ABSTRACT: Food-coring apparatus for use in the coring of foods, such as cauliflower, includes a movable flight conveyor having food-holding pockets therein and an air piston operated retractable head having an air-powered coring bit and a cover which is rapidly moved into coring position by the air piston. An actuating eccentric is mounted on the conveyor drive for actuating air to the piston and bit to move the retractable head toward the food to engage the food with the cover and coring bit. The depth to which the food is cored is controlled independently of the position of the conveyor flights by a switch responsive to the movement of the retractable head to retract the bit and cover and secure the air to the coring bit.
FOOD-CORING APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to coring apparatus and, more particularly, to an apparatus for rapidly and automatically coring food, such as cauliflower.

In the past, various assemblies have been provided for the coring of foods in the course of preparing the foods for marketing. Such prior coring apparatus has been primarily employed in the coring of foods which are either relatively easy to core because of their soft nature, such as tomatoes, or foods which are bored only to a short depth, such as onions. These coring devices generally include a bit-and-bit rotating assembly which is mechanically lowered into coring engagement with the food and in which the depth of the core is controlled mechanically through leverage lever and gear trains which are coupled to the food conveyor and which retract the bit and its drive assembly when the conveyor has moved to a predetermined position. Such mechanical linkage is slow and generally unsuitable for use with foods which must be deeply bored and where the food is tough and fibrous. Moreover, such prior devices are usually retracted from the food being bored in response to the progress of the food along the conveyor when the food reaches a certain point on the conveyor and thus retraction of the bit occurs without regard to whether the bit has completed its coring operation or not.

Since the prior devices have been generally found to be unsatisfactory where large, tough foods are to be bored to substantial depths, such as where cauliflower is to be bored, manual methods have usually been resorted to. Such large tough foods, and in particular cauliflower, present certain problems which are not encountered in the coring of tomatoes, onions or the like. For example, during the course of preparation for frozen packaging and the like, the heads of cauliflower are cut through the butt of the stalk such that the leaves fall away, leaving a substantial portion of the stalk remaining to which the numerous individual blossoms are still attached. The remaining portion of the stalk is both of substantial length and is quite fibrous and tough. In order to separate the individual flowers from the head so that they may be finally and individually prepared, the flowers are usually removed from the remaining stalk by cutting the stalk out manually, with a curved knife, or by drilling the stalk out by hand feeding the head against a horizontally mounted rotating auger. Either method is dangerous to personnel, is time consuming and produces results which lack uniformity and cause waste.

The food-coring apparatus of our invention overcomes the many difficulties encountered in the prior coring apparatus and is particularly well suited for the safe, efficient and effective machine coring of large and tough foods. In the coring apparatus of our invention, the rotating coring bit is capable of rapid movement into and out of coring relationship with the food. Moreover, in the coring apparatus of our invention the withdrawal of the coring bit from the bored food occurs independently of the position of the food on the conveyor, and in response to the depth to which the bit has actually bored into the food, thus obviating the possibility of the premature withdrawal of the coring bit before coring is completed which is particularly advantageous where large tough foods are to be bored. Moreover, in the apparatus of our invention the coring arrangement may engage the food prior to its arrival immediately beneath the coring assembly to effect a longer coring time and assist in urging the bit into the food as the food passes directly beneath the coring assembly, and the assembly may remain in coring position after the food has passed directly beneath the assembly to insulate a sufficient length of time to complete the coring operation, if necessary, and to enable an increase in the speed of the conveyor which carries the food. Also in the coring apparatus of our invention, the coring structure is retractable to a position which provides a maximum head space between the coring assembly and the conveyor and the depth to which the food is bored may be easily and readily adjusted as desired. The coring apparatus of our invention is capable of producing high bit torque and rapid coring which is highly desirable in the instance of tough foods and foods which are to be bored to a substantial depth. The coring apparatus of our invention includes a cover assembly which both firmly holds the food which is being bored in position and prevents the throwing of the food by the coring bit during coring. In a preferred embodiment of our invention the conveyor of the food-coring apparatus includes a plurality of pockets in which the food to be bored is positioned, the pockets not only effecting firm positioning of the food during coring in cooperation with a retractable cover, but also effecting rapid ejection of the food after coring. Finally, the coring assembly of our invention is capable of automatic and uniform coring of foods and substantially reduces the probability of personnel injury during coring.

