This invention relates to packing machines for successively placing individual articles in precise predetermined positions within a container. It has long been a problem where large numbers of articles are to be individually placed in a container in a predetermined position therein, to quickly and economically pack such articles by modern assembly line methods.

Such is the case in the packing of olives where two methods are used. One is the random or thrown method in which the olives are merely dropped at random into the container to fall where they may, and the other is called placement packing where each individual olive is placed in its particular, exact position within the container. Placement packing has in the past been entirely a hand operation and is slow and tedious work. The packers use long wooden tweezers and due to the extremely narrow neck of the customary containers in which the olives are packed, great skill is necessary to attain the high degree of accuracy and packing speed necessary.

It is therefore an object of my invention to provide a packing machine adapted to individually place an article in an exact predetermined position within a container and in the form illustrated is particularly adapted for successively packing olives in their containers by the placement method of packing.

It is a further object of my invention to provide an olive packing machine adapted for an assembly line arrangement and which is designed to initially pick-up an olive from supply at a predetermined position and carry the same into a container and thereafter place said olive in an exact predetermined position within said container and release said olive in that position.

It is still a further object of my invention to provide an olive packing machine using negative air pressure for carrying an olive or the like into a container in which it is to be packed and using positive air pressure for positively releasing and firmly placing said olive in precisely the desired position within said container.

A further object of the invention is to provide automatic means for picking up an olive or other article or object one at a time from a source of supply, preferably by a suction pick-up means, and positioning the container into which the individual articles are to be placed and packed as such adjacent this pick-up means, and also preferably providing a source of pressurized air under valve control, which valve also controls the suction producing means so that this suction pick-up means can be moved vertically up and down or in and out with respect to the container and to provide means whereby there is a relative lateral movement between the suction pick-up means and the container so that the olives or other articles or objects may then have their exterior portions placed against interior portions of the container. In some instances, it is desirable when packing olives or similar such delicacies, to apply force to the suction means when it is inside of the container to slightly flatten the bottom of the olive or the like so that it will remain properly positioned in order that the other olives that are individually placed therein in a row or layer may be expeditiously so placed and positioned and each of these other olives, especially on the bottom row or layer are also flattened on their bottoms by pressure exerted on the suction means. In following this procedure of filling the olives in layers or superposed rows within the container that has a restricted opening, it will be seen that the jars or other containers may be filled with olives or the like most expeditiously and automatically and unfailingly. Thus, the laborious former methods of placing olives or the like in jars or the like are greatly improved.

It is another object to provide an olive packing machine having cam actuated reciprocating as well as oscillating mechanisms operating in conjunction with controlled supplies of air under positive and negative pressure to initially pick-up an individual olive from a supply in a predetermined position and carry said olive into precisely the desired position within a container which is firmly held and thereafter place said olive within said container at precisely the desired location in a manner to cause the olive to remain in said placed position for other olives to be successively placed in said container.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a side elevational view of a machine embodying my invention;

Fig. 2 is a front elevational view of the machine illustrated in Fig. 1 with the outer portion of the olive supply chute cut away;

