

CLASS 111, PLANTING

SECTION I - CLASS DEFINITION

Processes and instruments for inserting in the ground seed, fertilizer, poison, plants, or other material or objects handled in a similar manner. Instruments for planting therefore include means for conveying, dropping, or directing material or objects to or upon the ground, combined with means for preparing the ground, as by furrowing, dribbling, or otherwise loosening or forming cavities therein for the reception of said material or objects, or with means for ridging, hilling, or other wise placing earth over said material or objects, or with both said means.

- (1) Note. This class includes, in addition to means for planting or burying certain specifically named materials or objects (1) broadcast-planting, comprising means for depositing and spreading material in general uniformly over the surface, together with means operating on the surface (as plows, rollers, harrows) to prepare the surface to receive such uniformly spread material or to cover it or mix it with earth; (2) drilling and dribbling, comprising means having earth-working tools or elements, (as furrow-opener, furrow-closer, hill-marker, cavity-former, etc.), together with means for depositing the material and in most instances means for separating the material from bulk.
- (2) Note. The terms “pipe or strand” and “liquid or gas” are used in the titles of subclasses herein as typical of a class of materials rather than as limitations. The term “planter element” as used herein includes devices peculiar or necessary to a complete planting operation, the usual elements being an earth-worker, a seed-depositor, and a covering device.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

Mechanisms per se for dispensing or retailing material from bulk are classified in appropriate dispensing or material or article handling classes, as for example, Class 221, Article Dispensing, or Class 222, Dispensing; but mechanisms comprising a valved chute to accumulate charges or otherwise peculiarly adapted to insure

depositing at intervals, when specialized for use in a planter, are deemed to be planting devices and are classified in this class.

SUBCLASSES

- 7.1** This subclass is indented under subclass 118. Devices where the earth working means are hand operated.
- 7.2** This subclass is indented under subclass 7.1. Devices having material supply means integral with the implement or directly supported by and carried with the implement.
- 7.3** This subclass is indented under subclass 7.2. Devices having a fluid control valve operated solely by contact of the implement with the ground.
- 7.4** This subclass is indented under subclass 7.2. Devices wherein the fluid is ejected by means of a force pump or other discharge assistant.
- 8** This subclass is indented under the class definition. Processes of planting comprising both drilling and broadcasting operations or implements which by an interchange or shift of parts may be used at will to plant in drill or to broadcast or implements which by a combination of parts drill material and broadcast other material simultaneously.

SEE OR SEARCH THIS CLASS, SUBCLASS:
14, and 130, and see the notes thereto.
- 9** This subclass is indented under subclass 8. Instruments embodying a main supporting-frame-section and an auxiliary frame-section, the latter usually composed of or carrying the earth-working tools and other elements and movable relative to the main frame-section.

- 11** This subclass is indented under subclass 130. Broadcasting implements having a device, such as a spreader, deflecting-board, blower, centrifugal blade, or the like, adapted to distribute the material over a more extended area than the normal discharge of the apparatus would otherwise effect.
- 12** This subclass is indented under subclass 11. Implements embodying also a main supporting-frame section and an auxiliary frame section, the latter usually composed of or carrying the earth-working elements and movably relatively to the main frame-section.
- 13** This subclass is indented under subclass 130. Implements embodying a main supporting-frame and an auxiliary frame, the latter carrying or unitary with the earth-working elements.
- 14** This subclass is indented under the class definition. Processes or instruments for placing material in the ground, accompanied by the forming of a furrow to receive the material or the closing of a furrow containing such material or by the forming of a ridge over the deposited material.
- SEE OR SEARCH CLASS:
- 173, Tool Driving or Impacting, appropriate subclass for a means to drive or impact a tool or the like, and particularly subclasses 184+ for such means mounted on a supporting vehicle.
- 175, Boring or Penetrating the Earth, appropriate subclass for subject matter including steps or means to bore or penetrate the earth.
- 405, Hydraulic and Earth Engineering, subclasses 174+ for a process or apparatus for laying pipe or cable into a submerged or subterranean location, and including a device for laying a cable which is nominally recited as a seed tape.
- 15** This subclass is indented under subclass 14. Drilling machines embodying means for accumulating charges of material for deposit at spaced points or means to insure the depositing of material at spaced points or to align the points of material deposit in a plurality or substantially parallel lines.
- 16** This subclass is indented under subclass 15. Devices embodying instrumentalities for effecting a change in the relationship of machine parts for the purpose of starting or maintaining the transverse alinement of points of material deposit in successively-drilled lines.
- 17** This subclass is indented under subclass 16. Devices comprising an alinement-maintaining means responding to movements of the planter over uneven portions of traversed ground.
- 18** This subclass is indented under subclass 15. The general organization of hill-planting machines, comprising the construction and arrangement of the supporting and operating frames and the relations of the hill-planting elements thereto and to each other.
- 19** This subclass is indented under subclass 18. Devices comprising and endless belt actuated by contact with the ground traversed for effecting the operation of the means for controlling or causing the delivery of the seed or other material from the hopper or other container.
- 20** This subclass is indented under subclass 18. The frame being in a plurality of sections adjoining in the supporting of the total load placed upon the machine.
- 21** This subclass is indented under subclass 20. Devices comprising forward and rearward sections connected by a transverse pivot and capable of a buckling action to lift certain parts of the planter from contact with the ground.

- (1) Note. In the usual type the forward frame carries the seed-dispensing elements and furrow-opener, which are lifted from the ground by a buckling or breaking of the joint between the frame sections through means generally located upon the rearward frame-section and comprising a lever mechanism.
- 22** This subclass is indented under subclass 18. Devices embodying a main supporting section and an auxiliary section having movement with relation to each other, the main frame being designed to support or carry the auxiliary frame.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
19,
- 23** This subclass is indented under subclass 22. The auxiliary section consisting of or carrying a rotary spot-marking device from which power is taken to actuate the means for causing or controlling the delivery of seed or other material from the hopper or other container.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
19,
- 24** This subclass is indented under subclass 22. The auxiliary section carrying the hopper and dispensing devices.
- 25** This subclass is indented under subclass 15. Dropping mechanism and mechanism for making a mark to locate the dropped material, the actuation of which mechanisms has a fixed time relationship.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
16, comprising devices for and aids in producing a change in the timing of operation of the depositing and marking mechanisms.
18+, for organizations comprising depositing and marking mechanisms in combination with special planter-frame construction.
- 26** This subclass is indented under subclass 25. Marking devices wherein accomplished by dropping upon the ground traversed a distinctively colored powder.
- SEE OR SEARCH CLASS:
239, Fluid Sprinkling, Spraying, and Diffusing, subclass 656 for a device comprising plural containers for nonfluid materials and a scattering or strewing means, one of which materials may be a colored indicating powder.
- 27** This subclass is indented under subclass 25. Depositing mechanism driven from the marking mechanism, the driving power being produced by the engagement of the marking device with the ground during the travel of the planter.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
19, and 23.
- 28** This subclass is indented under subclass 27. Wherein the marking device is a revolving member having a wheel-like form.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
21, and 23.
- 29** This subclass is indented under subclass 25. Marking device is driven directly or indirectly from the main axle of the planter.
- (1) Note. Excludes machines in which marking arms, lugs or the like are mounted directly upon or formed integral with the supporting wheels or axle.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
25, for machines in which marking arms, lugs or the like are mounted directly upon or formed integral with the supporting wheels or axle.