SUMMARY OF THE INVENTION

In one principal aspect, the food-coring apparatus of our invention includes a movable conveyor having a food-carrying surface for conveying the food through the apparatus and a fluid-operated power means positioned above the conveyor for moving a retractable head adjacent the food-carrying position and a coring position adjacent the food-carrying surface. The head includes a retractable coring bit and a cover for engaging the food during coring and control means is provided which operates in response to the movement of the head for determining the depth to which the food is bored independently of the position of the conveyor.

In another principal aspect, the coring apparatus of our invention includes a movable conveyor for conveying and positioning the material to be bored beneath a coring assembly which includes an air piston positioned above the conveyor, a reciprocating head movable from a position adjacent the piston toward the conveyor and carrying a rotatable coring bit, an air drive for driving the bit and a cover which encloses the bit and positions the material during coring. First control means, which is responsive to the movement of the conveyor, affects introduction of air to the piston to initiate rapid movement of the head toward the conveyor and to the air drive for rotating the bit and second control means, which operates independently of the movement of the conveyor, initiates movement of the head away from the conveyor to effect control of the depth to which the food is bored and terminates the air to the bit drive.

These and other objects, features and advantages of the present invention will be more clearly understood when the following detailed description is considered.

BRIEF DESCRIPTION OF THE DRAWINGS

In this description, reference will frequently be made to the attached drawings in which:

FIG. 1 is a perspective view of a preferred embodiment of food-coring apparatus constructed in accordance with the principles of our invention;

FIG. 2 is a side elevation view of the coring assembly of our invention taken along line 2—2 of FIG. 1;

FIG. 3 is a partially cross-sectioned end elevation view of the coring assembly taken along line 3—3 of FIG. 2;

FIG. 4 is a plan view of a preferred embodiment of conveyor pocket flight constructed in accordance with the principles of our invention;

FIG. 5 is a cross-sectioned side elevation view of a pocket of the coring flight taken along line 5—5 of FIG. 4 and showing a cauliflower head which has been bored but prior to its ejection from the conveyor;

FIG. 6 is a cross-sectioned side elevation view of the pocket shown in FIG. 5, but in which the cored cauliflower is shown being ejected from the pocket of the conveyor;

FIG. 7 is a side elevation view of the coring assembly of our invention showing the position of the retractable head of the assembly just prior to actuation and just after actuation;
FIG. 8 is a side elevation view of the retractable head of the coring assembly showing the coring bit in the process of coring the food which has moved to directly beneath the coring assembly;

FIG. 9 is a side elevation view of the retractable head of our coring assembly showing the position of the head at the completion of coring and after retraction from the cored food; and

FIG. 10 is a schematic diagram of the air and electrical coring apparatus operating and control circuits of our invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of food-coring apparatus as constructed in accordance with the principles of our invention is shown in FIG. 1 and includes, in general, a conveyor 1 and a pair of coring assemblies 2 and 3. The conveyor 1 is constructed of a plurality of pocketed flight plates 10 spaced from each other by plain spacer plates 12 and plates 10 and 12 are positioned in side-by-side relationship on a pair of parallel endless drive chains 14 so as to move horizontally and form an endless plate assembly. The pocketed flight plates 10 each include a pair of food-carrying pockets 16 and 18 for carrying the food to be cored to the cored assemblies 2 and 3.

As shown in FIG. 1, cauliflower heads are positioned in the pockets butt side up. Preferably each of the pockets 16 and 18 is of a different diameter so that varied sizes of heads of cauliflower may be accommodated for coring, the larger heads being positioned in the larger pockets 16 and smaller heads in the smaller pockets 18. The spacing plates 12 effectively space the pocket plates and the heads which are to be cored at sufficient intervals so that, just prior to positioning of a subsequent pocket plate and its heads in coring position, the coring of the preceding heads will have been completed. It will be evident that the width of the spacer plates will vary with the coring speed and conveyor speed and may be easily determined by one skilled in the art.

