

**TITLE: SYSTEM AND METHOD FOR PRESCRIPTIVE SEED
 TREATMENT**

FIELD OF THE DISCLOSURE

5 The present disclosure relates generally to a prescriptive seed treatment system and
method. More particularly, but not exclusively, the present disclosure relates to selecting
and planting prescriptively treated seed (e.g., seed treated with a prescriptive type, amount,
and/or mixture of substance(s) based at least in part on past, current, and/or predicted field
and/or market conditions).

10

BACKGROUND OF THE DISCLOSURE

 Modernized farming practices employ an array of agricultural tools and techniques.
One common technique is treating seeds with certain substances (typically an insecticide,
nutrients, fungicide, inoculant, nematicide and/or other plant growth or health substance)
15 prior to planting them. The seed treatment can help farmers in many ways, including by
improving plant yield through disease, nematode, insect and/or other pest protection,
tolerance, resistance and/or prevention, and/or improved early season plant growth, health
and/or vigor. Many believe that early growth is critical to optimizing yield, such that
controlling the conditions around the seed during germination and/or the early growth
20 period is often valued.

 However, efforts in soil conservation have led to an increase in no-till or low-till
farming, whereby the soil generally remains undisturbed through tillage. The technique
often leads to reduced soil temperature and increased soil moisture and field residues with
associated elevated levels of disease inoculum, weeds and pests, paradoxically increasing
25 the need for and value of seed treatment.

 Similarly, farmers are subject to the dynamic nature of commodity pricing
encountered in agriculture. For example, many farmers are rent-based farmers that do not
own the land on which they farm. As a result, such farmers are especially sensitive to
returning a profit in any given year. Further, huge negative swings in commodity prices
30 can cause farmers who own their land to no longer afford to continue farming as a living.
Accordingly, farmers often only plant crops that provide the highest projected net income
for a given year. Because certain crops (*e.g.*, corn in the corn belt in the United States)

often consistently have the highest projected return on investment in certain areas, farmers often practice monoculture (*i.e.*, planting the same crop each year) and/or do not frequently rotate crops. The absence of regularly rotating crops often takes a great toll on the soil, resulting in increased levels of diseases, weeds and/or pests and again increasing the need
5 for and value of prescriptively treating seed.

In current practice, seed treatment substances are often applied well prior to planting. For example, seed companies often treat most corn seed and significant amounts of soybean, and other seed prior to being bagged. By treating their seeds upstream prior to bagging them, seed companies have generated significant additional revenues beyond just
10 the seed itself. The revenue generated by such seed companies is so significant that many of them have invested millions of dollars in seed treatment equipment in their seed production, bagging and/or other facilities to maximize the efficiency and/or profitability of this product line. However, treating seeds prior to bagging them is deficient in several respects. For example, the greater the elapsed time between application of the substances
15 to the seed and planting of the same can decrease the potency of the substances, particularly in the cases of biocides. Additionally, pretreated seed are often treated with a seed treatment substance based on common pests or other targets across many regions and/or what is most profitable for the seed companies and/or others in the seed supply chain rather than factors relevant to a particular farmer when planting a particular field.
20 While sometimes seeds can be pretreated based on parameters relevant at the time of treatment, they still may not be relevant at the time of planting. Thus, the time between treatment and planting can further minimize the applicability or relevance of the seed treatment substance. Therefore, a need exists in the art for a system that can maintain the ability to use chemical and other seed treatment substances in a manner that better
25 maintains their potency and is tailored to the needs of a particular farmer planting a particular field at a particular time under particular conditions.

Some soybean and other seeds are treated downstream in the seed supply chain (*e.g.*, at a distributor, retailer or sales representative). These downstream entities also have expended significant amounts of investment in labor, logistics and equipment to be able to
30 deliver these downstream seed treatments.