Fig. 3 is a fragmentary vertical sectional view taken substantially along the line 3—3 of Fig. 2, and showing in detail the construction of the upper portion of my machine;
Fig. 4 is a horizontal sectional view taken substantially along the line 4—4 of Fig. 3;
Fig. 5 is a fragmentary vertical sectional view taken substantially along the line 5—5 of Fig. 1 and showing in detail the construction of the main cams of my machine;
Fig. 6 is a fragmentary horizontal sectional view taken substantially along the line 6—6 of Fig. 3, showing in detail the construction of the air pressure selector valve;
Fig. 7 is a fragmentary transverse vertical sectional view taken substantially along line 7—7 of Fig. 2 and showing the cam actuated control valve;
Fig. 8 is a fragmentary top plan view of the container holder;
Fig. 9 is a vertical sectional view taken substantially along the line 9—9 of Fig. 8;
Fig. 10 is a diagrammatic sketch showing the general arrangement of the air pressure lines and valves;
Fig. 11 is a fragmentary transverse vertical sectional view taken substantially along the line 11—11 of Fig. 1 and showing in detail the construction of the olive supply chute;
Fig. 12 is a fragmentary horizontal sectional view taken substantially along the line 12—12 of Fig. 3, and showing the olive pick-up and retaining suction cup;
Fig. 13 is a longitudinal sectional view of the cam actuated control valve in open position;
Fig. 14 is a longitudinal vertical sectional view of the control valve shown in Fig. 13 in closed pressure releasing position;
Fig. 15 is a diagrammatic view illustrating the generated curves of the two main cams with seven pairs of views, i.e., a, b, c, d, e, f, and g showing in side elevation and top plan the respective positions of the upper portion of my packing machine relative to the container at various stages of the cycle of operation and also showing certain relative positions of the synchronized control valve cam and;
Fig. 16 is a fragmentary horizontal sectional view taken substantially along the line 16—16 of Fig. 1 showing in detail the olive pick-up nozzle formed at the lower end of the supply chute.
As best shown in Figs. 1 and 2, I provide a supporting structure for my machine having legs 20 with a substantially rectangular upper supporting frame 21 respectively connecting the upper extremities of said legs and a lower supporting frame 22 respectively connecting intermediate portions of said legs 20. Suitable upright guides such as a pair of spaced parallel rods 23 are mounted on a suitable supporting bar 24 which connects opposed intermediate portions of the upper supporting frame 21. A pair of diagonal braces 25 are connected respectively with the upper extremities of said rods 23 and extend downwardly therefrom and are connected respectively to the rear corners of the supporting upper frame 21.
A reciprocating carriage or head, designated by the letter A, has a pair of sleeves 26 slidably mounted on the respective guide rods 25. An upper cross bar 27a and a lower cross bar 27b disposed in spaced parallel relation below said bar 27a and extending outwardly therebetween connect said sleeves 26, as best shown in Figs. 1 and 3. This head A is connected with an outside cam follower rod 28 which extends downwardly therefrom and has a roller 29 at the bottom thereof for engagement with an actuating cam which will subsequently be described.
As best shown in Figs. 1, 2 and 3, a hollow condut B is provided and has an upright portion 30 and is bent outwardly at the bottom of said upright portion 30 to form a crank arm 31 and is thereafter bent downwardly to form a dependent member 32 at the outer extremity of said crank arm 31. An oval shaped olive receiving suction cup 33 is fixed at the bottom of said dependent member 32. The suction cup 33 has a central aperture 33a formed therein which communicates with the passage through said hollow conduit B. A sleeve 34 is fixed to an intermediate portion of said upright element 30 of the conduit B. A bearing-carrying boss 35 is fixed in the outer portion of cross bar 27b as best shown in Fig. 3 and has a bearing 36 mounted in a central aperture therethrough. The sleeve 34 is journaled in the bearing 36 for oscillation therein and a collar 34a is fixed at the bottom of said sleeve 34 to prevent upward displacement of said conduit B. A bevel gear 37 is fixed as by the set screw 38 to the upper portion of sleeve 34 for oscillating said conduit B and arm 31. A pair of spacer plates 39 are interposed between the upper portion 27a and the lower portion 27b and have a chucking drive shaft 40 journaled in suitable bearings mounted thereon. A bevel gear 41, adapted to mesh with bevel gear 37, is fixed to the outer portion of shaft 40 as by a set screw 42. A collar 43 is set screwed to the shaft 40 on the opposite side of the front spacer plate 39 to prevent longitudinal displacement of shaft 40.
A chain driven sprocket wheel 44 is fixed to the rear portion of shaft 40 as by being set screwed thereto and a chain 45 is trained thereon. One end of the chain 45 is fixed to a reciprocating connector bar 46 as by the screw eye 47 as best shown in Fig. 3. The other end of the chain 45 is counterbalanced as by the steel tape 48 mounted on a suitable spring roller in the casing 49. Both the casing 49 and the connector bar 46 are disposed in spaced relation below said sprocket wheel 44 and said chain 45 extends downwardly on either side of said sprocket wheel 44 through apertures 27c in cross bar 27b. The connector bar 46 is set screwed to a reciprocating rod 50 which is slidably mounted at the rear extremity of said lower cross bar 27b. The reciprocating rod 50 extends downwardly from connector bar 46 and has the lower portion thereof slidably mounted on the inside of one side member of the lower supporting frame 22. An inside cam follower 51 is connected to the rod 50 as by the rigid connector arm 52 which extends rearwardly of said rod 50 and has a depending guide rod 53 fixed at the rear end thereof, the cam follower 51 being fixed at the forward end thereof as best shown in Fig. 1. The follower 51 engages an inside cam 54 and the follower 29 engages an outside cam 55 which in the form of the invention shown is fixed to said inside cam 54 as by the cam screws 56 as best shown in Fig. 5. These cams are designed to produce the respective generated paths illustrated in Fig. 15 and are connected together to produce the synchronized cycles illustrated in the fragmentary sketches showing the head A in its various relative positions as well as the respective positions of the oscillating arm 31 and suction cup 33, shown in views 15a through g.
Cams 54 and 55 are fixed to a rotary drive
shaft 57 which is journaled in suitable bearings 56 connected to the lower supporting frame 22. As best shown in Fig. 5, the connection between the shaft 57 and the cams 55 and 54 is made by a sleeve 59 being set screwed to said shaft 57 by two pairs of setscrews 60 disposed at right angles to each other and a plurality of cap screws 61 connect said cam 55 with one end portion of sleeve 55. The drive shaft 57 extends outwardly beyond one side of the lower supporting frame 22 and has a rotary driving pulley wheel 63 fixed thereon for driving the same. A pair of reduction pulleys 63 and 64 are mounted on a shaft 65 which is journaled for rotation in suitable bearings 66 mounted on the upper supporting frame 21. As best shown in Fig. 3, a driving belt 67 is trained on said driving pulley 62 and reduction pulley 63.