The conveyor 1 is mounted for horizontal movement at a preferably table height on a suitable structural frame 20 formed of angle iron or the like and the endless chains 14 pass around an idler shaft 22 at one end of the frame and a drive shaft 24 at the other end of the frame. The drive shaft 24 is driven by a suitable drive sprocket 26 and chain 27 which is a tubular endless power source, such as an electric motor 28. Aprons 30 preferably extend in longitudinal overlapping relationship over the edges of the upper conveyor flights 10 and 12 to prevent the passage of extraneous loose food particles from the sides of the conveyor.

A superstructure frame 32 extends upwardly from the frame 20 and trunnions 34 are mounted on opposite spaced horizontal portions 36 of the frame 32. A cylindrical elongated pivot shaft 38 extends between the trunnions 34 and is mounted for rocking motion in bearings carried by the trunnions. A crank arm 40 is connected at one end to an extended end 42 of the shaft 38 and is eccentrically and pivotally attached at the other end by a pivot pin 44 to the drive sprocket 26 of the conveyor. The pivot pin 44 is mounted in the shaft 38 such that the shaft 38 is rocked back and forth by the crank arm 40 as the drive sprocket rotates.

Referring in particular to FIGS. 1–3, the coring assemblies 2 and 3 are shown. A platform 46 is rigidly mounted on the shaft 38, such as by welding, the platform being formed of a suitable heavy plate material and may take the form of a heavy rigid channel member as shown in the drawing. Since both of the coring assemblies 2 and 3 shown in FIG. 1 are of substantially identical construction, only coring assembly 2 will be described in detail. Mounted on top of the platform 46 is a heavy plate 48 upon which is carried a fluid-powered cylinder 50 having fluid-operated reciprocating piston therein, the fluid preferably being air. A piston rod 52 extends through the plate 48 and the platform 46 and is firmly connected at its other end to a movable lower plate 54, as by nuts 56. A pair of studs 58 also extend through apertures at the ends of each of the plates from plate 48 through and beyond plate 54 and a spring 60 is carried on the lower end of each of the studs between the plate 54 and a shoulder formed on the distal end of the studs by nuts 62 to normally urge plate 54 upwardly toward plate 48.

A relatively rigid U-shaped housing 64 is rigidly attached to and suspended from the lower face of plate 54, as by welding, to form a retractable head with plate 54, and a fluid-driven coring bit 66 is mounted within the U-shaped housing, the fluid preferably being air. The drive shaft 68 of the motor extends through the bottom plate 70 of the housing 64 and a retractable coring bit 72 is removably attached to the drive shaft.

A cup-shaped cover 74, having a somewhat belled downwardly facing opening 76, depends from the housing and is attached to the sides of the housing by a pair of upwardly extending rods 78 which extend through tubular guide bosses 80 rigidly mounted on opposite sides of the housing, as by welding. Each of the rods 78 carries a compression spring 82 which bears against an enlarged shoulder 84 on the arms and the tubular boss to normally urge the cover 74 in a downward direction. The drive shaft 68 extends through the closed end of the cover 74 and the coring bit is enclosed within the cover when the cover is in its extreme lowered position as shown in FIG. 2.

The cover of each of the retractable coring assemblies is preferably of a different diameter such that the larger cover cooperates with the larger pocket 16 and the smaller cover with the smaller pocket 18 of the conveyor. The diameters of each of the respective covers are slightly smaller than the diameter of their corresponding pocket, so that when the cover is urged against the cauliflower head which is to be cored, the spring force exerted by springs 82 firmly clamps the cauliflower head between the belled periphery of the cover opening 76 and the peripheral shoulder of the pocket, as shown in FIGS. 7–9. The cover 74 not only holds and positions the food for the coring operation, but also prevents fragments of the food from flying during coring and prevents injury to personnel which might be caused by contact with the rotating high-speed coring bit.

Each of the coring assemblies also includes a separate microswitch 86 which is suspended adjacent the housing 64 by a suitable stationary bracket 87 from the edge of platform 46. An actuating stop plate 88 is adjustable mounted on the housing, as by a bolt-and-screw arrangement, and cooperates with a levered actuating roller and switch arm 89 of the microswitch so that, as the stop plate 88 moves downwardly to the extent of the depth to which the microswitch is to be cored, the plate trips the microswitch 86 to retract the bit and cover as will be explained in more detail later. Thus, the position at which the plate 88 is adjusted acts to control the depth to which the cauliflower is cored. Since a separate microswitch is provided for each coring assembly, assemblies 2 and 3 will function independently of each other with respect to coring depth adjustment and point of bit withdrawal.