- 30** This subclass is indented under subclass 29. Wherein the marking device is a tool which is plunged into the ground at intervals by a movement other than that of rotation, as by reciprocating or vibrating to and from the ground.
- 31** This subclass is indented under subclass 30. Plunging marker is so timed and located as to act as a cover for the deposited material.
- 32** This subclass is indented under subclass 29. Marking device is a revolving member of wheel-like form.
- 33** This subclass is indented under subclass 15. Device comprising means for intermittently impressing upon the ground traversed guide marks or impressions to indicate the points where the material should be planted to make aligned hills or combinations of such means with means for marking an unbroken line across a field as distinguished from a succession of spots.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 126+ for an apparatus including a means for making a continuous mark in the earth. Patents in which a planter is defined by name only are classifiable in Class 172, subclasses 126+ if the mark made is continuous.
- 34** This subclass is indented under subclass 15. Dispensing or dropping devices particularly adapted for use in hill-planting and characterized by means insuring discharge at intervals, such as a line-wire actuating or controlling means or a valved chute for checking or accumulating charges of material.
- SEE OR SEARCH CLASS:
221, Article Dispensing, appropriate subclasses for article dispensing devices, per se, and particularly subclass 185 for ambulant article dispensing devices.
- 35** This subclass is indented under subclass 34. Depositing mechanism adapted to be actuated through its cycle by any one of a plurality of means.
- (1) Note. The alternate operations of the mechanism may result in a change in the operation of the machine from hill-planting to simple drilling.
- 36** This subclass is indented under subclass 34. Mechanism wherein there is a primary and a secondary operating train, the source of power for the primary train being always from the axle of the traction wheels.
- (1) Note. In this type of machine the operation of the primary train may be modified or supplemented by the secondary, as when the primary serves to deliver seed from the hopper to the discharge chute and the secondary actuates a valve to release the seed from the chute. The secondary train may be actuated from the axle or other source of power.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
25,
- 37** This subclass is indented under subclass 36. The mechanism in whole or in part subject to a periodic control.
- (1) Note. The word "control" as herein used includes the initiation of the actuation, as by effecting a connection or disconnection of a driving-train, rather than the actuation itself for the dispensing elements.
- 38** This subclass is indented under subclass 37. Devices wherein intermittent control is effected by a wire having knots or equivalent, which engage suitable devices on the machine.

- 39** This subclass is indented under subclass 38. Devices wherein the intermittent control extends to means for the actuation of both the main dispensing device and an accumulating device.
- 40** This subclass is indented under subclass 38. Devices wherein the check-wire controls the actuation of the main dispensing means and also actuates the accumulator.
- 41** This subclass is indented under subclass 36. Devices wherein the dispensing element is actuated from the axle, while the check-wire actuates only the accumulator.
- 42** This subclass is indented under subclass 34. Devices wherein an endless belt having trip members engages a tappet, fork, or equivalent upon a rock-shaft or the like connected with the depositing devices.
- 43** This subclass is indented under subclass 34. Devices wherein actuation is effected solely by a wire or cable, which is anchored at a point outside of the machine and engages some relatively movable element of the machine.
- 44** This subclass is indented under subclass 43. Devices wherein the wire is wound upon a reel on the machine and actuates the depositing mechanism by reason of the winding or unwinding due to the draft of the wire during the traverse of the machine.
- 45** This subclass is indented under subclass 43. Devices wherein the line-wire carries knots and actuates the depositing mechanism by tripping a forked device connected thereto.
- 46** This subclass is indented under subclass 43. Devices wherein the tripped fork actuates both the main dispensing element and the accumulator.
- 47** This subclass is indented under subclass 43. Devices comprising a forked element or the like combined with guiding devices for directing the knot into contact with the forked element; also modifications of structure and means to accomplish the attachment or detachment of the wire and the fork.
- 48.1** **Guide:**
Device for guiding the line-wire to and from, across, or through the planting machine.
- 49** This subclass is indented under subclass 43. Devices for staking the ends of a line-wire, characterized generally by the presence of means for shifting the attached end laterally or providing additional length or wire, etc., as the planter approaches that end of the line-wire.
- (1) Note. Compare Classes 104, Railways, subclass 124; 114, Ships, subclasses 204+; 119, Animal Husbandry, subclasses 120 and 121; and 135, Tent, Canopy, Umbrella, or Cane, subclass 118.
- 50** This subclass is indented under subclass 34. Devices wherein the depositing devices are operated at will by the hand or foot of the operative.
- 51** This subclass is indented under subclass 34. Devices having combinations of a main dispensing element and a valved chute.
- 52** This subclass is indented under subclass 14. Devices having general organization of the supporting and operating frame of a drilling-machine other than hill-planters and the relation of the planting elements thereto and to each other.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
18+.
- SEE OR SEARCH CLASS:
280, Land Vehicles, subclasses 6.154+ for a land vehicle of general utility

- including means, interposed between the vehicle body, chassis, or frame and running gear thereof, for appropriately predisposing a load, load carrier, or receptacle portion to accommodate sustained travel upon an expansive inclined surface; subclasses 43+ for a land vehicle of general utility having vertically adjustable wheels for altering a dimension of the vehicle or a part thereof; or subclasses 400+ for either (a) an articulated land vehicle of general utility or (b) a plurality of interconnected land vehicles (i.e., vehicle train).
- 53** This subclass is indented under subclass 52. Devices wherein the frame being in a plurality of sections joining in the support of the total load placed upon the machine.
- 54** This subclass is indented under subclass 53. Devices wherein sections of the frame hingedly connected to permit relative movement of the sections.
- 55** This subclass is indented under subclass 54. Devices comprising also a frame designed to be supported or carried by the hinged sections of the main frame.
- 56** This subclass is indented under subclass 54. Devices comprising forward and rearward sections connected by a transverse pivot and capable of a buckling action to lift certain parts of the planter from contact with the ground.
- (1) Note. In the usual type the forward frame carries the seed-dispensing elements and furrow-opener, which are lifted from the ground by a buckling or breaking of the joint between the frame sections through means generally located upon the rearward frame section and comprising a lever mechanism.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 325 for a break joint frame in which earth-working tools are carried on a tongue means vertically pivoted to a wheel frame.
- 57** This subclass is indented under subclass 53. Devices wherein the sections of the main frame having capacity of movement to each other resulting in an enlargement of frame to cover increased area of ground.
- 58** This subclass is indented under subclass 57. Devices wherein the sections of the extensible frame mounted to move upon vertical pivots and movable toward and from each other at one end only of the frame.
- 59** This subclass is indented under subclass 52. Devices embodying a main supporting section and a secondary section having movement with relation to each other, the main frame-section being designed to support or carry the secondary frame.
- 60** This subclass is indented under subclass 59. Devices wherein a plurality of secondary frames are associated with a main frame.
- (1) Note. Where the several auxiliaries are identical in structure and function, and therefore constitute a mere duplication of a single auxiliary of that type, they are classified as if only a single auxiliary were present.
- 61** This subclass is indented under subclass 60. Devices wherein movement of the auxiliaries is controlled by a single means, usually such as a lever mechanism, for elevating or depressing the earth-working elements from or toward the ground.
- 62** This subclass is indented under subclass 59. Devices in operative position the auxiliary being free to trail or move with relation to the main frame to accommodate itself to the unevenness or inequalities of the ground traversed.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
23,
- 63** This subclass is indented under subclass 62. Devices wherein the floating auxiliary frame carries the hopper and dispensing devices.
- 64** This subclass is indented under subclass 63. Devices wherein the hopper-carrying auxiliary having the general form of planter or distributor attachable and detachable with respect to an otherwise complete machine, as a wagon, cultivator, or the like.
- 65** This subclass is indented under subclass 64. The machine and its attached planter or distributor constituting a complete planting instrumentality of the single row or drill type.
- 66** This subclass is indented under subclass 62. Device wherein the floating or trailing auxiliary frame comprising one or more drags or push-bars by which the earth-working elements or tools are carried.
- 67** This subclass is indented under subclass 66. Devices provided with means for lifting the tool-bars from contact with the ground and at the same time disconnecting the driving devices of the depositing mechanism.
- 68** This subclass is indented under subclass 59. Devices wherein the auxiliary frame elevated and depressed by means of a cranked ground-wheel axle forming part of or mounted upon the main or supporting frame of the planter.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 395+ for earth-working apparatus having ground wheels mounted on crank axles which are vertically adjustable relative to the frame of the apparatus.
- 69** This subclass is indented under subclass 52. Devices having provision in the construction of the frame for the adjustment of planter elements individually thereon, vertically, as to elevate or depress them; laterally, as to vary the distance between drilled rows, or longitudinally, as to change the relative spacing of elements acting in a single row.
- 70** This subclass is indented under subclass 52. Devices wherein the frame is of general rigid structure or has no hinged or articulated parts.
- 71** This subclass is indented under subclass 70. Devices carrying planter elements for drilling one row during one traverse, as distinguished from those implements that drill a plurality of rows during one traverse.
- 72** This subclass is indented under subclass 71. Devices comprising a depositing mechanism operable by the muscular power of the operative.
- 73** This subclass is indented under subclass 71. Devices comprising means for depositing a plurality of different materials in the same drill or trench.
- 74** This subclass is indented under subclass 71. Devices wherein the material is dispensed from a hopper that has a movement of rotation always in the same direction when the planter is moving in one direction.
- 75** This subclass is indented under subclass 71. Devices wherein the material is dispensed from a hopper that has a back-and-forth movement, either oscillating or reciprocating.
- 76** This subclass is indented under subclass 71. Devices wherein the material is dropped upon a vibrating chute, from which it is discharged to the ground.
- 77** This subclass is indented under subclass 71. Devices wherein the material is dispensed from a hopper by means of an element revolving in such manner as to intermittently discharge or