Regardless of where the seeds are treated, as referenced above, the current practice in the seed industry is to treat seeds in large batches using the same treatment materials for

the entire batch. While this is more efficient and profitable for the upstream and downstream applicators, it is deficient in several respects. For example, upstream and downstream treatment decisions often overlook what combination of seed and treatment is best suited for particular farmers, and farmers often are not satisfied with the amount of seed treatment choices they have available to them for purchase. Similarly by way of example, batch application of substances can sometimes result in uneven distribution of the same within the batch, and can sometimes further result in shedding and even loss of the applied substances as the seeds collide with one another due to vibration and the like. By way of further example, batch application prior to bagging limits the ability for seed companies to tailor the combination of seed and seed treatment to the particular planting conditions where a particular seed or group of seeds will be planted.

Currently, most seed treatment substances are chemicals. Despite the benefits of chemical seed treatment substances, the bulk application of chemicals to an agricultural field can have unintended and/or negative consequences. With the growing emphasis on safety, health, environmental and sustainability issues, concerns exist about runoff and dust off or drift from chemical biocides (*e.g.*, herbicides, insecticides, nematicides, fungicides, and the like) and potential damage to non-target organisms. Therefore, a need exists in the art for a method and system for treating seed that could reduce the aggregate amount of seed treatment chemicals deployed in a field.

Along these lines, significant amounts of research and development investments are currently being allocated to biological alternatives to agricultural chemicals. However, many biological alternatives have a significantly shorter shelf life than chemical alternatives. For example, most chemical seed treatments and even some biological seed treatments are durable enough to enable the aforementioned industry practice of pre-bagging batch treatment by seed companies several months prior to planting. However, some biological alternatives are not very durable and/or have shelf lives that can require treatment to occur a few days, hours or even minutes prior to planting. Because of these and other industry practices, many of these less durable biological alternatives are often used sub-optimally or do not even get commercialized. Thus, a need exists in the art for a system to enable deployment of a broader range of biological and other non-durable seed treatment materials much closer to or during planting, including a need to be able to apply less durable substances to the seed during the planting operation.

However, despite these significant investments, biological research and development takes significant time and resources. Thus, it is unlikely that biological seed treatment alternatives will completely replace chemical seed treatment substances. Therefore, a need exists in the art for a system that can enable use of a broader range of biological and/or other less durable seed treatment substances while also improving the ability to use chemical seed treatment substances.

Two agricultural industry trends in North America (consolidation of farm ownership and rising input costs) are noteworthy here. As farm owners gain more and more land, farm management practices often get more and more sophisticated. Similarly, input costs (e.g., seed and seed treatment costs) often rise, sometimes significantly. Partly as a result of rising input costs, some of the larger and more sophisticated farm operators have started demanding the ability to use only those inputs that are best suited for their fields. However, as described above, the industry's batch, pre-bagging treatment and other practices have been a roadblock to meeting demand for prescriptive seed treatments. Therefore, based in part on the dynamic, and generally increasing, prices of seed treatments and other inputs, a need exists in the art to enable farm operators to better utilize their seed treatment resources (e.g., by using types and amounts of seed treatment substances suited for their particular field conditions), including a need to reduce the quantity of or at least better tailor the use of seed treatment substances and labor expended.

Furthermore, conditions during planting are often dynamic, which only further enhances the need for prescriptive seed treatment. For example, the typical industry practice is for farm operators to load a pre-treated batch of seeds into the planter's seed bins the day before planting so that the farm operator can immediately begin planting first thing the next morning. If for any reason, such as adverse weather, a farmer is unable to plant in the desired field on the anticipated day, the farm operator is often forced to choose between not planting all the seeds loaded the prior day or planting the pre-loaded seeds in a different field where the conditions resulting from adverse weather are better for planting. If the farm operator chooses the former, it often results in negative yield performance due at least in part to fewer effective growing days. Conversely, if the farmer chooses the latter, it also often results in a negative yield performance, especially if the non-adverse weather-related field conditions make the combination of seed and seed treatment not well suited for a field other than the originally intended field. As a result, a need in the art

exists for a system whereby a farmer can pre-load its seed into a planter prior to planting day to optimize its amount of time planting on planting day and still have the ability to adapt to dynamic weather and other conditions that may occur on planting day.