Referring to FIG. 3, another microswitch 90 is mounted on the frame 20 and includes a levered actuating roller and switch arm 91 which is positioned in the path of movement of a dwell cam 92 which is stationarily mounted on the inside of the drive sprocket 26. Upon each revolution of the drive sprocket, the cam 92 contacts the actuating roller 91 to operate the switch 90 to initiate movement of the coring assemblies 2 and 3 toward the coring position and commence rotation of the coring both 72. The function of the microswitch 90 will be explained in more detail later.

Once the cauliflower has been cored, the individual flowers are principally located within the pocket as shown in FIG. 5, since the flowers have been confined by the cover 74, and the flowers are ready for dumping from the conveyor for further processing such grading, cleaning and the like. Referring to FIGS. 4–6, each of the pockets 16 and 18 includes a rectangular horizontal tab 94 positioned in the bottom closed end 95 of the pocket.
each of the pockets. A cam 96, which is attached to the under.
side of tab, extends downwardly through a slit 97 in the bot-
tom of the pocket and the cam is hingedly mounted at 98 to the
outside wall of the pocket. As shown in FIG. 6, as the flight
10 with the drive motor approaches the end of the
conveyor, the pocket flight tilts about the drive shaft 24 tend-
ing to dump the cored cauliflower particles from the pockets.
The ejection of the cauliflower particles is enhanced by the
tab 94 which is actuated upwardly in the pocket due to con-
tact of the edge of the cam 96 with the drive shaft 24 to break
up and push any compacted cauliflower particles which may be
glided in pockets 16.

Referring to FIG. 10, like reference numerals will be em-
ployed to designate like components in each of the systems of
the coring assemblies 2 and 3, with the components of as-
sembly 3 being primed. The air circuit 100 comprises a suita-
ble pressure working air inlet 102 and separator 104 for
separating dirt and water from the pneumatic operating air.

Air passes from the separator 104 to open conduits 106 of each of the coring assemblies 2 and 3. Conduit 106 is connected by branch conduits 108 and 108' to the top and bottom of the air cylinders 50 and 50' through solenoid operated four-way valves 110 and 110' such that air may
be admitted to either the top or bottom of the pistons 112 and
112' depending on the position of the valves. The air
source is also connected by branch conduits 114 and 114' to the
air cylinder 60 and 60' through solenoid operated valves 116 and 116' through solenoid operated valves 116 and 116'.

An electrical control circuit, generally designated as 2e and
3e, is provided for each of the coring assemblies 2 and 3
respectively to enable independent core depth adjustment as
previously mentioned. The circuits include a pair of relays 118 and 118' which operate switches 120 and 120' which control
the core to solenoids 122, 122 and 122', 122', respectively, from a suitable source of power 126. A relay-operating circuit,
general 128, is also provided which includes the microswitches 86 and 86', which are actuated by the move-
ment of the respective coring assemblies, and the cam-actu-
atated microswitch 90, which is actuated by the rotation of the
power drive sprocket 26 and dwell cam 92. Each of the solen-
oid-operating circuits 2e and 3e may include on-off power
switches 130 and 130' to open or close the individual circuits as
desired.

The operation of the coring assembly will now be described
particularly with reference to FIGS. 7 to 9 in which the se-
quence of operation of the coring assembly is shown, and
with reference to FIG. 10 in which the air and electrical cir-
cuits are shown.

At the commencement of operation, the on-off switches
130 and 130' are closed and the air circuit is pressurized with
working air to valves 110, 110', 116 and 116'. The conveyor
drive motor 28 is energized and the individual flights 10 and
12 commence movement from left to right as viewed in FIG. 1.
At this point the dwell cam 92 on the drive sprocket 26 is
out of contact with microswitch 90 causing the switch to be
opened to deenergize relays 118 and 118'. When the relays
are deenergized, their switches 120 and 120' are opened and the
valve solenoids 122, 122', 122' and 124' are deenergized.
When the valve solenoids are deenergized, the four-way valves
110 and 110' of solenoids 122 and 122' are positioned so as to
port air, as indicated by the solid arrows in FIG. 10, to the bot-
tom of the pistons 112 and 112' and exhaust air from the top
of the pistons, to move the pistons in an upward direction.
Such piston movement lifts plate 54, its housing 64 and its
associated coring bit 72 and cover 74 upwarly into a retracted
position as viewed in the solid line depiction in FIG. 7. Depo-
tuation of solenoids 124 and 124' closes valves 116 and 116',
cutting off air to the drive motors 66 and 66'.

