The present invention relates to packaging equipment and more particularly to an apparatus for withdrawing pre-formed trays one at a time from a magazine containing a tightly packed and nested stack of trays.

The tray feeding apparatus of the present invention is particularly adapted to de-nest pocketed trays from a nested stack of trays which cling to each other because of static electricity and because of suction created between the tightly packed trays as one tray is moved outwardly from the next adjacent tray.

It is therefore one object of the present invention to provide a tray feeding apparatus for withdrawing a pre-formed tray from a tightly packed stack of trays.

Another object is to provide a tray feeding apparatus adapted to grip and partially collapse a tray to more readily release the tray from a tightly packed stack of trays supported in a magazine.

Another object is to provide a suction gripping head having a pair of transversely movable suction cups arranged to grip the end portions of a tray and partially collapse the tray to facilitate its removal from a magazine containing a nested stack of trays.

Another object is to provide a suction gripping head having suction cups positioned to grip the bottom surfaces of the tray and having a pair of transversely movable suction cups arranged to grip ridged end surfaces of the tray and partially collapse the tray to facilitate its removal from a magazine containing a nested stack of ridged trays.

These and other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings, in which:

FIGURE 1 is a schematic side elevation of the tray feeding apparatus.

FIGURE 2 is a schematic end elevation of the apparatus of FIGURE 1.

FIGURE 3 is an enlarged perspective of one of the suction heads with the parts being shown in tray releasing position, above a released tray. Certain parts are cut away and other parts are shown in section.

FIGURE 4 is a vertical central section through one of the heads with the suction cup shown in gripping engagement with a tray, and with the tray being deformed.

FIGURE 5 is a section taken along line 5—5 of FIGURE 4.

FIGURE 6 is a schematic side elevation of one of the suction heads shown in a position indexed with a magazine and illustrating the pneumatic control system for the suction gripping head.

FIGURE 7 is a section taken along the lines 7—7 of FIGURE 6 illustrating certain portions of the pneumatic and vacuum control systems.

FIGURE 8 is a section taken along lines 8—8 of FIGURE 7 showing a vacuum control cam.

In general, the tray feeding apparatus 15 (FIGS. 1 and 2) of the present invention comprises an inclined magazine 16 having fingers which project within an open end thereof for supporting a stack of tightly packed, pre-formed plastic trays T therein. The magazine 16 is supported on a frame 17 which also supports an intermittently driven turret 18 that carries three identical suction heads 19 that are placed angularly around the axis of the turret. The turret is mounted on the horizontal shaft 21 which is journaled in the sleeve type bearings 22 rigidly secured to the frame 17.

The turret 18 is intermittently driven by a drive mechanism 23 which includes a continuously driven motor 24 that is connected to the input shaft 26 of an electrically actuated one-revolution clutch 27 of any suitable, well known type. The one-revolution clutch may be a model L.D.U. Hilliard Clutch, as manufactured by the Hilliard Corporation, 100 W. 4th Street, Elmira, New York. The one-revolution clutch 27 is activated upon demand for empty trays by a micro-switch (not shown) which may be placed alongside a continuously driven conveyor 29, upon which the trays removed from the magazine are placed in position to be actuated by a filling machine or wrapping machine (not shown) each time an empty carton is demanded. The output shaft 31 of the one-revolution clutch 27 is connected by a chain drive 32 to the input shaft 33 of an intermittent driving unit 34. The intermittent driving unit may be a Parallel Index Drive Unit, Series 512–T, as manufactured by Commercial Cam and Machine Company, Chicago 22, Illinois. The output shaft 36 of the intermittent driving unit 34 is connected to an intermediate shaft 37 by a chain and sprocket drive 38. The intermediate shaft 37 is journaled in a sleeve bearing 39 and is connected to the turret shaft 21 by a chain and sprocket drive 40. The drive mechanism 23 is so arranged that each actuation of the one-revolution clutch 27 causes the turret 18 to index 120° in a counterclockwise direction as viewed in FIGURE 1.

During the first half cycle of the one-revolution clutch, the turret 18 is rotated through 120° thereby swinging one of the suction heads 19 with a tray attached thereto from a tray receiving position R indexed in alignment with the magazine 16, to a tray discharging position D indexed directly above the conveyor 29 at which point the suction head 19 releases the tray causing the tray to drop upon the conveyor 29 to be moved away from the apparatus 15. During this time, the following suction head has been indexed into the tray receiving position. During the next half cycle of the one-revolution clutch 27, the suction head 19 which is indexed at the magazine is moved into gripping engagement with and partially collapses a tray T and removes the tray from nesting engagement with the other trays in the magazine. The suction head 19 at the magazine 16 then holds the freestray in alignment with the magazine 16 until another cycle of operation is initiated upon energization of the one-revolution clutch 27.