I provide a suitable source of rotary power such as the electric motor 68 mounted on the lower supporting frame 22 and having a suitable pulley wheel driven thereby. A belt 69 is trained on said motor pulley wheel and the large reduction pulley wheel 64 for driving the same.

I provide a source of negative air pressure such as the vacuum pump 70 mounted on the upper frame 21 and having the vacuum gauge 71 mounted thereon as best shown in Fig. 1. This pump 70 is connected with the top extremity of the upstanding portion 30 of hollow conduit B through a pilot operated selector valve 72 which is mounted on said reciprocating head A, by a suitable flexible conduit such as the rubber tubing 73 connecting the vacuum pump 70 with valve 72 and tubing 74 connecting valve 72 with the top of hollow conduit B. A source of positive pressure, such as the compressed airline 75, is provided. This air under positive pressure passes through a reduction valve and pressure gauge 76 and 77 respectively and therefrom through flexible tubing 78 to said selector valve 72.

The construction of the selector valve is shown in Figs. 3 and 6 and it has a casing 72c with a valve chamber 72b formed therein. A piston rod 72d is slidably mounted in said chamber 72b and has a retraction spring 72d' interposed between one end of said chamber and one end of said piston for normally urging the other end of said piston against the other end of said chamber. Four ports are formed in said casing 72a communicating with said chamber 72b, one of these ports is connected with the vacuum line 73 and the opposing port normally in communication with said first mentioned port as shown in Fig. 6, is connected with conduit supply tubing 74. The positive pressure line 76 is connected with another port of said selector valve 72 and said piston 72c normally seals off communication between said positive pressure line 76 and conduit supply line 74. Any suitable means for actuating said selector valve piston 72c can be used, but I have found that a controlled source of compressed air operates very efficiently. By providing a cam actuated control valve 75, as best shown in Figs. 7, 13 and 14, I can synchronize the operation of the valve 72c with the reciprocating and oscillating cycles and supply air under positive pressure to conduit supply line 74. The control valve 75 is mounted adjacent the drive shaft 57 at the rear end of the said portion thereof and a valve actuating roller 75a is resiliently urged into engagement with the said shaft 57 which has a cam 80 fixed thereon to intermittently actuate said valve 75. The de-

The container holder 84 is mounted in spaced relation from the propelling mechanism 86 of said section 82 and is supported on a vertically adjustable supporting angle 85. The depending portion of angle 85 is hinged in a bracket 82 and is slidable received between a pair of cooperating supports 86 which have a plurality of vertically aligned similarly spaced apertures disposed in respective horizontal alignment to permit a pin 87 to be inserted therethrough. The relative elevation of the container holder 84 and container held therein may be varied by removal of the pin 87 and adjustment of the depending portion of angle 85 and thereon reinserting the pin 87 in the new position.