The operator next manually positions selected heads of cau-
iflower to be cored in pockets 16 and 18 of the flights 10 as
each flight commences movement from the left-hand end of the
conveyor as viewed in FIG. 1, the heads of cauliflower being
positioned stalk end up. As the conveyor flights con-
tinue to move to the right, the drive sprocket 26 continues to
rotate, eccentrically driving crank arm 40 to rock the entire
coring assembly platform 46, via shaft 42, back and forth to
each side of the vertical, as shown in FIGS. 7 and 9. The
rocking arm is preferably such that the coring assembly rocks
to approximately a maximum of 10° forward and 10° aft of the
vertical.

Since the coring assemblies 2 and 3 are retracted at this
point, the microswitches 86 and 86' are closed and are posi-
tioned in readiness to energize the relays 118 and 118' as soon
as dwell cam 92 on the drive sprocket reaches the roller 91 of
microswitch 90. The dwell cam 92 is shaped and positioned so
as to actuate the switch 90 as each pocket flight 10 reaches a
position slightly forward of a direct extension of the coring as-
sembly when the assembly is swung forward to its maximum
position as shown in FIG. 7 and continues to actuate the
switch until slightly after the assembly has moved to its max-
imum rear swing as shown in FIG. 9.

As each empty pocket flight 10 moves beneath the coring
assemblies, the control system is rapidly energized and then
deenergized through their cycles due to the actuation of
microswitch 90 and then rapid deactuation of microswitch 86
and 86'. When the pocket flight which carries the heads of
cauliflower which are to be cored approaches the coring as-
semblies 2 and 3 such that it is positioned in line with the bit
72 and cover 74 which has been swung forward as previously
described by the crank arm 40 to the position shown in FIG. 7.
The dwell cam 92 on the drive sprocket closes switch 90
completing the circuit through the already closed microswitches 86 and 86' and through the relays 118 and
118'. When the circuit is completed through the relays 90 so as to
actuate the relays, the relays close switches 120 and 120'
completing the circuit through the solenoids 122, 122 and
122', 124'. When solenoids 122 and 122' have been actuated, they operate the four-way valves 110 and 110' to
valves and port pressurized air, in the direction depicted by
the dotted arrows in FIG. 10, to the top of the pistons 112 and
112' and exhaust air from the bottom of the pistons driving the
pistons downwardly. The downward movement of piston 112
movethedwelling and its associated cover 74 and bit 72
toward the cauliflower which is to be cored, as shown in the
dotted line depiction in FIG. 7. Solenoids 124 and 124' are
also simultaneously activated to open valves 116 and 116',
porting pressurized air to the bit drive motors 66 and 66'
commencing high-speed rotation of the coring bit 72.

As the cover 74 and bit 72 move toward the stalk of the cau-
flower, the belled cover opening 76 firmly engages the cau-
iflower head and clamps the head between the peripheral
shoulders of the pocket 16 and the cover, a downward force
being exerted on the cover by springs 82. It will thus be seen
that movement of the cover 74 will substantially cease when
the cover is in firm contact with the cauliflower head, but the
cover will, at all times, be urged toward the cauliflower head
by the springs. Since the coring bit 72 is directly attached to
the housing 64 and is movable with respect to the cover 74,
the bit, which is rotating at a high speed, will be forced from
the cover and into the stalk of the cauliflower head as the
housing continues to move toward the head.