- control the discharge from a nonrotatable and nonvibrating hopper.
- 78** This subclass is indented under subclass 77. Devices wherein the rotating dispenser is mounted directly upon the driving-axle.
- 79** This subclass is indented under subclass 14. Devices wherein organized planting implements are peculiarly adapted to single-row drilling not involving specified relation to frame arrangement.
- 80** This subclass is indented under subclass 79. Devices adapted to deposit a plurality of materials.
- 81** This subclass is indented under subclass 79. Devices wherein the invention alleged lies in the arrangement of material depositing and earth-working elements with relation to each other only.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
52+, for arrangements for planting elements associated with and effected by peculiarities of the supporting frame.
- 82** This subclass is indented under subclass 79. Implements constructed or adapted to be propelled by the muscular power of a man.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 351+ for hand propelled earth-working devices.
- 83** This subclass is indented under subclass 14. Planting elements comprising a plow for forming a wide trench and means for drilling material in a relatively narrow drill in the bottom thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
61,
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 721+ for lister plows.
- 84** This subclass is indented under subclass 14. Devices wherein bars are with planting elements thereon designed to be dragged over the earth.
- (1) Note. The drag-bar unit may be considered as a special type of auxiliary frame carrying a furrow-opening and other planter elements of the single-row planter.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
66+,
- 89** This subclass is indented under the class definition. Processes of and instruments for placing material in general in the ground, comprising the forming of a cavity other than a furrow therein to receive the material and the depositing of the material in said cavity.
- (1) Note. The cavity may be formed by removing earth or by displacing it, as by a piercing-tool.
- SEE OR SEARCH CLASS:
166, Wells, appropriate subclasses for wells for receiving fluids from the earth or inserting fluid into the pores of an earth formation.
- 90** This subclass is indented under subclass 89. Devices comprising a rotating material-dispensing receptacle, which usually also carries the tools for forming the cavity.
- 91** This subclass is indented under subclass 90. Devices comprising a rotating member carrying the cavity-forming tools.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
90,
- 92** This subclass is indented under subclass 89. Hand devices for forming a depression in the earth and depositing material therein.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
106+, and 118+.

- 99, for hand devices which merely form a depression.
- 93** This subclass is indented under subclass 92. Implements designed to be attached to some vehicle, traveling agricultural implement, or the like and operable at will by the operative.
- (1) Note. Typified by the “replanting” attachments for cultivators.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
50, and 82.
- 94** This subclass is indented under subclass 92. Devices comprising means, such as a plurality of chutes or material- guideways, for insuring a deposit of material in spaced relationship within the “hill”.
- 95** This subclass is indented under subclass 92. Devices comprising a material-depositing mechanism with means to control or regulate the discharge of material at will.
- 96** This subclass is indented under subclass 95. Devices including a sliding member designed to be plunged into the ground to form a cavity, the dropping of material being under the control of said member.
- 97** This subclass is indented under subclass 92. Devices including a plurality of pivoted staves adapted to cooperate in forming a cavity in the ground, the dropping of material being under the control of said staves.
- 98** This subclass is indented under subclass 92. Devices including a foot- plate, which is brought into contact with the ground in forming the cavity, the dropping of material being under the control of said foot-plate.
- 99** This subclass is indented under subclass 89. Hand implements for forming a cavity other than a furrow in the ground to receive material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
106+, and 92+, for manually operated implements for holding material, making a cavity in the ground and depositing the material therein.
- 118+, for tools for forming similar cavities in the earth and introducing liquid vapor, or gas into contact with or beneath the surface of the soil.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 21+ for an earth-perforating means which makes a plurality of holes in the ground by means which enter and leave the ground at the same angle and see subclasses 540+ for rolling implements with tines which may perforate the ground.
175, Boring or Penetrating the Earth, for devices for boring or perforating the earth to form a hole therein, particularly subclasses 327+ for an earth-boring bit or bit element.
294, Handling: Hand and Hoist-Line Implements, subclasses 50.5 through 50.9 for manually operated implements for digging a hole and gripping and removing material therefrom.
- 100 PLANT SETTING:**
This subclass is indented under the class definition. Process or apparatus for placing plants or primordial plant material such as cuttings, slips, tubers, clones, or the like into the soil or a soil confining receptacle at an attitude which permits and for the purpose of facilitating subsequent growth thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
199, for seed tape planters which may contain seedlings.
- SEE OR SEARCH CLASS:
47, Plant Husbandry, subclasses 73+ for transplanting containers, per se; and subclasses 85 and 86 for modular containers, per se.
- 101 Excavating transplanter:**
This subclass is indented under subclass 100. Apparatus in which a means such as a blade, scoop, shovel or the like is impressed into the soil to surround the bulk of a plant's root system and which can be manipulated so that a substantially undisturbed root ball is removed from the soil to facilitate moving of the plant to a new growing location.

- (1) Note. Apparatus of this subclass are disclosed as being used for plants to be transplanted or saved as opposed to apparatus found in the SEARCH CLASS notes below, which are “stump removers” that merely remove or destroy plants. Apparatus which places the excavated plant into a container will be found here.