Moreover, the optimal type and amount of seed treatment substances often varies
5 from field to field, row to row, and even seed planting location to seed planting location. In particular, the field and other conditions can vary greatly across fields, rows and seed planting locations. To that end, farmers have adopted tools and techniques such as variable rate planters, variable blend and variable rate fertilizers, multi-hybrid and multi-variety planters (*i.e.*, planters capable of planting multiple, different types of hybrids during the
10 same planting session), and the like. Thus, a need exists in the art for a prescriptive seed treatment that permits precise selection of which seed and the type and amount of seed treatment substances that should be planted in a particular location, including a need for being able to select immediately prior to or during planting operation, a combination of seed and seed treatment well suited for the location where and the timing when the seed is
15 to be planted based, at least in part, upon historic, current, predictive and/or other field and/or other planting conditions.

Notably, current prescriptive agriculture systems and methods do not contemplate prescriptively treating seeds during planting. For example, in furrow fertilizer application systems often damage seeds that come into direct contact with the fertilizer. Thus, in
20 furrow fertilization application systems typically include some mechanism to ensure the fertilizer is applied in the furrow in a location where it does not come into contact with any seed. Thus, a need exists in the art for a prescriptive seed treatment where the seed together with the seed treatment substance are planted in the same location, including where the seed treatment substance not only can come into direct contact with, but also is
25 intentionally applied to the seed prior to the seed being planted into the field.

Further, recent trends relating to environmental, safety, health, sustainability and other similar concerns have received increased recognition from those both inside and outside of the industry. As a result, governmental, non-profit and other organizations have pushed to reduce negative dust off, non-target or other safety, health, environmental or
30 other sustainability impacts that may result from planting seeds with seed-applied substances. For example, abrasion of seed treatment products or dust off can occur during seed packaging, seed transport, planter loading, movement in planters across the field and

otherwise during the planting operation. Some have suggested that dust off from loading seeds that have been pre-treated with neonicotinoid and/or other seed treatments could have a negative impact on the health of bees and other important insects. However, some seed and chemistry companies and other industry participants have suggested that

5 neonicotinoid seed treatments can result in potentially strong yield and/or other benefits, such that their continued use is important to the industry. Thus, a need exists in the art for a system that can minimize the amount of dust-off resulting from seed treatment substances while a farm operator loads its seeds onto a planter and plants those seeds, including a need to enable the potential benefit of neonicotinoid seed-applied substances in a manner that

10 can reduce the potential harm from dust off.

SUMMARY

It is therefore a primary object, feature, and/or advantage of the present disclosure to improve on or overcome the deficiencies in the art.

15 In an aspect of the present disclosure, a method for prescriptive seed treatment is disclosed that prescriptively selects, based at least in part on one or more conditions, a combination of seed and one or more types and/or amounts of seed treatment substances to be planted together at a particular location.

According to an aspect of the present disclosure, the method for prescriptive seed

20 treatment includes providing a planter, one or more seeds and one or more seed-applied substances, selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at a calculated location, generating the combination and planting it.

According to an aspect of the invention, the selection can take place by selecting

25 one or more types and/or amounts of seed-applied substances to be applied to seed, and the combination can be generated by delivering the selected type(s) and amount(s) of the seed applied substance(s) through a substance flow path to a substance applicator that applies the seed-applied substances to the seed within the seed flow path.

According to an aspect of the invention, the combination can also be generated by

30 placing different combinations of seeds and/or seed-applied substances into at least two of a plurality of seed receptacles, selecting a seed receptacle containing the selected

combination and delivering the combination from the selected seed receptacle so it can be planted by the planter.