The container holder 84 has a container re-
ceiling cylindrical upper portion with a plurality of resilient container engaging fingers 84a for resiliently gripping the sides of a container inserted therein. A holder bottom plate 84b is pivotally mounted on the outstanding portion of supporting angle 85 as by the pivot pin 84c. A container holding upper plate 84d is interposed between said bottom plate and said outstanding portion of said angle and is also pivoted on pin 84c. The periphery of the bottom plate 84b has a plurality of spaced stop notches 84e formed therein and a spring stop 84f is adapted to be resiliently received by a selected notch 84e. The resilient stop is fixed in upstanding relation at the periphery of the positioning plate 84d. A control handle 84g is fixed in outstanding relation to said positioning plate 84d and a pair of spaced handle stop pins 84h is mounted in upstanding relation on said supporting angle 85. A container anti-slip pad, such as the rubber pad 84i is mounted on the top surface of the bottom plate 84b to prevent the container from rotating relative to the holder 85 and also serving to prevent breakage when the containers in the form of glass jars, are received therein.

Operation

Olive containers, such as the jars illustrated in the accompanying drawings and best shown by the dotted lines in Fig. 3, have a narrow diminished neck portion through which it is necessary to insert each olive substantially centrally therethrough. This produces a problem because after the central insertion of the olive into the container, said olive must be placed with a portion thereof shunted against the side wall of said container. This necessitates swinging the olive outwardly after it has been inserted into the container.

At the beginning of the packing strokes of the reciprocating and oscillating cycles, the head arm 31 and arm 31 are in rest position, as shown in Figs. 1 and 2, with the suction cup 33 disposed directly over the end olive in chute 82. The drive shaft 37 is rotated in a clockwise direction as indicated by the directional arrows shown in Fig. 1 and the cam 55 lowers said suction cup 33 directly into engagement with the olive at the lower end of chute 82, cam 54 holding the arm against oscillation. It is absolutely essential that some pick-up and retaining means be provided to prevent said suction cup 33 from being dropped before the head arm 31 is in rest position. I have found that producing suction in the conduit B is the simplest and most efficient means for accomplishing this.

A negative pressure is therefore produced in conduit B to initially pick-up an olive and thereafter retain the same in suction cup 33. The suction cup 33 has an oval shape and a concave olive receiving socket is formed in the lower portion thereof. The longitudinal axis of the olive is aligned with the longitudinal axis of the oval suction cup and the olive is received therein in sealed relation thereto. If the position of the olive in the nest 50 of the chute is slightly out of alignment with said suction cup, the shape of said cup 33 will straighten the olive out and align the same with said cup; whereas, if a cup of another shape than that conforming with the substantially oval shape of the olive were used, the olive would not be straightened out as it is picked up and could not therefore be accurately placed.

When the olive is picked up, the head arm 31 is raised a slight distance to clear the end stop 82b of the chute 82. It is entirely conceivable that the chute 82 could be designed so that this initial rise would not be necessary. The initial olive engaging position is shown in views 15a, and views 15b show in dotted lines the olive in raised position before swinging over the central portion of the container. The small arrows within the conduit B indicate the direction of the air pressure therein. When the olive has been raised to clear the chute stop 82b, the head reciprocating cam 55 holds the head at that elevation and the oscillating inside cam 54 swings the olive through an angle of approximately 190 degrees to position the same directly over the central portion of the diminished neck of the container as shown in views 15b.