SEE OR SEARCH CLASS:

- 37, Excavating, subclasses 302 and 303 for stump removers and see (1) Note above.
- 47, Plant Husbandry, subclass 76 for receptacles, per se, for the root balls of trees.
- 171, Unearthing Plants or Buried Objects, subclass 1 for methods of recovering buried objects; and subclass 50 for extractors, per se.

102 Through mulch:

This subclass is indented under subclass 100. Process or apparatus where the plant material is implaced through a natural or synthetic layer which breaks up the capillarity of a mineral soil layer therebeneath.

SEE OR SEARCH CLASS:

- 47, Plant Husbandry, subclass 9 for mulching, per se.

103 Laterally shifted to final position:

This subclass is indented under subclass 100. Process or apparatus which includes a provision or special structural feature which causes the plant material to be moved into its final growth position from a direction which is parallel to the soil surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 62, and 191+, for rolling packers which may express pressure laterally against planted material.

104 Plant dispensing (i.e., singulation from a bulk source):

This subclass is indented under subclass 100. Process or apparatus which includes a supply of living plant material and which further includes means to select a single element from

the supply for spaced or timed delivery to the soil.

SEE OR SEARCH CLASS:

- 221, Article Dispensing, appropriate subclasses for the subcombination of a dispenser.

105 Supply in organized array:

This subclass is indented under subclass 104. Process or apparatus wherein the bulk supply of plant material includes an organizer for the material such as a tape, chain, tray, string, band or the like.

SEE OR SEARCH CLASS:

- 414, Material or Article Handling, subclass 331.01 for a moveable rack having superposed charge supporting elements and external means for discharging the elements; and subclasses 403+ for a device for emptying portable receptacles.

106 Manually operated implement:

This subclass is indented under subclass 100. Apparatus manipulated and directly controlled by the exertion of muscle power by the operator to perform the needful planting operation.

- (1) Note. This subclass does not include hand propelled machines wherein the cycle of operations is performed without hand control other than the propulsion of the machine.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 82, for hand propelled, single row seed planting implements and see (1) Note above.
- 92, for similar devices for forming a depression and depositing material in the earth.
- 99, for hand devices which merely form a depression in the soil.
- 101, for manually-operated excavating transplanters.

107 With furrow opener:

This subclass is indented under subclass 106. Apparatus further including a device adapted to be drawn through the soil to open a long shall-

low narrow trench therein into which plants or plant materials are set.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 14, for drilling machines for seed planters.
- 109+, for machine powered, plant setting drilling machines.
- 120+, for drilling machines including liquid or gas soil treatment.

108 With irrigator:

This subclass is indented under subclass 106. Apparatus further including a reservoir for containing a plant watering liquid and a manually operated release means for dispensing a portion of such liquid into the general area of the set plant.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 7.1, for hand-manipulated devices which direct liquid, gas or vapor into contact with or beneath the top surface of the soil.
- 110, for plant setting drilling machines with irrigators.

109 Drilling machines (i.e., furrow opener):

This subclass is indented under subclass 100. Apparatus including a device adapted to be drawn through the soil to open a long, shallow, narrow trench therein and further including a depositing device which sets plants in the trench.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 14+, for drilling machines for seed planters.
- 120+, for drilling machines including liquid or gas soil treatment, but not used for plant setting.

110 With irrigator:

This subclass is indented under subclass 109. Apparatus further including a reservoir for containing a plant watering liquid and means for dispensing a portion of such liquid within the formed furrow or into the general area of the set plant.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 108, for manually-powered plant setting machines which include an irrigator.
- 120+, for drilling machines which treat the soil with a gas or liquid.

111 Runner opener:

This subclass is indented under subclass 109. Apparatus wherein the opening element is symmetrically arranged with respect to the line of draft, has an earth-breaking portion which extends downwardly and rearwardly from the top front portion of the element, and has side portions extending rearwardly and diverging outwardly from the earth-breaking portion and which become generally planar and parallel to each other towards the rear of the element so that the element has an overall shape which resembles the bow portion of a boat.

- (1) Note. This definition comprehends flat-bottomed structures or structures which have a bottom which is V-shaped in cross-section.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 125, for runner-type openers used in conjunction with a liquid or gas soil treatment.
- 152, for runner-type openers used with seed depositors.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 721+ runner-type openers, per se.

112 Rotating or orbiting opener:

This subclass is indented under subclass 109. Apparatus wherein the opening element turns, spins, or revolves about an axis.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 121+, for a rotary opener associated with liquid or gas soil treatment.
- 157+, for a rotary opener associated with seed depositors

SEE OR SEARCH CLASS:

172, Earth Working, subclass 518 for a rotating or orbiting earth-working tool, per se.

113 Power operated:

This subclass is indented under subclass 112. Apparatus wherein the opening element derives its rotary or orbiting motion from forces transmitted thereto by means other than or in addition to, the opener's frictional contact with the soil.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

122, for power-operated rotary furrowers associated with liquid or gas soil treatment.

158+, for power-operated rotary furrowers associated with seed depositors.

SEE OR SEARCH CLASS:

172, Earth Working, subclasses 35+ for power-operated earth working tools, per se.

114 Plant containing receptacle impressed into soil:

This subclass is indented under subclass 100. Process or apparatus wherein the plants are situated within a specialized container, and means are provided which act in coordination with the specialized container for exerting a force on such container to press the container into the soil and wherein at least a portion of the container remains in the soil with the root system of the plant.

SEE OR SEARCH CLASS:

47, Plant Husbandry, subclasses 73+ for receptacles, per se, used in transplanting; and subclass 84 for shipment packaging of plants.

115 Dibbler:

This subclass is indented under subclass 100. Apparatus including means to form a cavity, other than a furrow, in the soil by a nub, stem, nipple, dagger, probe, protrusion, or the like which is intermittently impressed and removed from the soil.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

89+, for a dibbler associated with a seed depositor and particularly subclass 99 for a hand implement type of dibbler.

116 Auger type:

This subclass is indented under subclass 115. Apparatus wherein the dibbler forms a hole in the soil by means of at least one element which is rotated as it is forced into the soil, the element including a cutting edge and an upwardly directed helical surface which feeds engaged soil upwardly with rotation of the element to remove soil from the hole.

117 Angled:

This subclass is indented under subclass 115. Apparatus wherein the dibbler is forced into the soil at an orientation which is other than generally perpendicular to the soil surface.

(1) Note. Apparatus of this subclass may include a ram or motor causing the dibbler to enter the soil by a chopping action or swinging motion about a pivot.

118 LIQUID OR GAS SOIL TREATMENT:

This subclass is indented under the class definition. Process or apparatus for directing liquid, gas, or vapor into contact with or beneath the top surface of the soil.

(1) Note. Included herein are patents claiming a means to spray a liquid onto the surface of the soil and means to scratch or disturb the soil where the spraying and soil disturbance, as disclosed, are applied to the same area of the soil to facilitate penetration of the liquid into the soil. See the Notes to Class 47, subclass 1.1 for a statement of the line

SEE OR SEARCH THIS CLASS, SUB-CLASS:

100, for implements having means to hold or guide plants into the ground.

