies. For example, an input of a 10's and unit number "69" would actuate the solenoid in column "60" and would cause all the vacuum cup assemblies attached to shaft 46 in that vertical column to move into contact with the items or envelopes 22a in the trays 21 of the bins in that column. Again for the sake of simplicity, only one shaft 46 complete with vacuum cups is shown in the figure. It is to be understood that each column in the grid has its associated actuator. Since only one of the cups, that cup corresponding to the decimal number input of the column of cups moved by shaft 46, has vacuum applied thereto, only one item will be picked from the grid. The item will be moved into chute 34 and will fall onto conveyor means 31 for transport to a collection station 102 for processing the items in each individual order.

Although the system has been described in terms of the cooperation of a solenoid vacuum valve and a solenoid actuator mechanism for vacuum pickup heads, other types of picking mechanism could be used. Instead of 10 large solenoids to actuate the vacuum cups, a solenoid air valve may control a single piston that would actuate any vertical column of vacuum cups that may be keyed in through its separate solenoid. Where vacuum is not the picking means, the same system may be applied to gating. By developing a grid of shutters, only one passage may be opened when one horizontal and one vertical shutter are actuated. In a system utilizing vacuum picking cups, the force of vacuum applied is made

sufficiently large and the diameter of the vacuum lines is made sufficiently small so as to make it possible to pick one item from the selected tray despite the fact that the other vacuum heads do not lie on a sealing surface.

The solenoids 28 and 29 of the operating means are connected to the selection means of the device by a "lost-motion" type of circuit which will ensure that the vacuum solenoid 28 will maintain vacuum for as long as is necessary to pull an item. It will be apparent that the solenoid 29 which moves the vacuum-picking means or vacuum cups 32 toward and away from the exits and the items will move the cup 32 toward the items during a closed circuit condition, and will reverse when the circuit to solenoid 29 is open. It is, therefore, required that the circuit to a vacuum solenoid 29 remain closed longer than the circuit to a solenoid 28 so that the vacuum will continue while the operation of moving the cup 32 away with the item continues. The vacuum phase of the circuit should continue so long as the actuating shaft 46 is moving back to give the cup 32 a chance to pull the item into the chute 34. This is why it is necessary to have a "lost-motion" phase in the circuit which permits the solenoid 29 to open circuit before the solenoid 28 is in an open circuit position.

I accomplish this by providing a selection means having a panel 60 and a plurality of switch-pressing buttons 62 which are numbered serially from 0 to 99. For the sake of clarity, FIG. VI in which the panel 60 is illustrated, has been cut away and shows only a few of the 100 switch buttons which correspond to each of the 100 bins in the invention as illustrated in FIG. V. The selector means is in turn connected to the solenoids 28 and 29 as shown in FIG. V by means of a circuit which is represented basically in FIG. VII of the drawings. I call this a "lost-motion" switching circuit in which two inputs select and operate two solenoids, a solenoid 28 and a solenoid 29 at a selected coordinate. The circuit shown in FIG. VII is a part of a larger circuit made by extending the circuit illustrated to cover all of the switch buttons and all of the solenoids, the circuit of FIG. VII covering basically solenoids 28 at rows 0, 1 and 2 and solenoid 29 of the 10's column. In the actual device, the circuit has connections for all of the solenoids and this can be done by placing extra circuit portions for solenoids 29 at the breaks indicated as X in the drawing. Also, further circuits for solenoids 28 can be added at the breaks indicated by Y in the drawing. Suffice it to say that FIG. VII has been prepared to illustrate an operation of the device in which the solenoid 29 of the 10's column and the solenoid 28 of the 2 row are operated. This illustration will serve to illustrate the operation of any solenoid desired to be selected by the selection system.

In this operation, if the operator desires to select an item from bin 12 of the bin assembly 100, the operator would push button 62 marked "12" on the panel 60 of the selection means. The button marked "12" is connected by any means known to the art to switches 70 and 72 as shown in FIG. VII. Switches 70 and 72 are normally open, and will be placed in closed condition when button 12 is pressed. Switch 72 closes the circuit to solenoid 29 and the 10's column of the device, and switch 70 closes the circuit to solenoid 28 in the unit 2 row of the device. Also shown in FIG. VII are switches 74 and 76 which respectively are used to close circuits to solenoids 28 in the zero row and "1" row of the device. These are for purposes of illustrating the extension of the circuit.