The olive is thereafter lowered centrally through the diminished neck portion of the container and down into the central portion of the jar as best shown in views 15c. This downward stroke stops a slight distance above the bottom of the container to permit the final swing of the olive out against the side wall of said container. The dotted lines in the plan view numbered 15d and 15e show the olive in the same position as in views 15c and it is thereafter swung outwardly toward the side wall of the container through an arc of approximately 10 degrees into the position shown by full lines of the plan view 15d and 15e. Simultaneously with this outward swinging movement, there is a downward movement of the head to simultaneously place the olive against the bottom and side of the container or against or superposed over a layer or row of olives already in the container depending, of course, on whether the bottom layer or successive superposed layers or rows of olives are being packed or placed in the container. This 10 degree swinging movement is a backward or negative swinging of the arm 31 so that the placed position of the olive within the container is substantially 190 degrees from the initial position of said olive at the lower end of said chute 82.

There is negative pressure in the conduit throughout these entire packing strokes of the reciprocating and oscillating cycles. However, at this point, the vertical cam 60 displaces control valve piston 12a to project selector valve piston 12c and cut off the suction and simultaneously introduce positive pressure into said conduit B, thus positively ejecting the olive from the suction cup 33 and thoughtful reciprocating and oscillating mechanisms to firmly place the olive in an exact predeter mned position within said container. Due to the compression of the olive, the placement thereof slightly flattens the same on the bottom which causes the olive to remain in said placed position for other olives to be successively placed therearound. Simultaneously with the discharge of the positive pressure and the final placement of the olive, there is a short rise of the head A to permit the suction cup 33 to clear the placed olive when oscillated back to its normal position.

After the suction cup 33 has cleared the placed olive, there is a change from positive back to negative pressure. This is done merely for convenience and simplicity of design and of course, is not necessary to the operation of the machine and merely atmospheric pressure could be used during the return strokes of the reciprocating and oscillating cycles. After the suction cup 33 has been raised to clear the olive, the oscillating inside cam 54 swings said cup back to the center of container and thereafter the reciprocating cam raises said cup 33 to an elevation slightly above the olive at
the lower end of the chute and disposed in 190 degrees oscillated position relative thereto as shown by the dotted lines in views 195. The oscillating cam 29c can thereafter swing said cup back through 190 degrees or place the same directly over the olive at the lower end of the chute.

When the cams 54 and 55 are rotated, the respective rods 30 and 28 are vertically reciprocated to vertically displace the head A through a predetermined cycle of operation and to displace the connecting bar 46 through a synchronized predetermined cycle of operation. The reciprocator of the connecting bar 46 carries the attached end of the chain 45 upwardly and downwardly therewith. It will be apparent from the construction of my machine that while the two cam followers 29 and 51 are moving at the same rate of vertical displacement, the relative position between the head A and the connector bar 46 will remain exactly constant and thereby prevent rotation of the sprocket wheel 44. The spring tape 48 will maintain a substantially constant tension in chain 45 as said head A is being lowered and raised. The relation between the vertical rise and fall of the respective cam followers 29 and 51 is well shown by the slopes of the two generated curves of the two cams 54 and 55 illustrated in Fig. 15. When the rate of the vertical displacement of the two cam followers 29 and 51 differs, the sprocket wheel 44 will be oscillated and this oscillatory movement is carried to the crank arm 31 through the shaft 40, bevel gears 41 and 31, and the upstanding portion 48 of conduit B. The reciprocating and oscillating cycles are synchronized by the connection between the cams 54 and 55 and their mounting on a single drive shaft 57, and the operation of the air valves which control the air supply to the conduit B, is also synchronized with said reciprocating and oscillating cycles by the mounting of cam 30 on said shaft 57 for the predetermined timing of the air supply. The adjustment of the timing of the machine operations is made by merely adjusting the angular relation of said three cams 54, 55, and 58.