SEE OR SEARCH CLASS:

47, Plant Husbandry, subclass 48.5 for soil-treating devices of cartridge or container form to be buried in and to remain in the ground, usually dis-

- charging their irrigating or fertilizing contents over a period of time; and subclass 1.7 for similar combinations of liquid sprayers and soil-disturbing means where the sprayer, as disclosed, is adapted to spray a plant; and subclass 1.01 for this combination where, as disclosed, the soil is disturbed at an area other than that sprayed.
- 126, Stoves and Furnaces, subclasses 271.1+ for means to apply hot gas (e.g., steam or flame) to the earth or other surface for the purpose of heating said surface.
- 166, Wells, appropriate subclasses for subject matter relating to the treating of wells by directing fluid into the well or the adjacent earth.
- 222, Dispensing, appropriate subclasses for fluid dispensers.
- 239, Fluid Sprinkling, Spraying, and Diffusing, appropriate subclasses for means to spray a liquid onto the ground surface where no means is provided to disturb the ground to facilitate penetration of the soil by the liquid.
- 405, Hydraulic and Earth Engineering, subclass 38 for machines which inject a waterproof material into the soil for creating a water barrier to retain irrigation water in arid soil; subclasses 53+ for subject matter relating to the storing of fluid underground for subsequent recovery; and subclasses 12+ for irrigating systems involving the conduction of liquids in channels or the like.
- 406, Conveyors: Fluid Current, subclasses 38+ and 185 wherein the claimed treatment fluid may contain entrained solid treatment materials, and soil disturbance is not claimed.
- 504, Plant Protecting and Regulating Compositions, subclasses 116.1 through 367 for processes of treating terrestrial or aquatic plants or their habitat by applying a specific chemical thereto.
- 119 Treating substance includes ammonia (e.g., flashing control):**
This subclass is indented under subclass 118. Apparatus including a special provision for the problems inherent with the storage, handling, or dispensing of ammonia into the soil because of its low boiling point.
- 120 Drilling machine (i.e., furrow opener):**
This subclass is indented under subclass 118. Apparatus further including a device adapted to be drawn through the soil to open a long, shallow, narrow trench therein into or about which the liquid or gas treatment is applied.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
14+, for drilling machines for seed planting.
109+, for drilling machines for plant setting.
- SEE OR SEARCH CLASS:
47, Plant Husbandry, subclass 9 for vertical mulchers having plow openers.
172, Earth Working, subclasses 681+ for a specific type of earth-working tool.
405, Hydraulic and Earth Engineering, subclass 154.1 for machines which lay pipe, cable, or the like behind furrow openers.
- 121 Rotating or orbiting opener:**
This subclass is indented under subclass 120. Apparatus wherein the opening element turns, spins, or revolves about an axis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
112+, for a rotary opener associated with plant setting.
157+, for a rotary opener associated with seed depositors.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 518+ for a rotating or orbiting earth-working tool, per se.
- 122 Power operated:**
This subclass is indented under subclass 121. Apparatus wherein the opening element derives its rotary or orbiting motion from forces transmitted thereto by means other than,

or in addition to, the opener's frictional contact with the soil.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 113, for power-operated rotary furrowers associated with plant setting.
158+, for power-operated rotary furrowers associated with seed depositors.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 35+ for powered rotating earth working tools.

123 **Chisel opener:**

This subclass is indented under subclass 120. Apparatus wherein the opening element is specifically disclosed as working deep in the soil and having such a configuration that it merely lifts the soil and does not shift it laterally of the line of the furrow.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 156, for a chisel opener used with a seed planter.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 699+ for chisel type openers, per se.

124 **Shoe opener:**

This subclass is indented under subclass 120. Apparatus wherein the opening element is symmetrically arranged with respect to the line of draft, has an earth breaking portion, has wing portions extending laterally beyond the sides thereof which form a V-shape when viewed in plan or front elevation, and has a portion extending upwardly from the central portion of the V for attachment to a standard.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 152, for a shoe-type opener used with a seed depositor.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 724 and 730 for shoe-type openers, per se.

125 **Runner opener:**

This subclass is indented under subclass 120. Apparatus wherein the opening element is symmetrically arranged with respect to the line of draft, has an earth-breaking portion which extends downwardly and rearwardly from the front portion of the element and has side portions extending rearwardly and diverging outwardly from the earth breaking portion and which become generally planar and parallel to each other towards the rear of the element so that the element has an overall shape which resembles the bow portion of a boat.

- (1) Note. This definition comprehends flat bottomed structures or structures which have a bottom which is V-shaped in cross-section.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 111, for runner-type openers used for plant setting.
153, for runner-type openers used with seed depositors.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 721+ for runner-type openers, per se.

126 **Moldboard opener:**

This subclass is indented under subclass 120. Apparatus wherein the opening element includes a landside which has a member adapted to slide over the soil to receive the side pressure caused by soilworking, a point for making an initial cut in the earth, a share for making a substantially horizontal cut beneath the surface to cut a slice of soil, and a board to guide and completely invert the soil slice.

SEE OR SEARCH CLASS:

- 37, Excavating, subclasses 366+ for similar ditching-type excavation plows.
172, Earth Working, subclass 754 for moldboard openers, per se.

127 **Injector nozzle situated above soil surface:**

This subclass is indented under subclass 118. Process or apparatus wherein the treating fluid is caused to enter the soil or to disturb the soil by action of a pressurized fluid issuing from a

- nozzle which is spaced at a selected distance above the surface of the soil.
- 128 Rotating dibble injector:**
This subclass is indented under subclass 118. Process or apparatus including a revolving, cavity forming tool and timing means which causes introduction of the treating fluid into the soil in timed relationship with the penetration of the soil by the tool.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
91, for a rotating dibble carrying tool used with a seed depositor.
- 129 Multiple fluid treatment:**
This subclass is indented under subclass 118. Process or apparatus wherein the treating fluid is at least two disparate substances delivered to the soil in a fluid state or dissolved or entrained in a carrying fluid.
- 130 BROADCASTING:**
Process or apparatus which is adapted to strew seed, fertilizer, or particulate matter with substantial uniformity, but with no specific pattern, upon and to mix the same with the soil.
- SEE OR SEARCH CLASS:
239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 650+ for apparatus adapted to strew or scatter nonfluid material, without mixing or covering with soil.
- 131 Including powered tiller:**
This subclass is indented under subclass 130. Apparatus including a device which turns over or mixes the soil and which derives its motion from forces transmitted thereto by means other than, or in addition to, frictional contact with the soil.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
161, for material deposited into a tiller operating zone wherein the tiller forms furrows.
- SEE OR SEARCH CLASS:
172, Earth Working, appropriate subclasses for specific types of powered tillers.
- 132 Material dispensed ahead of tiller:**
This subclass is indented under subclass 131. Apparatus wherein the strewn material is first deposited on the soil and thereafter mixed with the soil by the powered tiller.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
160, for a powered rotary furrow opener wherein material is deposited ahead of the furrow opener.
- 133 Material dispensed behind tiller:**
This subclass is indented under subclass 131. Apparatus wherein the soil is first turned over and mixed by the powered tiller and thereafter the material is strewn upon the turned over or mixed soil.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
162, for a power-rotary furrow opener wherein the material is deposited behind the opener.
- 134 Gauge means for auxiliary frame:**
This subclass is indented under subclass 62. Apparatus which includes a means to effectively control the cutting depth of a furrow opener mounted on a floating auxiliary frame.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 738 for an adjustable gauge runner and subclass 764 for runner or shoe gauges, per se.
- 135 Rotating gauge means:**
This subclass is indented under subclass 134. Apparatus wherein the means to control the cutting depth of the furrower opener turns, spins, or revolves about an axis.
- (1) Note. Included herein are gauge wheels that precede an opener acting in conjunction with packer wheels that follow openers, which together effectively gauge the cutting depth of an opener mounted on an auxiliary frame.