The flight 10 continues to move to a point directly beneath
the vertical and then beyond, as shown in FIGS. 8 and 9
respectively, the bit being forced further and further into the
cauliflower head both by the power cylinder as the housing
continues to move further from its retracted position and by
the movement of the flight to directly beneath the coring as-
sembly as shown in FIG. 8. Since the cover 74 is spring loaded,
the cover will move toward or away from the housing and/or
the flight 10 as necessary, to exert a constant holding force on
the head and to compensate for the arcuate movement of the
housing and/or the falling apart of the cauliflower head as the
stalk is being removed. The cover 74 acts to hold the food
continuously and firmly during coring as well as prevents frag-
ments of the food from flying about.
When coring bit 72 of assembly 2 has moved downwardly toward the pocket to the extent necessary to core the head positioned therein to its desired depth, the stop plate 88, which has been adjustably set on the housing 64 to define the coring depth, has moved downwardly to a point where it will move the arm 89 of the microswitch 96, opening the switch 96. When switch 96 is opened, relay 118 will be deenergized opening relay switch 120 and deenergizing solenoids 122 and 124. The microswitch 86 of assembly 3 is similarly, but independently, operated to deenergize relay 118'. Just prior to deenergization of the solenoids, the bit 72 and cover 74 are positioned approximately as shown in the solid line depiction in FIG. 9.

When the solenoids are deenergized, the valves 116 and 116' are closed to secure the air to the air motors 66 and 66' stopping rotation of the bits, and simultaneously, the four-way valves 110 and 110' are reversed, porting air as shown by the solid line arrows to the bottom of the pistons 112 and 112' and exhausting air from the top of the pistons to cause the pistons to move upwardly and retract the cover 74 and bit 72 to its retracted position, as shown in the dotted line depiction in FIG. 9. When the coring heads have been retracted, the microswitches 86 and 86' will again close, but in the meantime the dwell cam 93 on the drive sprocket 26 has rotated to such position that the switch 90 is opened preventing reenergization of the relay coils. The electrical circuit is thus readied to repeat the aforementioned sequence when the crank arm 40 has again rocked the coring assembly forward to the next pocket flight.

The pocket flight 10 containing the decored cauliflower heads continues to move to the right as viewed in FIG. 1 and when the flight reaches the end of the conveyor, it tilts downwardly as the flight passes over the end to be returned to the beginning of the conveyor. As the flight tilts, the decored cauliflower flowers are dropped from the pockets of the flight to another suitable conveyor or the like for further processing as necessary. Complete cleaning of the pockets upon dumping is insured by the tab 94 which is urged upwardly by engagement of its cam 96' with the drive shaft 24 as the pocket is being dumped as previously described.

It will be appreciated that the depth to which the cauliflower is cored is independently controlled irrespective of the particular progress of the flight. Thus, if the coring depth is reached early in the cauliflower's course of travel, the coring bit 72 will be and is automatically retracted. On the other hand, if an extremely tough and large cauliflower head is encountered, the coring bit is maintained in contact with the head as long as necessary to complete the coring of the head and is only retracted when the coring bit has been extended to the length as determined by the adjustable stop plate 88. Moreover, the extension of the coring bit and cover 74 into contact with the head is rapid and the speed of the bit and its torque is high due to the provision of the quick-acting high-pressure air cylinder 50 and air motor 66, thus reducing the possibility of binding of the bit and insuring rapid coring of large foods to substantial depths in the minimum time possible. Such rapid coring substantially decreases the possibility of under penetration and incomplete coring in toughier foods.

It will be appreciated that although our invention has been described in terms of the coring of cauliflower, the coring apparatus may be employed in the coring of other food, and is particularly suitable where the food to be cored is large and tough and must be cored to a substantial depth. Moreover, it will be understood that the embodiment of the invention which has been described is merely illustrative of an application of the principles of the invention. Numerous modifications may be made by those skilled in the art without departing from the true spirit and scope of the invention.

It is claimed:

1. In a food-coring apparatus, movable conveyor means having a food-carrying surface thereon for conveying and positioning the food to be cored,

fluid power means stationarily positioned a substantial distance above said conveyor,
a retractable head mounted on said power means, said retractable head including a rotatable bit for coring the food and cover means for engaging and at least partially covering the food during the coring of the food, said retractable head being moved by said power means between a first retracted position and a second coring position adjacent the food carrying surface,

mounting means pivotally mounting said fluid power means and retractable head for pivotal movement about a pivot axis perpendicular to the direction of movement of said conveyor means, and control means for determining the depth to which said food is cored independently of the progress of said movable conveyor means.