The degrees of angular rotation for each stage of the operation of the cams 54 and 55 are laid off on Fig. 15 and the ordinates of the curves of the two main cams 54 and 55 are proportional to the actual radii of the designed cams as illustrated in Figs. 1 and 2. After the first olive has been placed in the container, the container is rotated through a predetermined angle depending on the size of the olives as well as the size of the container. If these sizes are such that four olives are to be packed in each tier, then the container is rotated through an angle of 90° before the next olive is placed therein. The operation of the placing of the subsequent olives is identical to that previously described. When four olives have been placed in the first tier, then the container is lowered by removing pin 87 and inserting the same in the next lower aperture, the spacing between the apertures being exactly equal to the difference in elevation of adjacent tiers. In addition to lowering the container, it is also rotated through an angle of ½ of the angle between adjacent olives in the same tier. This is done by swinging the handle 84g from one stop pin 84b to the other, in the case of four olives to a tier, through an angle of 45°. The notches 84e and spring stop 84f will hold the jar during this 45° rotation, the notches in the form shown being spaced at 90° for use in a "4 pack" operation and will indicate each 90° rotation of the container during the packing of each tier. From this description it will be seen that the olives in adjacent tiers will be staggered and thus fit more compactly into the container to completely fill the same. The mechanism for the angular shifting of the container for the successive packing of olives therein can easily be constructed so that the above steps are performed automatically.

There are many different varieties of olives which are packed in containers. Some of these olives are stuffed with pimento and other stuffing material by initially putting out the stone and the central portion at one end of the olive and filling the recess thus formed with some seasoning and decorative material. As a general rule these stuffed olives are packed only by the placement method of packing because it is desired that the stuffed ends of all of the olives be disposed adjacent the side walls of the glass container in which they are customarily packed. It will be seen that by the placement positioning method as previously described with the staggered adjacent tiers of olives, that the stuffed ends of the olives in alternate tiers can be vertically aligned to present a decorative and pleasing packing design within a transparent container. This stuffing operation is a hand operation and it will be a simple matter for the operators who are performing this stuffing operation to place the olives so that they will be carried to the chute of a series of such machines as are herein illustrated, with the stuffed ends all facing one direction, said olives being picked up in that position by the suction cup and placed with their stuffed ends against the side wall of the container. Therefore, the oval shape of my suction cup is essential to the successful placement of the olives in an exact predetermined position within the container.

It will be seen that I have provided a highly efficient packing machine for individually selecting an article such as an olive and placing the same in an exact predetermined position within a container. The final positioning movement of each olive outwardly and downwardly to place the same in precisely the desired position with a predetermined portion thereof pressed against the side wall of the container after central insertion through the diminished neck thereof is a very important step in the successful operation of my packing machine.

A problem arises in the placing of the first tier of olives in that each olive is being placed on a hard, smooth surface on which an article such as an olive is very subject to roll out of position. There have been packing machines designed for the placing of articles within recessed compartments which prevents the articles from rolling out of position and also eliminates the necessity of placing the articles in an exact position therein. Here, there are two problems, one is the placing of the olive in precisely the desired position within the container and the other is after the placement thereof to prevent the olive from rolling out of position. Due to the slight compressibility of an olive, it is possible to firmly place the same against the bottom and side of the container to flatten the contacted portion thereof to permit the olive to resist subsequent displacement during the packing of other olives therearound. Also, due to the extremely light weight of an olive, a third problem arises which is to positively release the olive from the suction cup when said olive is in the desired position. Merely cutting off the suction force is not enough
to break the seal between the olive and the suction cup and therefore, additional releasing means must be provided. Since I use negative air pressure to retain the olive, it is logical that I should use positive air pressure carried through the same supply conduit to positively eject the olive and cooperate with the oscillating and reciprocating mechanisms to place said olive at the precisely desired position within the container.

It will be seen that this positive blast of air will serve the two functions of breaking the seal between the olive and suction cup to release said olive and also of adding in placing the olive and to permit the suction cup to be raised therefrom without danger of displacing the olive from its placed position in said container.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

What I claim is:

1. A machine for individually and successively placing a plurality of substantially similar articles in a layer in an open-topped container, comprising, suction means for picking up and retaining one of the articles on the end thereof, a container supporting means adjacent the pick-up means, means for effecting relative movement between the pick-up means and supporting means so as to position the suction retained article substantially centrally above the opening in the container, means for effecting relative vertical movement between the container and the pick-up means with one of the articles carried and held thereby so as to dispose the retained article substantially centrally within the container, means to obtain relative lateral movement between the pick-up means and the container while the former is disposed therein so as to position the retained article within the container with a portion of the article in engagement with an interior side wall portion of the container, and pressurized air means supplied through said pick-up means for releasing the retained article so positioned.

2. A machine as defined in and by claim 1, wherein the articles to be inserted and packed in the container are olives, and the containers are glass jars provided with a restricted opening.