- 136 Packing means gauges opener:**
This subclass is indented under subclass 135. Apparatus wherein the rotating gauging means serves the auxiliary function of moving or compressing soil back into the furrow.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
191+, for rotating-packing means which does not gauge a floating auxiliary frame.
- 137 Adjustable gauge wheels separate from packer:**
This subclass is indented under subclass 135. Apparatus wherein the rotating-gauge means selectively supports the opener so as to operate at any of a variety of set depths.
- 138 Sled frame:**
This subclass is indented under subclass 134. Apparatus in which the gauging means comprises a pair of spaced parallel runners which slide over the surface of the soil, and an opening element is positioned between and supported by both runners.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 393 for sled frames limited to working the earth.
- 139 Including trash control accessory:**
This subclass is indented under subclass 14. Apparatus including a specific device which cuts, breaks up, moves, or removes living vegetation, fallow, stones, clods, residue or the like from the path of the opener.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 29 for a means for shifting surface material without soil disturbance.
- 140 Coulter:**
This subclass is indented under subclass 139. Apparatus wherein the trash control accessory includes a device which cuts a vertical slit in the trash or soil to clear and predefine a path for an opener which follows thereafter and which has a vertically extending portion operating in the slit.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 165 for the combination of a coulter and an earth-working tool.
- 141 Dozer (e.g., deflector):**
This subclass is indented under subclass 139. Apparatus wherein the trash control accessory includes at least one primary blade set at a predetermined height above the soil and positioned ahead of the opener to grade or deflect laterally obstructive material from the path of the opener.
- 142 With tine:**
This subclass is indented under subclass 141. Apparatus wherein the primary dozing blade has attached thereto a secondary blade which serves to scratch, sweep, or rake at least a portion of the path of the opener.
- 143 Having holddown:**
This subclass is indented under subclass 139. Apparatus wherein the trash control accessory includes means for positioning or holding trash or plants (e.g., weeds) so that they may be covered or cut by the operation of the opener.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 29+ and 514 for holddowns for earth-working machinery.
- 144 Including mulching accessory:**
This subclass is indented under subclass 14. Apparatus including a specific means to change the compaction or arrangement of, and thereby the capillarity of soil areas down to a preselected depth along a path which includes and is wider than the width of the furrow formed by the opening means.
- (1) Note. Included herein are devices which break up soil (i.e., crust) which lies in and to the side of the path of the opener and also devices which form a mulched surface wider than the furrow and which follow the depositing device.
- SEE OR SEARCH CLASS:
47, Plant Husbandry, subclass 9 for mulching devices, per se.

- 145 Harrow:**
This subclass is indented under subclass 144. Apparatus in which the mulching accessory comprises a framework which includes a plurality of spikes or sharpened disks which are drawn through the soil.
- 146 Spring tooth:**
This subclass is indented under subclass 145. Apparatus wherein the harrow includes resilient spikes which are drawn through the soil.
- 147 Including subsoiler (i.e., deep soil tiller):**
This subclass is indented under subclass 14. Apparatus including a specific soil-penetrating device preceding the material-depositing means which enters and disturbs soil to a depth which exceeds the depth at which seeds are to be deposited.
- (1) Note. The subsoiler may act as the primary furrow opener in combination with and ahead of such an opener.
- 148 With furrow smoother:**
This subclass is indented under subclass 147. Apparatus which further include a device which follows the subsoiler and function to fill, cover or even out the soil disruption caused by the subsoiler.
- (1) Note. These devices generally operate between the subsoiler and the furrow opener and may take the form of a rolling or nonrolling member.
- 149 Furrow opener:**
This subclass is indented under subclass 14. Apparatus wherein significance is attributed to a device adapted to be drawn through the soil to open a long, shallow, narrow trench therein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
107+, for manually-operated furrow openers used with plant setting machines.
109+, for furrow openers used with plant setting machines.
120+, for drilling machines including liquid or gas soil treatment.
- 150 Including dispensed material deflector:**
This subclass is indented under subclass 149. Apparatus further including a device mounted on or a surface associated with the opener to cause a change in the direction of the material being deposited to generate a preferred pattern of material placement within the opened soil.
- 151 Including trip mechanism:**
This subclass is indented under subclass 149. Apparatus including means permitting the furrow opening element to shift with respect to the soil or with respect to its supporting or propelling means when it meets an obstacle while being drawn over the field, said means (1) having a high initial resistance to said shifting of the element, which resistance decreases after the element starts to shift, or (2) requiring manual resetting by an attendant (e.g., shear pin).
- (1) Note. This definition comprehends flat bottomed structures or structures which have a bottom which is V-shaped in cross-section.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 260.5, 261+, and 705 for trip mechanisms for earth-working elements used without material depositors.
- 152 Shoe opener:**
This subclass is indented under subclass 149. Apparatus wherein the opening element is symmetrically arranged with respect to the line of draft, has an earth-breaking portion, has wing portions extending laterally beyond the sides thereof which form a V-shape when viewed in plan or front elevation, and has a portion extending upwardly from the central portion of the V for attachment to a standard.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
124, for a shoe-type opener used with a seed depositor.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 724 and 730 for shoe-type openers, per se.

153 Runner opener:

This subclass is indented under subclass 149. Apparatus wherein the opening element is symmetrically arranged with respect to the line of draft, has an earth-breaking portion which extends downwardly and rearwardly from the top front portion of the element, and has side portions extending rearwardly and diverging outwardly from the earth-breaking portion and which become generally planar and parallel to each other towards the rear of the element, so that the element has an overall shape which resembles the bow portion of a boat.

- (1) Note. This definition comprehends flat-bottomed structures or structures which have a bottom which is V-shaped in cross-section.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 111, for runner-type openers used with a plant setting drilling machine.
125, for runner-type openers used in conjunction with a liquid or gas soil treatment.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 707+ for resilient tine-type furrow openers, per se.

154 Boot opener (e.g., tooth or tine):

This subclass is indented under subclass 149. Apparatus having a generally elongated-furrow-opening element having a soil-working portion and a standard to support it in furrow opening position in which the soil working portion is no longer in lateral and longitudinal extent than the standard.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclass 713 for boot-type furrow openers, per se.

155 Spring formed tool or standard:

This subclass is indented under subclass 154. Apparatus in which the furrow-opening element or its intermediate supporting means is formed of resilient material.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 707+ for resilient tine-type furrow openers, per se.

156 Chisel opener:

This subclass is indented under subclass 149. Apparatus wherein the opening element is specifically disclosed as working deep in the soil and having such a configuration that it merely lifts the soil and does not shift it laterally of the line of the furrow.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 123, for a chisel-type opener used with a liquid or gas soil treatment.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 699+ for chisel-type openers, per se.

157 Rotary opener:

This subclass is indented under subclass 149. Apparatus wherein the opening element turns, spins, or revolves about an axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 112+, for a rotary opener associated with plant setting.
121+, for a rotary opener associated with a liquid or gas soil treatment.

SEE OR SEARCH CLASS:

- 172, Earth Working, subclasses 518+ for a rotating earth-working tool, per se.

158 Power rotated:

This subclass is indented under subclass 157. Apparatus wherein the opening element derives its rotary motion from forces transmitted thereto by means other than, or in addition to, the opener's frictional contact with the soil.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 113, for power-operated rotary furrowers associated with plant setting.
122, for power-operated rotary furrowers associated with a liquid or gas soil treatment.

- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 35+ for powered-rotating earth working tools.
- 159 With tine:**
This subclass is indented under subclass 158. Apparatus in which the rotating opener has teeth, projections, blades, or other configurations spaced circumferentially and projecting generally at right angles to the axis of rotation to engage the soil intermittently or with a varying effect as the opener turns.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 540 for a tined earth-working implement, per se.
- 160 Rotatable about vertical axis:**
This subclass is indented under subclass 159. Apparatus wherein the tines rotate about an axis which is generally perpendicular to the surface of the soil.
- SEE OR SEARCH CLASS:
172, Earth Working, subclass 495 for plural driven, contiguous, cooperating, or intermeshing rotary ground-engaging tools which rotate about a vertical axis; and subclass 111 for a single tool which rotates about a vertical axis.
- 161 Material deposited into tiller operated zone:**
This subclass is indented under subclass 159. Apparatus wherein a depositing means introduces material simultaneously with and into the same area where the opener is creating a furrow to thereby incorporate the dispensed material into the soil which is formed into a furrow.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
131, for a machine having a powered tiller and material broadcaster which operates simultaneously and in the same location but where the furrows are not formed.
- 162 Material deposited behind tiller:**
This subclass is indented under subclass 159. Apparatus wherein a furrow is formed by the powered tiller and thereafter material is deposited into the formed furrow.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
133, for material broadcasting behind a tiller which does not form a furrow.
- 163 Disk:**
This subclass is indented under subclass 157. Apparatus wherein the rotary opener is a generally circular, plate-like member.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
135+, for rotating openers with gauge means mounted on an auxiliary frame.
- 164 Plural cooperating disk openers:**
This subclass is indented under subclass 163. Apparatus including at least two coating disk elements which operate to open a furrow.
- SEE OR SEARCH CLASS:
172, Earth Working, subclasses 574+ for openers of this general type but which lack a depositing means.
- 165 Staggered arrangement:**
This subclass is indented under subclass 164. Apparatus wherein at least one of the disks is not aligned in a transverse direction with the other disk or disks in the assembly.
- 166 Scalloped or fluted:**
This subclass is indented under subclass 164. Apparatus wherein at least one of the disks has undulations, indentations or the like at the outer periphery thereof.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
169, for a dish-shaped disk which is scalloped or fluted.
- 167 Flat:**
This subclass is indented under subclass 163. Apparatus wherein the sides of the disk are substantially planar.

- 168 Dished:**
This subclass is indented under subclass 163. Apparatus wherein the disk is concave on one side and convex on the other side.
- 169 Scalloped or fluted:**
This subclass is indented under subclass 168. Apparatus wherein the disk has undulations, indentations or the like at the outer periphery thereof.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
166, for a plural disk opener with at least one scalloped or fluted disk.
- 170 Having depositor feature:**
This subclass is indented under subclass 14. Apparatus having a specific device which causes spaced or timed delivery of material into a furrow.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
34+, for hill drop planters.
- 171 Endless conveyor with traps:**
This subclass is indented under subclass 170. Apparatus including a driven endless element moveable along a path of circulation and which includes traps which are loaded and unloaded at different points along said path to deliver material towards the open furrow as the machine advances.
- SEE OR SEARCH CLASS:
198, Conveyors: Power Driven, subclasses 804+ for endless conveyors, per se.
- 172 Chain:**
This subclass is indented under subclass 171. Apparatus wherein the endless element is a series of interconnected links.
- 173 Screw conveyor:**
This subclass is indented under subclass 170. Apparatus including a material supporting surface which traverses a spiraling path to deliver material towards the open furrow as the machine advances.
- SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, subclass 788 for spiral conveyors, per se.
- 174 Fluid current conveyor:**
This subclass is indented under subclass 170. Apparatus wherein material to be deposited is carried toward the open furrow by means of, or with the assistance of a flowing gas stream.
- SEE OR SEARCH CLASS:
406, Conveyors: Fluid Current, appropriate subclasses for fluid current conveying, per se.
- 175 Flow divider head:**
This subclass is indented under subclass 174. Apparatus wherein at least one primary fluid conveying current conveys material from an inlet to the fluid conveyor to a structure which substantially evenly divides the fluid conveying current into a plurality of secondary streams for delivery to the opened furrow.
- SEE OR SEARCH CLASS:
406, Conveyors: Fluid Current, appropriate subclasses for fluid current conveying, per se.
- 176 Material speed reducing means:**
This subclass is indented under subclass 174. Apparatus including means near the outlet of the fluid current conveyor which is effective to reduce the pressure of the entraining fluid to near atmospheric so that the deposited materials will not be blown or bounced out of the furrow.
- 177 Rotating dispensing element:**
This subclass is indented under subclass 170. Apparatus including at least one member which turns, spins, or revolves about an axis to receive a charge of material from a bulk supply and deliver that charge for deposit into the furrow.
- SEE OR SEARCH CLASS:
221, Article Dispensing, subclass 277 for rotary discharge assistants.

178 Roll or drum:

This subclass is indented under subclass 177. Apparatus wherein the rotating dispenser is at least one cylinder which extends across an outlet of the source of supply.

179 Air pressure differential drum:

This subclass is indented under subclass 178. Apparatus wherein the rotating dispensing element is a hollow cylinder and wherein the charge of material is held on the surface of the drum by an air pressure differential caused by (a) the creation of a subatmospheric pressure within the hollow interior of the drum and expressed through holes in the drum surface or (b) by a superatmospheric pressure which traps material against the surface of the drum.

SEE OR SEARCH CLASS:

221, Article Dispensing, subclass 211 for suction-type discharge assistants, per se.

180 Vacuum blocker rotates:

This subclass is indented under subclass 179. Apparatus including a member which turns, spins, or revolves about an axis and rolls along the interior of the drum's surface to selectively cover the holes in the drum's surface thereby cutting off the relative vacuum so as to allow the charge of material to be released from the drum.

181 Excess material remover:

This subclass is indented under subclass 179. Apparatus which further includes means such as a brush, air nozzle, scraper, or the like to remove extra material which may adhere to the surface of the drum before that extra material is released into the furrow.

182 Protrusions on drum periphery:

This subclass is indented under subclass 179. Apparatus further including members which extend radially outwardly from the drum periphery and through which the air pressure differential is expressed.

183 Plate type trap:

This subclass is indented under subclass 177. Apparatus wherein the rotating dispensing element is a disk which contains holes, grooves, depressions or the like which capture a charge

of material from the supply and deliver that charge for deposit into the furrow.

184 Vertical:

This subclass is indented under subclass 183. Apparatus wherein the plate assumes a substantially vertical attitude and rotates about a substantially horizontal axis.

185 Air pressure differential:

This subclass is indented under subclass 184. Apparatus wherein the charge of material is held on the surface of the disk by an air pressure differential caused by (1) the creation of a subatmospheric pressure on one side of the disk which is expressed through holes in the disk surface or (2) by a superatmospheric pressure which traps material against the surface.

SEE OR SEARCH CLASS:

221, Article Dispensing, subclass 211 for suction type discharge assistants, per se.

186 Plural depositors for disparate material:

This subclass is indented under subclass 170. Apparatus including at least two depositing mechanisms which deposit at least two materially different materials into the soil.

(1) Note. At least one of the materials must be dispensed directly into the furrow.

(2) Note. The multiple depositors may deposit different types of seed or seed and an agricultural amendment such as fertilizer, insecticide, or the like.