When switches 70 and 72 are closed, solenoid 29 activates and its piston or other movable operating means designated by reference numeral 78 in FIG. VII is connected to a double-pole switch 80 and as well to shaft 46 so that as the solenoid operates, it not only rotates shaft 46 but pushes the poles of switch 80 thereby pushing vacuum cups 32 toward the bins and closing switch arm 82 which completes the closing of the branch of the circuit to energize solenoid 28 connected to switch 70, which is also closed. This creates a vacuum by operation of vacuum solenoid 28 all along the second or unit 2 row of the device. Switch arm 82 has in it a lost-motion element which will maintain the switch in closed position for a

time after the reverse of piston 78 so that when element 78 reaches the end of its stroke and starts returning, switch arm 82 will remain in closed position for a short period of time as will be indicated in this description.

After switch arm 82 is closed, switch arm 84 continues to move until it reaches a contact 86 closing a relay circuit. The relay 88 is a two-pole relay having one pole or arm normally open and one pole or arm normally closed. Thus, pole or arm 90 is normally open, and pole or arm 92 of relay 88 is normally closed. Contact of arm 84 to contact point 86 will operate the relay, closing pole 90 and opening pole 92 thereby opening the circuit to solenoid 29 and causing element 78 to reverse. When element 78 reverses, it pulls back arm 84 before arm 82 comes back because of the lost-motion feature connected to arm 82. The return of arm 84 opens the circuit to the relay. However, relay 88 is a holding relay and because switch 72 remains closed from the pressing of button 12, will continue to maintain a closed circuit for relay 88 attached to switch 70. This creates a condition of vacuum while solenoid 28 is in reverse and permits the cup 32 to pull an item 21 at this time. Just before element 78 returns to its rest position, the lost-motion effect of pole 82 operates and opens the circuit at pole 82 releasing the vacuum solenoid. Removal of the operator's finger from button 12, thereby opening switches 70 and 72, maintains the device at a rest position ready for the next operation.

In addition to a panel assembly such as that shown in FIG. VI, there may be even a simpler panel assembly comprising 20 buttons, 10 buttons for the vertical columns and 10 buttons for the horizontal rows to be operated by both hands of the operator or two fingers of one hand as desired. These buttons will be connected singly to switches for the solenoids 28 and 29, and the same results would be obtained through the use of a basic circuit illustrated in FIG. VII.

In addition, the selection circuit of the device can be connected to more sophisticated inputs such as a reader for punchcards or tapes illustrated in FIG. VIII of the drawings. The reader 200 would be any type of reader known to the art which could read binary codes or other types of codes usually associated with tapes or cards. The output of the reader would go to a decoder 202. The output of the decoder 202 would go to block storage device 204. The output of the block storage would go to a selector means 206 which could be similar to the circuitry shown in FIG. VII of this application, and then further relayed to the storage bin 100 in accordance with the description set forth hereinabove.

I have indicated in FIG. VII of the drawings those portions of the circuitry of FIG. VII which are associated with the selector means by providing a dotted outline box with reference numeral 94, and those portions of the circuitry of FIG. VII which are physically located on the bin assembly 100 by providing a dotted outline box reference numeral 96.

The present invention is best adapted to store and provide retrieval for materials packaged in envelopes; for example, dress patterns and the like. It can, however, be modified to hold other items which would lend themselves to storage and retrieval in such an apparatus.