3. A machine as defined in and by claim 1, wherein the articles are olives, the open top of the container is restricted, a single valve control means operatively connected with the suction pick-up means and the pressurized air means, means for operating the valve so that either the suction pick-up means is operating to pick up and retain an olive or the pressurized air means is being operated for releasing the retained article when the latter is properly positioned within the container.

4. A machine as defined in and by claim 1, wherein the suction pick-up means includes an arm in the form of a crank and having a suction cup at its free end, the suction cup being adapted to engage, pick-up and retain the article on the arm, and the lateral movement is attained by oscillating the crank arm when a part of the same with the article thereon is disposed within the container, and means for imparting the lateral movement to the said crank arm.

5. A machine as defined in and by claim 4, wherein a control valve is operatively connected with the crank arm and with a source of suction, the valve having operatively connected thereto a source of pressurized air, and the said valve serving to either produce a suction through the crank arm and the suction cup at the end thereof or when moved to allow pressurized air to pass to the suction cup to release the retained article held thereon in the container.

6. A machine for individually positioning substantially similarly shaped articles in an open-topped container and in a plurality of superposed rows of such articles in the container, comprising suction operated means including an elongated arm portion with a suction cup at one end thereof adapted to pick up and retain one article at a time thereon, a container supporting means adjacent the pick-up means, means for moving the arm with the article carried by the suction cup thereon to a position substantially centrally over but outside of the opening of the container, means for effecting relative vertical movement between the container and the pick-up means with one of the articles carried and held thereby so as to dispose the retained article substantially on the bottom of the container, means to obtain relative lateral movement between the pick-up means and the container whereby the retained article is positioned on the bottom of the container and with a side portion thereof contacting an interior side wall portion of the container, air supply means conducted through said suction means for releasing the article so positioned, and repeating the positioning and inserting of the successive articles into the container until a full or closely packed layer on the bottom thereof is attained by picking up each individual article by the pick-up means and the positioning thereof above the opening of the container and the relative movement between the container and the pick-up means, and means to effect a further relative vertical movement between the pick-up means and the container whereby additional superposed successive rows of the articles can be packed in the container until the latter is filled.

7. A machine as defined in and by claim 6, wherein the articles to be inserted and packed in the container are olives, and the containers are glass jars provided with a restricted opening.

8. A machine for placing and packing olives in a glass jar or the like having a restricted opening therein, comprising, a hollow rigid suction arm with a suction cup on one end thereof, the arm being carried by a vertically reciprocable support and having its other end connected with a suction creating source through the intermediary of a valve, means carried by the support for imparting a partial rotation to the arm, a source of pressurized air operatively connected with the said valve, synchronized cam operating means for effecting rotation of the arm and for controlling the supply of pressurized air to the valve, the container for the olives being disposed adjacent but removed from the suction cup on the end of the arm, means for rotating the cam operating means whereby the suction cup is engaged with an olive from a suitable source of supply of olives and while the cup is under the influence of suction as controlled by the valve, the arm will be moved by the said means to position the suction held olive substantially centrally above the opening in the container, then the said reciprocable means when operated will effect a lowering of the arm with the olive retained on the suction cup within the container and the arm is further moved laterally to position the side portion of the olive against an inside portion of the interior of the container and a bottom portion of the olive against the bottom of the container and to flatten same which results in
proper positioning of the olive in the container, and said cam means then effects a release of the suction and a simultaneous application of pressurized air to the suction cup so that the olive is released while so positioned within the container, and the arm is then withdrawn from the container.

9. A packing machine for independently placing articles, such as olives and the like, in precisely predetermined relation within an open-topped container, said machine comprising a supporting structure, and article receiving and retaining element mounted on said structure for generally horizontal shifting movement through a predetermined path with provision for vertical shifting movement thereof on said supporting structure, a container-receiving structure mounted on said supporting structure and adapted to receive an open-topped container therein, mechanism for shifting said article receiving element through its predetermined horizontal path, mechanism for vertically shifting said element, means for synchronizing the shifting movements of said element to insert the same through the open top of a container positioned in said container receiving structure, said shifting mechanisms including mechanism for finally positioning said element within said container to precisely place and retain said predetermined relation in said container, and means for shifting said container receiving structure after an article has been placed therein to precisely position said container to receive the next article in a predetermined relation to said first article and permit filling of said container with a plurality of precisely packed articles.