Each suction head 19 (FIGS. 3 and 4) is mounted on one of a plurality of evenly spaced arms 50 rigidly secured to and projecting radially from the body 52 (FIGS. 6 and 7) of the turret 18. Each head 19 comprises an elongated slide block 54 that is bolted to one of the arms 50 and includes a short arm 56 and a long arm 58 having a cylinder mounting angle bracket 59 projecting outwardly therefrom. Slots 60 (FIGURE 5) are formed in the edges of the slide block 54 and slidably received upstanding arms 62 and 64 of a U-shaped carrier 66, which arms are separated by a slot 68 thereby permitting the carrier 66 to be moved from the extended position shown in FIGURES 3 and 4 to the retracted position illustrated in FIGURE 6. The cylinder 70a of a primary pneumatic power unit 70 is secured to the angle bracket 59, which is secured to and projects outwardly from the long arm 58 of the slide block 54, and the piston rod 70b is secured to a flange 74 bolted to and extending outwardly from the lower end of the U-shaped carrier 66.

The cylinder 76a of the secondary pneumatic power unit 76 is secured to an angle bracket 78 bolted to the carrier 66, while the piston rod 76b of the power unit 76 has a cam 80 in the shape of a paraboloid securely thereto.
Two generally triangular shaped plates 82 and 83 are bolted to the sides of the carrier 66 and have a two-piece suction cup supporting slide block 84 bolted thereto. A pair of L-shaped carriages 86 and 87 are slidably received in a transverse slot 88 in the slide block 84. The carriages include arms 89 and 91 which project upwardly through a slot 92 in the upper surface of the slide block 84. The arms 89 and 91 have cam followers 94 journaled thereon, which cam followers are engaged by the cam 90 when the secondary power unit 76 is activated thereby moving the carriages 86 and 87 outwardly. The carriages 86 and 87 are normally urged inwardly by springs 96 connected between the slide block 84 and the associated carriages. Cap screws 97 secured in ears 98 which are welded to and project inwardly from the slide block 84 are positioned to engage the associated arms 89 or 91 of the carriages and serve to provide adjustable means for limiting the outward movement of the carriages.

The slide block 84 carries four suction cups 101 (FIGS. 3 and 4) which engage the inside surface of the bottoms of two central article containing pockets 102 of the tray T (FIG. 3). Each of the carriages 86 and 87 carries a centrally disposed side engaging flexible suction cup 104 which engages and conforms to the inside surface of an end wall 106 of the associated end pockets 108 of the tray to partially collapse the central portions of the end walls inwardly. Although the end walls 106 are ribbed as clearly illustrated in FIGURE 3, the material from which the suction cups 104 are made is sufficiently flexible to seal against these ribbed walls and grip the walls with sufficient force to deflect them inwardly.

The control systems for directing air into the pneumatic power units 70 and 76 and for evacuating the suction cups 101 and 104 in timed relation with the movement of the turret 16 are best shown in FIGURES 6, 7 and 8. Since the parts of the control systems for each suction head 19 are the same, only those parts associated with one head will be described in detail. Because the control systems are so closely related to the operation of the machine, the control systems and operation will be described simultaneously.

With the motor 24 (FIG. 1) operating and with the magazine 16 filled with trays T, each cycle of operation is initiated by closing a switch (not shown) which actuates the one-revolution clutch 27. A single revolution of the output shaft 26 of the one-revolution clutch causes the input gear driven unit 34 to swing the particular head 19 that is aligned with the magazine 16 and has a tray T gripped thereto, from the position shown in FIGURE 6 to the position shown in FIGURE 3 where the tray T is blown off the suction head 19 onto the conveyor 29.