In another aspect of the present disclosure, a method for seed treatment on a planter is provided. According to the method, a planter with a seed receptacle, a substance
5 receptacle with a seed-applied substance, a substance flow path, a seed flow path and a controller are provided. The controller can, based at least in part on one or more conditions, determine one or more amounts of seed-applied substances to be applied to the seed during the planting operation, and those amounts of substances are transferred from the substance receptacle through the substance flow path. The seed is transferred from the
10 seed receptacle into the seed flow path, and the selected amount(s) of the seed-applied substance(s) is(are) applied to the seed within the seed flow path.

BRIEF DESCRIPTION OF THE DRAWINGS

15 Illustrated embodiments of the disclosure are described in detail below with reference to the attached drawing figures, which are incorporated by reference herein, and where:

Fig. 1A is a front perspective view of a planter implement system in accordance with an illustrative embodiment;

20 Fig. 1B is a front perspective view of a planter implement system in accordance with an illustrative embodiment;

Fig. 2A is a side elevation view of a row unit in accordance with an illustrative embodiment;

25 Fig. 2B is a front perspective view of a row unit in accordance with an illustrative embodiment;

Fig. 3 is a side elevation view of a row unit in accordance with an illustrative embodiment;

Fig. 4 is a partial schematic and partial perspective view of a planter implement system in accordance with an illustrative embodiment;

30 Fig. 5 is a schematic view of a planter implement system in accordance with an illustrative embodiment;

Fig. 6A is a schematic view of a seed drop tube and substance applicators in accordance with an illustrative embodiment;

Fig. 6B is a schematic view of a seed drop tube and substance applicators in accordance with an illustrative embodiment;

5 Fig. 6C is a schematic view of a seed drop tube and a substance applicator in accordance with an illustrative embodiment;

Fig. 6D is a schematic view of a seed drop tube and a substance applicator in accordance with an illustrative embodiment;

10 Fig. 7A is a top plan view of a seed drop tube and substance applicators in accordance with an illustrative embodiment;

Fig. 7B is a top plan view of a seed drop tube and substance applicators in accordance with an illustrative embodiment;

Fig. 7C is a top plan view of a seed drop tube and substance applicators in accordance with an illustrative embodiment;

15 Fig. 8A is a schematic view of a seed drop tube configuration and substance applicators in accordance with an illustrative embodiment;

Fig. 8B is a schematic view of a seed drop tube configuration and substance applicators in accordance with an illustrative embodiment;

20 Fig. 8C is a schematic view of a seed drop tube configuration and substance applicators in accordance with an illustrative embodiment;

Fig. 8D is a schematic view of a seed drop tube configuration and substance applicators in accordance with an illustrative embodiment;

Fig. 9 is a schematic view of another planter implement system in accordance with an illustrative embodiment;

25 Fig. 10 is a block diagram providing a pictorial representation for a method of operation of a planter implement system in accordance with an illustrative embodiment; and

Fig. 11 is a block diagram providing a pictorial representation for a method of operation of a planter implement system in accordance with an illustrative embodiment.

30

DETAILED DESCRIPTION

The present disclosure contemplates many different methods and structures used to select a combination of seed and seed-applied substances to be planted at a particular location. Representative applications of methods and apparatus according to the present application are described in this section. These examples are being provided solely to add context and aid in the understanding of the described embodiments. It will thus be apparent to one skilled in the art that the described embodiments may be practiced without some and/or all of these specific details. In other instances, well known process steps have not been described in detail in order to avoid unnecessarily obscuring the described
5 embodiments. Other applications are possible, such that the following examples should not be taken as limiting.

In the following detailed description, references are made to the accompanying drawings, which form a part of the description and show, by way of illustration, specific embodiments in accordance with the methods and structures of the present disclosure.
15 Although these embodiments are described in sufficient detail to enable one skilled in the art to practice the described embodiments, it is understood that these examples are not limiting; other embodiments may be used, and changes may be made without departing from the spirit and scope of the described embodiments.