2. The apparatus of claim 1 wherein said control means is responsive to the movement of said retractable head toward said second coring position to control the depth to which the food is cored.

3. The apparatus of claim 1 wherein said control means is mounted for selective positioning for effecting selected variation of the distance between said first and second positions and the depth to which said food is cored.

4. The apparatus of claim 1 wherein said means for pivotally moving said fluid power means and retractable head comprises conveyor power means, eccentric means mounted on said conveyor power means, and crank means driven by said eccentric and driving said fluid power means to pivotally move said retractable head to an angular position to each side of vertical in the direction of travel of said conveyor means.

5. The apparatus of claim 1 including eccentric control means responsive to the movement of said conveyor means to initiate movement of said retractable head from said first retracted position toward said second coring position.

6. The apparatus of claim 1 wherein said fluid power means is an air cylinder.

7. The apparatus of claim 1 wherein said retractable head includes fluid-powered means for rotating said bit.

8. The apparatus of claim 1 wherein said cover means encloses and is movable relative to said bit and includes spring means normally urging said cover means toward said conveyor means.

9. The apparatus of claim 1 wherein said conveyor means includes a plurality of spaced pockets defined in the food-carrying surface thereof which are adapted to receive the food to be cored therein, each of said pockets being movable into a position beneath said retractable head, said cover means clamping the food to be cored between the periphery of said pockets and an edge of said cover means when said retractable head is moved to said second coring position.

10. The apparatus of claim 9 wherein the cross sectional dimension of said cover means is greater than the cross sectional dimension of said pockets.

11. In a food-coring apparatus, movable conveyor means having a food-carrying surface thereon for conveying and positioning the food to be cored,

fluid power means stationarily positioned a substantial distance above said conveyor,
a retractable head mounted on said power means, said retractable head including a rotatable bit for coring the food and cover means for engaging and at least partially covering the food during the coring of the food, said retractable head being moved by said power means between a first retracted position and a second coring position adjacent the food-carrying surface,

a plurality of spaced pockets defined in said food carrying surface which are adapted to receive the food to be cored therein, each of said pockets being movable into a position beneath said retractable head, said cover means clamping the food to be cored between the periphery of said pockets and an edge of said cover means when said retractable head is moved to said second coring position.
movable means in said pockets positioned in a first position during coring and movable to a second ejecting position after coring for ejecting the cored food from said pockets, and control means for determining the depth to which said food is cored independently of the progress of said movable conveyor means.

12. The apparatus of claim 11 wherein said movable means is moved to said second ejecting position by a cam.

13. The apparatus of claim 1 including a plurality of said fluid power means, said retractable heads, and said control means, each of said control means determining the depth of core of its associated retractable head independently of the other said heads.

14. In a coring apparatus having a movable conveyor for conveying and positioning the material to be cored beneath a coring assembly, said coring assembly comprising, an air piston position a predetermined distance above the conveyor, a reciprocating head movable from a position adjacent the piston toward the conveyor, said head including a rotatable coring bit, air drive means for rotating said bit at a substantial speed, and cover means normally enclosing said bit and positioning the material during coring, first control means responsive to the movement of the conveyor for introducing air to the piston to initiate rapid movement of said head toward the conveyor and for introducing air to the drive means to initiate rotation of said bit, and second control means operating independently of the movement of the conveyor for reversing the air to the piston to terminate movement of the head toward the conveyor, and initiate movement of the head away from the conveyor to define the depth to which the food is cored and to terminate air to said bit drive means.

15. The apparatus of claim 14 wherein the second control means is responsive to the extent of movement of said reciprocating head toward the conveyor.

16. In a food-coring apparatus, movable conveyor means having a food-carrying surface thereon for conveying and positioning the food to be cored, fluid power means stationarily positioned a substantial distance above said conveyor, a retractable head mounted on said power means, said retractable head including a rotatable bit for coring the food and cover means for engaging and at least partially covering the food during the coring of the food, said retractable head being moved by said power means between a first retracted position and a second coring position adjacent the food carrying surface, and control means for determining the depth to which said food is cored independently of the progress of said movable conveyor means, said control means actuating said power means to retract said retractable head to said first retracted position in response to movement of the retractable means over a predetermined distance from said first toward said second positions, and terminating rotation of said bit when said head is moved to said first retracted position.