At the start of the cycle of operation, the parts are positioned as indicated in FIGURES 6, 7 and 8. The first 180° of rotation of the output shaft 31 of the one-revolution clutch 27 causes the intermittent driving unit 34 to rotate the turret 18 through an angle of 120° thereby positioning another suction head 19 in alignment with the magazine 16. Simultaneously, with the completion of the first 180° of rotation of the one-revolution clutch 27, the lobe 114a of a cam 114 that is keyed to the shaft 31 contacts and actuates a switch 115 (FIG. 6) which closes a circuit from lines L1 and L2 to a solenoid 116. Energization of the solenoid 116 shifts the core 118 of a main air valve 119 from its seated position, wherein a main conduit 120 is open to the atmosphere through a passage 122 and vent port 124, to a position wherein high pressure air, from a source not shown, flows through a conduit 126 and a passage 128 in the core 118 and then enters the main line 120. The solenoid remains energized during the next 180° of rotation of the output shaft 31 of the one-revolution clutch.

The main line 120 is connected to a swivel joint 130 which directs the air into an air chamber 132 (FIG. 7) of the turret 18. Three normally closed, manually operated air valves 134, one for each suction head 19, are secured to and communicate with the chamber 132. The valve 134 associated with the suction head 19 that is indexed with the magazine 16 is opened by a roller 136 that is journaled on a bracket 138 secured to a stationary portion of the swivel joint 130. Thus, high pressure air is directed from the source through the conduit 76 into the core of the valve 119, main line 120, swivel joint 130, air chamber 132, open valve 134, and into a branched conduit 140.

A portion of the air flows through a branch 140a of the conduit 140 into the closed end of the primary pneumatic power unit 76 thereby moving the piston rod 76b to the extended position, thus causing the suction cups 101 and 104 to move into engagement with the foremost tray in the magazine 16. Immediately upon reaching the extended tray engaging position, a stop 144 engages and shifts the core 146a of a valve 146 against the urging of a spring 148 causing a passage 150 in the core to register with a branched conduit 152, thereby allowing the suction cups 101 and 104 to move outwardly against the ribbed walls 106 of the tray T.

Simultaneously with the indexing of the suction head 19 at the magazine 16, i.e., after the shaft 31 (FIG. 6) has rotated 180° from the beginning of the cycle of operation, and after the lobes 160 on a cam 162 engages one end of the core 164 (FIG. 6) of the vacuum valve 166. The core 164 is urged against the lobe of a spring 165 and shifts the core 164 of the vacuum valve 166 thereby opening the circuit which evacuates the suction cups 101 and 104. A source of vacuum (not shown) is connected to a swivel joint 168 that is connected to the vacuum valve 166. The swivel joint 168 is connected with a reduced diameter portion 174 which registers with a vacuum passage 176 in the valve when the associated suction head 19 is indexed with the magazine 16. The passage 176 communicates with a chamber 178 to which one end of four conduits 180 are connected. The other ends of the conduits communicate with the suction cups 101 and 104. As shown in FIGURE 3, passages 182 are formed in the slide block 84 and interconnect each pair of suction cups 101.

Thus, after the shaft 31 of the one-revolution clutch 27 has rotated 180°, suction is applied to the suction cups 101 and 104, and high pressure air is simultaneously directed into the primary pneumatic power unit 76 to move the cups 101 against the floor of the tray pockets 102. High pressure air is then directed into the secondary power unit 76, upon shifting of the valve core 146a, to move the cam 80 into engagement with the cam followers 94 to thereby move the suction cups 104 laterally outwardly into gripping engagement with the ribbed end walls 106 of the tray T. The parts remain in this position for the next 60° of the rotation of the cam 114, at which time the switch 115 is opened thereby de-energizing the solenoid 116. De-energizing the solenoid 116 causes the passage 123 in the core 118 to register with the conduit 120 and vent port 124.

Upon shifting the core 118 to the venting position, a spring 76c in the secondary power unit 76 immediately causes the piston rod 76b to move to the retracted position thereby withdrawing the cam 80 from between the cam followers 94 causing the suction cups 104 to pull the end walls 106 of the tray inwardly to partially collapse
the tray 7 so that it can be pulled past the tray holding fingers 16a in the magazine 16. The air in the secondary power unit 76 flows through the conduit 151, the passage 140 in the core 140 of the valve 146, the conduits 140b and 140c, the open valve 134, the air chamber 132, the swivel joint 130, the conduit 120, the passage 122 of the valve 119, and is vented from the system through the vent port 124.

After the piston rod 76b of the secondary power unit 76 has returned to the retracted position shown in FIGURE 6, a spring 76c in the head 76a returns the piston rod 76b, and accordingly, withdraws the suction head with a tray gripped thereon from the magazine 16. In order to assure that the piston rod 76b will be completely retracted before the piston rod 76b moves appreciably, a needle valve 145 is positioned in the branch 140a of the conduit 140b to control the rate of flow of air being discharged from the power unit. Upon retraction of the piston rod 76b, air flows from the power unit 76 through the branch 140a of the conduit 140b and through the other flow passages mentioned immediately above, for discharge from the systems through the vent port 124. The tray remains gripped to the suction head 19 in the position shown in FIGURE 6 until the completion of the cycle of operation.