It will also be understood that, although the terms first, second, etc. may be used
20 herein to describe various elements, these elements should not be limited by such terms. These terms are only used to distinguish one element from another. For example, a first step could be termed a second step, and, similarly, a second step could be termed a first step, without departing from the spirit and scope of the present disclosure.

The terminology used herein is for the purpose of describing particular
25 embodiments only and is not intended to be limiting of the present disclosure. As used in the description of the invention and the appended claims, the singular forms “a”, “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. By way of example only, while the singular form of numerous components and steps are described in various embodiments herein, it will be apparent that more than one
30 of such components and/or steps can be used to accomplish the same. It will also be understood that the term “and/or” as used herein refers to and encompasses any and all possible combinations of one or more of the associated listed items. It will be further

understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, functions, integers, steps, operations, elements, and/or components, but do not preclude the presence and/or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. It will be similarly understood that the terms “including,” “include,” “includes,” “such as” and the like, when used in this specification, are intended to be exemplary and should be construed as including, but not be limited to, all items recited thereafter. As used herein, the term “if” may be construed to mean “when” or “upon” or “in response to determining” or “in response to detecting,” depending on the context.

10 As used herein, the term “planter” includes equipment, devices and other planter implement systems and/or technology used in planting operations. For example, the present disclosure contemplates that planters can include past planters, currently existing planters, future planters and other current and future equipment used in the planting process, including tractors, cabins, nurse tanks and bulk input devices. The various
15 features of the disclosure are useful in connection with any device used in planting one or more seeds (*e.g.*, broadcast planters, drill planters, air planters, bulk planters, individual row unit planters, clam-shell planters, cone planters, cyclone planters, pneumatic planters, finger planters, plate planters and the like), especially those devices that could be used to plant one or more combinations of seeds and seed-applied substances that are
20 prescriptively selected for planting at one or more locations.

As used herein, the term “seed” includes seeds of any type of plants, including row crops, cereals, grains, oilseeds, fruits, vegetables, turf, forage, ornamental, nuts, tobacco, plantation crops and the like.

As used herein, the terms “substance” and/or “seed-applied substance” include any
25 composition applied to seeds prior to the seeds being planted (*e.g.*, when the seed comes in contact with the soil in a field). The seed-applied substance(s) can include active ingredients, other substances, combinations of more than one active ingredient and/or other substances, and/or mixtures having one or more active ingredients and/or one or more other substances. The active ingredients can include any type of substance that causes
30 something to occur (for example the ingredient(s) in a pesticide that impact the pest, the ingredients in a fungicide that impact the disease and/or plant growth, health and/or vigor, the ingredients in a nematicide that impact the nematode, the ingredients in an inoculant

and/or other plant growth and/or health substance that cause the plant to improve its growth, health and/or vigor). The active ingredients can include any past, present and/or future active ingredients and can be chemicals, biologicals, biostimulants, micronutrients and/or other compositions. Examples of some current potential active ingredients include
5 clothianidin, ipconazole, trifloxystrobin, imidacloprid, metalaxyl, pyraclostrobin, bradyrhizobium, myclobutanil, thiamethoxam, abamectin, mefenoxy, fludioxonil, fipronil, azoxystrobin, cyantraniliprole, Rynaxypyr®, and the like. The other substances typically do not impact the target (for example pest, disease, nematode and/or plant growth, health and/or vigor), but can be helpful to include for a variety of reasons,
10 including causing the active ingredients to be at the appropriate levels and/or concentrations to be efficacious but not harmful to the seed and/or plant, helping the active ingredient affix and/or stick to the seed, helping the treated seeds not stick to each other and/or other objects, improving the color of the treated seed (e.g., to indicate the seed is treated with a pesticide), increasing the number and/or amount of active ingredients a seed
15 can absorb and/or otherwise carry and the like. Examples of some of these other substances include polymers, pigments, binders, surfactants, colorants, coatings, and other additives. The seed-applied substances can take any form, including wet and dry substances.