187 To various depths:

This subclass is indented under subclass 186. Apparatus including means to deposit one material at a level in or upon the soil which is different than the level at which the other material is deposited.

188 At least one solid, one liquid:

This subclass is indented under subclass 186. Apparatus wherein one of the disparate materials dispensed is a particulate solid, and another of the disparate materials dispensed is a flowable liquid.

- 189 Including seed tamper in furrow:**
This subclass is indented under subclass 14. Apparatus including a specific element such as a wheel, roller, blade, or the like which exerts pressure on seed dispensed within the open furrow to press the seed into the soil at the bottom of the furrow.
- 190 Furrow closer:**
This subclass is indented under subclass 14. Apparatus including a specific device which moves soil back into the furrow to cover the deposited material.
- 191 Rotating furrow closer:**
This subclass is indented under subclass 190. Apparatus wherein the furrow-closing element turns, spins, or moves about an axis as it moves soil back into the furrow.
- 192 Disk:**
This subclass is indented under subclass 191. Apparatus wherein the rotating furrow-closing element is a generally circular plate-like member which pushes soil laterally into the furrow.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
194+, for a wheel-type closing means which exerts a downwardly directed component of force on the soil which closes the furrow.
- 193 Plural:**
This subclass is indented under subclass 192. Apparatus including at least two furrow-closing disks.
- 194 Packer wheel:**
This subclass is indented under subclass 191. Apparatus wherein a rotating furrow-closing element has a circular periphery which exerts a component of force downwardly on the soil as it moves the soil into the furrow.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
192, for disk-type furrow closers which resemble a wheel in shape, but only apply a laterally directed force to the soil.
- 195 Plural:**
This subclass is indented under subclass 194. Apparatus including at least two furrow-closing wheels.
- 196 Pinch adjustment:**
This subclass is indented under subclass 195. Apparatus in which wheels are mounted in angular relationship to each other so as to form a ridge of soil when moved over the furrow, the angular relationship being resettable to selectively vary the height or compaction of the ridge.
- 197 Drag:**
This subclass is indented under subclass 190. Apparatus in which soil is moved back into the furrow by a member which slides along the soil surface and is pulled behind the drilling machine.
- 198 Chain:**
This subclass is indented under subclass 197. Apparatus wherein the furrow-closing member is a series of interconnected links.
- 199 SEED TAPE PLANTERS:**
This subclass is indented under the class definition. Process or apparatus wherein a narrow, flexible strip, ribbon, or band which has seeds secured thereto in spaced relation is placed into the soil.
- SEE OR SEARCH CLASS:
47, Plant Husbandry, subclass 56 for seed tapes, per se.
405, Hydraulic and Earth Engineering, subclass 176 for apparatus for laying a tape or strip within the ground.
- 200 MISCELLANEOUS:**
This subclass is indented under the class definition. Process or apparatus not provided for in any of the above subclasses.
- CROSS-REFERENCE ART COLLECTIONS
- 900 METHODS OF PLANTING SEEDS AND MISCELLANEOUS COMPOSITIONS:**
Collection or art relating to processes for placing seeds in soil or to the chemical make up of various soil or seed treating materials.

- 901 LAWN OR TURF:**
Collection of art relating to the treating, maintaining, or installing of grassy areas.
- 902 Pasture renovation:**
Collection of art under 901 specifically relating to the reconditioning or replanting of lawn or turf used for the feeding of grazing animals.
- 903 MONITOR:**
Collection of art relating to devices which keep track of, regulate, or control the operation of a planting machine.
- 904 Population control function:**
Collection of art under 903 specifically relating to control elements which change the rate of dispensing in a planting machine responsive to a sensed undesired rate.
- 905 SEED TREATING SEED PLANTER:**
Collection or art relating to a planting device including an agent which acts upon seed either before or during the planting operation to improve or alter the seed itself or the planting operation.
- 906 SPECIALIZED COMMODITY:**
Collection of art relating to the planting of a particularly named type of agricultural product.
- 907 Cane:**
Collection of art under 906 specifically relating to the planting of tall, woody grasses or reeds (e.g., sugar cane).
- 908 Potato:**
Collection of art under 906 specifically relating to the planting of plant or tuber parts which develop sturdy edible tubers (e.g., sweet potato, white potato).
- 909 Bulb:**
Collection of art under 906 specifically relating to the planting of an underground stem, usually surrounded by scalelike modified leaves and containing stored food for the undeveloped shoots of the new plant stored within it (e.g., tulip).
- 910 Onion:**
Collection of art under 909 specifically relating to the planting of an edible bulb having a pungent odor and taste and commonly known as an onion.
- 911 Rice:**
Collection of art under 906 specifically relating to the planting of a cereal grass with a starchy edible seed and commonly known as rice.
- 912 Pineapple:**
Collection of art under 906 specifically relating to the planting of a tropical plant having large swordlike leaves and a large, fleshy edible fruit consisting of the flowers fused into a compound whole with a terminal tuft of leaves and which is commonly known as a pineapple.
- 913 Vegetable (i.e., small seed):**
Collection of art under 906 specifically related to the planting of a specialized small, seeded, named edible plant (e.g., beet, spinach, etc.).
- 914 Lettuce:**
Collection of art under 913 specifically related to the planting of a vegetable having edible leaves and commonly known as lettuce.
- 915 SPECIAL CONDITION:**
Collection of art relating to machines designed to handle or treat seeds which are in a peculiar state.
- 916 Seed pellet:**
Collection of art under 915 specifically related to the planting of single, small seeds which are placed into solid or densely packed balls of nonseed material in units of uniform size which may in turn be singulated by a conventional planting machine.
- 917 Gel:**
Collection of art under 915 specifically related to the planting of seeds which are encased in a semisolid colloid.
- 918 Sprout:**
Collection of art under 915 specifically related to the planting of chitted (i.e., soaked, pre-sprouted, germinating, or dormancy broken) seeds.

- 919 SPECIAL TRANSPLANT RELATED FEATURE:**
Collection of art related to the preparation of a living plant for moving it from one location in the soil to another.
- 920 AIRPLANE:**
Collection of art relating to transplanting or planting from an aeronautical device.
- 921 UNIQUE MOTOR DRIVE:**
Collection or art relating to unconventional means by which power is derived from or transmitted to a planting machine.
- 922 VARIABLE DRIVE MECHANISM:**
Collection of art relating to speed adjustable power transfer devices used or usable in planting machines.
- 923 INTERROW, INTERCROP PLANTER:**
Collection of art relating to the planting of a second crop between rows or within a population of a growing crop before the harvesting of that growing crop.
- 924 MINIMUM AND NO TILL PLANTER:**
Collection of art relating to machines which are designed to plant crops with the savings of at least one tillage step (e.g., plowing, harrowing, fertilizing, etc.).
- 925 TANK AND HOPPER TRAILERS:**
Collection of art relating to vehicles which deliver material to and are towed by, hitched to, or otherwise associated with a planter so as to supply the planter.
- 926 SPECIAL SUSPENSION OR GAUGING FEATURE:**
Collection of art related to a planting machine which has a particular provision to adjust or maintain weight or pressure onto an opener assembly, subframe, or the like, to maintain or enhance planting depth.
- 927 PARALLELOGRAM MOUNTING:**
Collection of art relating to the use of links connected in parallel (parallelogram linkage) for the mounting of assemblies, subassemblies, tools or the like on planting machines.

END