When the next cycle of operation of the tray feeding apparatus 15 is initiated upon another activation of the one-revolution clutch 27 (FIG. 1), the first 180° of rotation of the output shaft 31 of the one-revolution clutch 27 causes the suction head with the tray attached thereto to swing 120° from the tray receiving position R to the tray discharge position D. During the first approximately 110° of this rotation, the core 164 of the vacuum valve 166 in the cam 162 is moved by the cam 162 and accordingly, retains the suction passages open to the suction head. Thereafter, the core 164 is moved to the right by the spring 165 into a shallow groove 186 in the cam 162 thereby momentarily positioning reduced diameter portion 174 of the core 164 in alignment with a high pressure air passage 188 in the valve 166. The air passage 188 is connected by a conduit 190 to the high pressure air chamber 132. Thus, high pressure air momentarily flows through the vacuum valve 166, through the conduits 189, and through the suction heads 101 and 103 to thereby blow the tray off the suction head 19 onto the conveyor 29 (FIG. 1). Upon completion of the 120° of rotation of the turret 18, the exposed end of the core 164 moves out of the groove 186 onto an intermediate arcuate portion 192 of the cam 162 which positions the reduced diameter portion 174 of the core 164 opposite a wall 194 of the valve thereby blocking both the suction passage 176 and the air passage 188. The exposed end of the core 164 remains on the intermediate cam portion 192 until the suction head 19 associated with the valve 166 is again moved into the tray receiving station R.

From the foregoing description, it will be apparent that the tray feeding apparatus of the present invention grips and removes trays one at a time from a stack of nested trays in a magazine and thereafter discharges each tray upon a conveyor for advancement to a filling machine or the like. The apparatus includes transversely movable cups which engage the side walls of each tray to partially collapse the tray, and also includes suction cups which grip the bottom walls of the tray to aid the transversely movable cups in reliably withdrawing individual trays from the magazine.

While one embodiment of the present invention has been shown and described, it will be understood that various changes and modifications will be made without departing from the spirit of the invention or the scope of the appended claims.

Having thus described the present invention so that those skilled in the art may practise the same, we claim:

1. Apparatus for de-nesting pocketed trays from a stack of trays with each tray having a floor and flared end walls projecting therefrom, comprising a magazine for supporting a stack of nested trays and having an open end through which the trays are individually withdrawn, tray supporting fingers secured to opposite portions of said magazine and projecting within said open end in position to engage opposite edges of the side walls of the foremost tray, first gripping means movable in a direction normal to the plane of said floor into position to grip the floor of the tray, second gripping means comprising cups, curved arms secured to said carriers and projecting toward said end walls from said carriers, gripping elements on said arms movable in a direction transversely and of normal to said first gripping means into gripping engagement with the flared end walls to first grip and then partially collapse said end walls by pulling the end walls inwardly out of engagement with the tray supporting fingers, and means for moving said first and second gripping means with the foremost tray attached thereto away from said magazine and stack of trays therein.

2. In an apparatus for de-nesting trays, a suction head comprising support means, a carrier supported by said support means and mounted for a reciprocable movement relative thereto along a predetermined path between an extended position and a retracted position, first gripping means rigidly secured to said carrier, a pair of carriers supported by said carrier and mounted for movement transversely of said predetermined path, second gripping means secured to the outer end of each of said carriers, a first power means connected between said support means and said carrier for reciprocating said carrier along said path, a second power means carried by said carrier and operatively connected to said carriers, control means carried by said carrier and operatively connected to said second power means for engaging by said control means to thereby actuate said control means for activating said second power means when said carrier has been moved to the extended position, and means for supplying power to said power means.

3. In an apparatus for de-nesting trays the combination of support means, a carrier supported by said support means and mounted for reciprocable movement relative thereto along a predetermined path between an extended and a retracted position, a first suction cup rigidly secured to said carrier, a pair of carriers supported by said carrier and mounted for movement transversely of said predetermined path between an extended and a retracted position, second suction cups secured to the outer end of each of said carriers, a first pneumatic power means connected between said support means and said carrier for reciprocating said carrier along said path, a second pneumatic power means carried by said carrier and operatively connected to said carriers, and means for supplying air under pressure to said power means.