As used herein, the term "combination" includes one or more types and/or one or
20 more amounts of seed-applied substances that are applied to a seed.

As used herein, the term "farmer" includes farmers, farm owners, farm managers, farm investors, farmer operators, seed companies, planter companies, chemical companies, biological companies, agricultural research companies and/or any other individual and/or entity that can engage in farm-related decisions and/or activities.

As used herein, the term "condition(s)" includes any circumstance that can impact
25 what seed to be planted at a particular location and/or the type and/or amount of seed-applied substance(s) applied to such seed. In some embodiments, these conditions can include historical conditions, current conditions, future and/or predictive conditions and the like. By way of example, historical conditions can include past pests and/or diseases (e.g.,
30 corn rootworms, cutworms, aphids, nematodes, white mold, fungus), pest pressures, soil types, weather conditions, water levels, soil conditions (e.g., last-known nutrient, fertility, temperature and/or moisture levels of the soil), weeds, weed pressures, knowledge of the

terrain of the field, and/or planting practices and/or associated yields. By way of further example, current conditions can include current pest type and/or levels, pest pressure, soil type, weather conditions, planting date, water levels, soil conditions, weed levels, weed type, weed pressure, field terrain of the field, global positioning system (GPS) coordinates, geographical location of the system, geographical location, other location-based conditions, seed availability, nearby pest pressures and/or trends, commodity pricing and/or other market conditions, planter gas level, planter engine and/or ground speed and/or other planting operational monitoring information. By way of still further example, future conditions can include weather forecasts and/or predictions, projected planting date, projected yield of seeds, and/or predicted commodity pricing and/or other market conditions. Additionally, the conditions can be based, at least in part, on historical measurements, real-time measurements, predicative measurements, analytics and/or the like.

Figs. 1A and 1B illustrate exemplary agricultural equipment systems with which the objects of the present disclosure can be implemented. In a preferred embodiment, the agricultural equipment is comprised of a planter implement 10. The planter 10, as previously defined, can include a tractor 12 that can be operably connected to a draw bar 14 that can be operably connected to a framework 18, which can be comprised of any type, number and/or configuration of structural members to support the components of the planter 10, including one or more individual row units. Fig. 1A illustrates a planter 10 that can be configured with bins 20 associated with each row unit 16 along the length of the planter 10, commonly known as an individual row fill planter. Fig. 1B illustrates a planter 10 that can be configured with bins 20 centrally located along the framework 18, wherein the bins 20 can be operatively connected to each row unit 16 along the length of the planter 10, commonly known as a bulk fill planter.

In some embodiments, a bulk input device 22 can be operably connected to the individual row fill planter and/or the bulk fill planter. A bulk input device 22 can contain larger quantities of one or more agricultural inputs (*e.g.*, seed, chemicals, fertilizer, etc.) for use in planting and/or related activities. In one exemplary embodiment, the bulk input device 22 can comprise a commodity cart containing bulk amounts of seed. The bulk input device 22 can be towably connected to the planter 10, as illustrated in Figs. 1A and 1B, and/or otherwise connected to the planter 10 as commonly known in the art. As discussed

in detail below, the bulk input device 22 can be operably connected to the bins 20 of each row unit 16 along the length of the individual row fill planter, and/or to the bins 20 of the bulk fill planter. In another exemplary embodiment, the bulk input device can comprise one or more bins 20. The bulk input device 22 typically minimizes the frequency with
5 which a farmer reloads the planter 10. The bins 20 and/or the bulk input device 22 can store one or more types of seed. In some exemplary embodiments, the bins 20 can all store the same type of seed (*e.g.*, varieties, blends of varieties, hybrids, blends of hybrids and/or the like). In other exemplary embodiments, each of the bins 20 can store a different type of seed (*e.g.*, distinct varieties, blends of varieties, hybrid, hybrid blends, and/or the like). In
10 still other exemplary embodiments, one or more bins 20 can store the same types of seed and one or more other bins 20 can store different types of seeds, such that while not all bins 20 store the same type of seed, some amount of overlap of seed type can occur across bins 20.