It is apparent that the basic storage unit is illustrated in FIG. V, and in accordance with the 10's and units of the decimal system, contains 100 bins to be selected by crossing coordinates in accordance with the invention. Selection systems have been described of which some have been illustrated in FIGS. VI and VII. It is to be understood that a selection system may be provided in which more than one item can be selected simultaneously; for example, in the system described in FIG. VI, if two buttons are pressed simultaneously, two separate coordinates will be selected and two items will be pulled at the same time. It will also become apparent that an operator, even pressing buttons manually, can select eight or 10 different items at a vastly greater rate of speed than selecting such items from a bin by hand. Greater rates of speed can be achieved with the punchcard or tape systems since these systems can be coded by many operators at many different stations if necessa-

ry and fed into a single dispensing order-picking system of the invention to be operated at ultrahigh speed.

In addition, stock items such as dress patterns having manufacturer's numbers may be reflected on the buttons of a switch box such as the box in FIG. VI by placing the actual item number on the face of the button so that the operator desiring a particular item number, finding that number on the button, will press the button which, in effect, is actually coded to the decimal switching system of the invention, and will select the proper item from the proper bin.

The simplest selector panel assembly for a 100-bin storage rack would have 10 switches with operating buttons for the 10's and units columns respectively of the decimal system. An operator could press a 10's button with one hand or finger and a unit button with another hand or finger simultaneously to obtain the cross coordinates to operate the device. These selection systems can, of course, be adapted to 100's and 1,000's in conjunction with a plurality of storage bins in 10 by 10 relationship.

While I have described my invention in its preferred forms, there are other forms which it may take without departing from the spirit and scope of the invention, and I, therefore, desire to be protected for all forms coming within the claims hereinbelow.

Wherefore I claim:

1. An order-picking system for selecting at least one item having at least one surface from a plurality of items stored in bins, said system comprising an main frame including a plurality of bins comprising support means to support a plurality of items arranged in successive order, said bins having exit means in grid arrangement; in combination with picking means having portions in perpendicular, coordinate, grid arrangement, operation means for the picking means comprising a first set of operating means portions to activate picking means portions aligned along a first set of coordinates of said grid arrangement, and a second set of operating portions to activate picking means portions aligned along a second set of coordinates of said grid arrangement substantially perpendicular to said first set of coordinates, in which; the portions of the first set of operating means each operate carrier means having picking means, along the first set of coordinates, and the portions of the second set of operating means each operate valve means attached to vacuum compressor means and to vacuum line means communicating to each of the picking means along said second set of coordinates, together with order selecting means comprising circuit means leading to each of the first set of operating means portions, and circuit means leading to each of the second set of operating means portions, whereby selection of a circuit means of a first set and a selection of a circuit means of the second set will provide activation to all of the picking means common to the coordinate selected, resulting in operation of the picking means where the coordinate lines cross.

2. A through feed system as claimed in claim 1, in which articles to be dispensed are bundle-fed from the rear, are disengaged from the bundle once in place, and are engaged with the feed at the front.

3. The order-picking system as claimed in claim 1 comprising means for restraining and withdrawing envelopes one at a time from a tray comprising a top fixed restraint and a deflectable bottom restraint.

4. The order-picking system as claimed in claim 1, in which the bin comprises a platform and a feed arm, said feed arm being mounted on guide means associated with potential energy means positioned to urge said feed arm toward said exit, said feed arm having an item contact portion and a curved portion curving away from said item contact portion to said guide means, said arm being rotatably mounted on said guide means.

5. The order-picking system as claimed in claim 4, in which there is indicator means comprising a band attached to said arm and disposed in a continuous pathway, a portion of which is visible from outside the frame and including a calibration means.

6. The order-picking system as defined in claim 4, in which each bin has a pull back rod.

7. The order-picking system as claimed in claim 1, in which the exit means each have a portion substantially adjacent a plane common to all of said portions of said exit means.

8. An order-picking system as claimed in claim 1, in which the operating portions comprise electrically activated solenoids, and in which the selection system comprises at least one circuit connection between at least one selector switch positioned in a selection area with at least one solenoid.

9. An order-picking system as claimed in claim 1, in which the operating portions comprise electrically activated solenoids, and wherein selected pairs of solenoids are connected by circuit means to switch means operated by a single selector button.

10. The order-picking system as claimed in claim 1, in which there are a plurality of storage units each having 100 bins, and the selector system comprises selecting means to select first a storage unit and then the coordinates of the 100 bins of the storage unit.