10. A packing machine for independently placing articles, such as olives and the like, in precisely predetermined relation within an open-topped container, said machine comprising a supporting structure, a suction article pick-up and retaining element mounted on said structure for generally horizontal shifting movement through a predetermined path with provision for vertical shifting movement thereof on said supporting structure in close association with said article pick-up and retaining element and adapted to receive an open-topped container therein, mechanism for shifting said article receiving and retaining element through its predetermined path, mechanism for vertically shifting said element to centrally introduce the same into a container positioned in said container-receiving structure, and means imparting lateral shifting movement to said article receiving and retaining element after the same has been centrally introduced into the container to position the retained article within the container with a portion thereof in engagement with the interior side wall portion of the container.

11. A packing machine for independently placing articles, such as olives and the like, in precisely predetermined relation within an open-topped container, said machine comprising a supporting structure, an article receiving and retaining element mounted on said structure for generally horizontal shifting movement through a predetermined path with provision for vertical shifting movement thereof on said supporting structure, a container-receiving structure mounted on said supporting structure and adapted to receive an open-topped container therein, mechanism for shifting said article receiving element through its predetermined horizontal path, mechanism for vertically shifting said element, means for synchronizing the shifting movements of said element to insert the same through the open top of a container positioned in said container receiving structure, said shifting mechanisms including mechanism for finally positioning said element within said container to precisely place an article in predetermined relation in said container, and means for shifting said container-receiving structure including mechanism for rotating the same on its longitudinal axis through a predetermined arc after each article has been placed therein to precisely position said container to receive the next succeeding article and for intermittently lowering the elevation of said container-receiving structure after each layer has been packed to permit a plurality of layers to be successively packed, one on top of the other, in a container held in said container receiving structure.

12. A machine for individually and successively placing a plurality of substantially similar articles in a layer in an open-topped container comprising, suction-operated pickup means including an arm with a suction cup on one end thereof wherein said cup picks up and retains an article therein, container supporting means adjacent the pickup means, means for effecting relative vertical movement between the container and the pickup means with one of the articles carried and held thereby so as to dispose the retained article substantially centrally within the container, means to obtain relative lateral movement between the pickup means and the container while the former is disposed therein so as to position the retained article within the container with a portion of the article in engagement with an interior side wall portion of the container held in said supporting means, pressurized air article-releasing means operating through the suction pickup means for releasing an article retained therein, and common valve means having provision for connection with a suction creating source and a pressurized air supply source for controlling the operation of the suction pickup and the pressurized air release of the article.

13. A machine for individually and successively placing a plurality of substantially similar articles in a layer in an open-topped container, said machine comprising a suction pick-up and retaining element for picking up and retaining one of the articles thereon, means for holding a container in article-receiving position and for restraining the container against lateral displacement thereof, means for effecting relative vertical movement between the container holder and the pick-up means with one of the articles carried and held by the pickup means so as to dispose the retained article substantially centrally within a container held by said holding means, means to obtain relative lateral movement between the pickup means and the container holder while the former is disposed within the container so as to position the retained article therewithin a portion of the article firmly pressed into engagement with an interior side wall portion of the container, and means for releasing the retained article so positioned.

14. A machine for individually and successively placing a plurality of substantially similar articles in a layer in an open-topped container, said machine comprising an article-feeding mechanism precisely positioning an article in a predetermined orientation and in a predetermined article pick-
up location, a suction pickup and retaining element for picking up one of the articles from said pickup location and retaining the same thereon, container-supporting means to receive and position a container therein, means for effecting relative vertical movement between the container and the pickup means with one of the articles carried and held thereby so as to dispose the retained articles substantially centrally within the container, means to obtain relative lateral movement between the pickup means and the container while the former is disposed within the container so as to position the retained article therewithin with a portion of the article in engagement with the interior side wall of the container in a precisely predetermined discharge position, and means for releasing the retained article in said discharge position.

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