4. In an apparatus for de-nesting trays the combination of support means, a carrier supported by said support means and mounted for reciprocable movement relative thereto along a predetermined path between an extended and a retracted position, a first suction cup rigidly secured to said carrier, a pair of carriers supported by said carrier and mounted for movement transversely of said predetermined path between an extended and a retracted position, second suction cups secured to the outer end of each of said carriers, a first pneumatic power means connected between said support means and said carrier for reciprocating said carrier along said path, a second pneumatic power means carried by said carrier and operatively connected to said carriers, and means for supplying air under pressure to said power means.

5. In an apparatus for de-nesting trays the combination of support means, a carrier supported by said support means and mounted for reciprocable movement relative thereto along a predetermined path between an extended and a retracted position, a first suction cup rigidly secured to said carrier, a pair of carriers supported by said carrier and mounted for movement transversely of said predetermined path between an extended and a retracted position, second suction cups secured to the outer end of each of said carriers, a first pneumatic power means connected between said support means and said carrier for reciprocating said carrier along said path, a second pneumatic power means carried by said carrier and operatively connected to said carriers, and means for supplying air under pressure to said power means.
power means connected between said support means and said carrier for reciprocating said carrier along said path, a cam secured to said second power means and operatively connected to said carrier to move said carrier away from each other when actuated, and a normally closed valve carried by said carrier and connected to said second power means, an abutment rigid with said support means and positioned to be engaged by said valve when said carrier is in said extended position to open said second power means and means for actuating said carrier toward said tray when said second suction cups engage the bottom wall of said tray, a cam secured to said second power means and operatively connected to said carrier to move said carrier away from each other when actuated, and a normally closed valve carried by said carrier and connected to said second power means, an abutment rigid with said support means and positioned to be engaged by said valve when said carrier is in said extended position to open said second power means and cause air to flow into said second power means, means for actuating said carrier toward said tray when said second suction cups engage the bottom wall of said tray, and means for retracting said carrier into said retracted position.

5. Apparatus for de-stacking trays from a stack of trays with each tray having a floor and end walls projecting therefrom, comprising a magazine for supporting a stack of trays and having an open end through which the trays are individually discharged, tray supporting fingers secured to opposite portions of said magazine and projecting within said open end in position to engage opposite edges of the end walls of the foremost tray, a suction head movable toward and away from said magazine, first suction cup fixed to said suction head and moveable with said suction head into engagement with the floor of said foremost tray, second suction cups supported by said head and moveable therewith and transversely relative to the magazine for engaging the end walls of the tray, means for reciprocating said suction head toward and away from said magazine, means responsive upon engagement of said first suction cup with the floor of said tray to effect outward transverse movement of said second suction cups into engagement with the end walls, means for applying suction to said cups to grip the tray, means for moving said second suction cups toward each other to disengage said end walls from said tray upon engaging fingers prior to movement of said suction head away from said magazine, and means for swinging said suction head between a position in alignment with the magazine and a discharge position spaced from said magazine.

6. Apparatus for de-stacking trays from a stack of trays with each tray having a floor and end walls projecting therefrom, comprising a magazine for supporting a stack of trays and having an open end through which the trays are individually withdrawn, tray supporting fingers secured to opposite portions of said magazine and projecting within said open end in position to engage opposite edges of the end walls of the foremost tray, the improvement which comprises a suction head, support means for moving said suction head between a tray receiving position aligned with the magazine and tray discharging position spaced from the magazine, a first suction cup on said head for gripping the floor of said tray, a first air cylinder connected between said suction head and said suction cup for moving said suction head along a path toward and away from said magazine between an extended tray gripping position and a retracted tray withdrawing position, a pair of second suction cups carried by said head and moveable transversely of said path, a second air cylinder carried by said suction head and operatively connected to said second suction cups to control the transverse outward movement thereof, means for directing air into said first air cylinder when said head is in the tray receiving position, a valve on said suction head, means for opening said valve when said suction head is in the tray receiving position to activate said second air cylinder to move said second suction cups into engagement with the end walls of the tray, resilient means carried by said suction head for urging said second suction cups toward each other, control means for directing air into said cylinders during a portion of the time said suction head is in the tray receiving position and for thereupon discontinuing the supply to said cylinders, means for supplying suction to said suction cups while said suction head is in the tray receiving position and while said tray is being carried toward the tray discharging position, and means for directing high pressure air through said suction cups in the prior to movement of said suction head into the discharge position for discharging the tray therefrom.