11. The order-picking system as claimed in claim 1, in which there are collection means and a collection station.

12. An order-picking system as claimed in claim 1, in which the exit gate means has restraining element means.

13. The order-picking system as claimed in claim 1, in which the picking means portions are vacuum operated.

14. The order-picking system as claimed in claim 1, in which the picking means portions are in the form of vacuum cups having offset resilient connections.

15. The order-picking system as claimed in claim 1, in which the portions of the first set of operating means each operating carrier means are a first set of solenoids each operating a bar, and the portions of the second set of operating means each operating valve means attached to vacuum compressor means are a second set of solenoids each operating a valve attached to a vacuum compressor.

16. An order-picking system for selecting at least one item having at least one surface from a plurality of items stored in bins, said system comprising a main frame including a plurality of bins comprising support means to support a plurality of items arranged in successive order, said bins having exit means in grid arrangement; in combination with picking means having portions in perpendicular, coordinate, grid arrangement, operation means for the picking means comprising a first set of operating means portions to activate picking means portions aligned along a first set of coordinates of said grid arrangement, and a second set of operating portions to activate picking means portions aligned along a second set of coordinates of said grid arrangement substantially perpendicular to said first set of coordinates, in combination with order selecting means comprising a binary-to-decimal translator having means to receive binary-coded material and means to translate the binary code to a decimal system operating switches to close circuits to the grid system.

17. An order-picking system for selecting at least one item having at least one surface from a plurality of items stored in bins, said system comprising a main frame including a plurality of bins comprising support means to support a plurality of items arranged in successive order, said bins having exit means

in grid arrangement; in combination with picking means having portions in perpendicular, coordinate, grid arrangement, operation means for the picking means comprising a first set of operating means portions to activate picking means portions aligned along a first set of coordinates of said grid arrangement, and a second set of operating portions to activate picking means portions aligned along a second set of coordinates of said grid arrangement substantially perpendicular to said first set of coordinates, in which the picking means portions are in the form of vacuum cups affixed to a series of shafts in parallel arrangement, and connected to a series of vacuum lines in parallel arrangement, said parallel shafts and parallel lines being generally perpendicular to form a picking means grid arrangement with coordinates corresponding to coordinates formed by the first mentioned exit means grid arrangement, with each of said shafts and vacuum lines having operating means portions.

18. The order-picking system as defined in claim 17, in which the operating means portions comprise vacuum solenoids for the vacuum lines, and shaft operating solenoids for the shafts, together with selection means comprising switch means to selectively operate said solenoids.

19. The order-picking system as defined in claim 18, in which the shaft-operating solenoids are associated with switching means adapted to be selectively connected to the operating means for at least one vacuum solenoid.

20. The order-picking system as defined in claim 19, in which there is at least one hold relay in the selection circuit adapted to keep the circuit to at least one vacuum solenoid closed when the closed circuits to at least one shaft-operating solenoid opens.

21. The order-picking system as defined in claim 20, in which at least one selected shaft moves its vacuum cups toward and away from items stored at the exit grid while at least one selected vacuum line exerts exhaust pressure on its vacuum cups to move at least one selected vacuum cup at a selected pair of coordinates in the picking means grid arrangement to contact at least one item at a selected pair of coordinates in the exit grid arrangement.

22. The order-picking system as defined in claim 21, in which the grid arrangements are in the form of 10 by 10 grids, and there are 10 shafts, each having an operating solenoid, and 10 vacuum lines, each having a vacuum solenoid, and there is selector circuit means including an operating switch normally open for each of said solenoids, and selector means having 100 switch throwing means, each of said switch throwing means being adapted to close a shaft solenoid switch and a vacuum solenoid switch.

23. The order-picking system as defined in claim 22, in combination with a translator for translating binary-coded signals from tape or cards to a decimal system, and a decoder, and a block storage device.

24. The order-picking system as defined in claim 22, in which there are a plurality of main frames or storage units and the selector means includes further switching means to provide for the selection of one of the plurality of storage units in addition to the selection of the 10's and units coordinates contained in said storage unit.

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