7. An apparatus for de-stacking trays having bottom walls and side walls the combination of support means, a carrier supported by said support means and mounted for reciprocating movement relatively thereto along a predetermined path between an extended and a retracted position, a first suction cup rigidly secured to said carrier, a pair of carriages supported by said carrier and mounted for movement transversely of said predetermined path between the extended and retracted positions, resilient means connected between each carriage and said carrier for normally urging said carriages toward each other, a pair of second suction cups with one of said second suction cups being secured to the outer end of each of said carriages, first pneumatic power means connecterd between said support means and said carrier for reciprocating said carrier along said path, first abutment rigid with said support means and positioned to be engaged by said valve when said carrier is in said extended position to open said second power means and cause air to flow into said second power means, means for actuating said carrier toward said tray when said first suction cup engages the bottom wall of said tray, a cam secured to said second power means and operatively connected to said carriages to move said carriages away from each other when actuated, second abutment means secured to said carrier and disposed in position to engage said carriages for positively terminating the outward movement of said carriages when said second suction cups engage associated side walls of the tray, a normally closed valve carried by said carrier and connected to second power means, an abutment rigid with said support means and positioned to be engaged by said valve when said carrier is in said extended position to open said second power means and cause air to flow into said second power means, means for actuating said carrier for reciprocating said carrier along said path, a second power means carried by said carrier, a cam secured to said second power means and operatively connected to said carrier, control means carried by said carrier and mounted for movement relatively thereto along a predetermined path between an extended and a retracted position, a pair of carriages supported by said carrier and mounted for movement transversely of said predetermined path, gripping means secured to the outer end of each of said carriages, a first power means connected between said support means and said carrier for reciprocating said carrier along said path, a second power means carried by said carrier and operatively connected to said carriages, control means carried by said carrier and operatively connected to said second power means, an abutment rigid with said supporting means in position to be engaged by said control means to thereby actuate said control means for actuating said second power means when said carrier has been moved to the extended position, and means for supplying power to said second power means.

8. In an apparatus for de-stacking trays the combination of support means, a carrier supported by said support means and mounted for reciprocating movement relative thereto along a predetermined path between an extended and a retracted position, a pair of carriages supported by said carrier and mounted for movement transversely of said predetermined path between the extended and retracted positions, resilient means connected between each carriage and said carrier for normally urging said car-
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9 riages toward each other, a pair of suction cups with one of said suction cups being secured to the outer end of each of said carriage, first pneumatic power means connected between said support means and said carrier for reciprocating said carrier along said path, a second pneumatic power means carried by said carrier, a cam secured to said second power means and operatively connected to said carriages to move said carriages away from each other when actuated, a normally closed valve carried by said carrier and connected to said second power means, an abutment rigid with said supporting means and positioned to be engaged by said valve when said carrier is in said extended position to open said valve and cause air flow into said second power means, means for supplying air under pressure to said power means, and control means for terminating the supply of air to said power means and for venting said power means whereby said second power means is moved to its inactive position and said resilient means returns said carriages to their retracted positions prior to said first power means returning said carrier to its retracted position.

10. Apparatus for de-nesting trays from a stack of trays with each tray having a floor and end walls projecting therefrom, a magazine for supporting a stack of nested trays and having an open end through which the trays are individually withdrawn, tray supporting fingers secured to opposite portions of said magazine and projecting within said open end in positions to engage opposite edges of the end walls of the foremost tray, the improvement which comprises a suction head, support means for moving said suction head between a tray receiving position aligned with the magazine and tray discharging position spaced from the magazine, a first air cylinder connected between said suction head and said magazine support means for moving said suction head along a path toward and away from said magazine between an extended tray gripping position and a retracted tray withdrawing position, a pair of suction cups carried by said head and movable transversely of said path, a second air cylinder carried by said suction head and operatively connected to said suction cups to control the transverse outward movement thereof, means for directing air into said first air cylinder when said head is in the tray receiving position, a valve on said suction head at the tray receiving position to activate said second air cylinder to move said suction cups into engagement with the end walls of the tray, resilient means carried by said suction head for urging said suction cups toward each other, control means for directing air into said cylinders during a portion of the time said suction head is in the tray receiving position and for thereafter discontinuing the supply to said cylinders, means for supplying suction to said suction cups while said suction head is in the tray receiving position and while said tray is being carried toward the tray discharging position.

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