In some preferred embodiments, the bins 20 can be configured in a manner that
15 each row unit 16 can get access to each type of seed that is to be planted by that particular row unit 16. This could be accomplished in many ways. For example, each row unit 16 could have its own dedicated set of bins 20 that contain enough of each type of seed that could be planted by such row unit 16 to be able to supply the proper amount of each of such type of seed to the row unit 16 during the planting operation. Typically in such
20 embodiments, the number of bins 20 used and/or the overall amount of weight carried by the planter is likely relatively high because it may be preferable to include a buffer of each seed type at each bin 20 for each row unit 16 to increase the likelihood that enough of each type seed that could be planted by each row unit 16 is stored at the bins 20 for each row unit 16.

By way of further example, the bins 20 could be configured in a manner that each
25 type of seed to be planted by the row units 16 has only one bin 20, and each of those bins can be operably connected to each row unit 16. In such embodiments, typically fewer, much larger bins 20 will be used. Also, the overall amount of seed and/or weight to be carried by the planter can be decreased at least in part because the buffer amount of each
30 seed type that may be planted can be spread across all of the row units 16 and thus typically can be much smaller than what would be needed for embodiments having bins 20 dedicated to each row unit 16.

Many other embodiments other than these two examples could be employed, including configurations where more than one bin 20 containing one or more of the types of seed is located on the planter, but where one or more of those bins 20 can service more than one row unit 16.

5 Referring to Figs. 2A and 2B, exemplary row units 16 of the planters 10 of Figs. 1A and 1B, respectively, are illustrated. The row units 16 can be configured to meter a seed to a relative location on the field. In this particular embodiment, each of the row units 16 can comprise a seed hopper 24, a seed meter 26, a seed drop tube 28, an opening disc 32, seed firmer wheels 34, and closing wheels 36. A person having ordinary skill in the art is
10 familiar with the operation of the above components comprising at least a portion of a seed flow path, which typically can extend from an origination point of the seed within the planter implement 10 (*e.g.*, a bulk input device 22 and/or seed storage bin 20) to just before the seed hits the location where it is planted (*e.g.*, a furrow and/or other location in a field). In short, the opening disc 32 can create a furrow within the field. A seed can be transferred
15 from the seed hopper 24 to the seed meter 26, which typically can be configured to singularize the seeds in an effort to increase the likelihood that each specific location only receives one seed. The seed can pass through the seed drop tube 28 into the furrow, after which seed firmer wheels 34 can apply pressure to the seed in the furrow. The closing wheels 36 can close the furrow overtop the seed. Transferring seed through the seed flow
20 path can be accomplished through a variety of means, including hydraulics, electric motors, vacuum pressure, positive air pressure, gravity, and the like. One or more of the components of the row unit 16 can comprise an insertion and/or dispersion device configured to insert the seed into the field and/or disperse the seed on top of the soil. The above process can occur at each and/or some row unit(s) 16 along the planter 10. A planter
25 10 can have one, two or any number of row units 16, but many modern commercial planters have as many as forty-eight row units with larger planters under development. The planters 10 illustrated in Figs. 1A and 1B have sixteen and twenty-four row units 16 respectively.

A primary object of the present disclosure includes selecting a combination of seed
30 and seed-applied substance to be planted at a location, including selecting seeds and one or more substances to apply to the seeds. In some embodiments, the seed-applied substances can be applied to the seeds prior to the seeds being loaded onto a planter implement 10.

However, in other embodiments, one or more of the seed-applied substances may be applied to the seed during the planting operation. According to some of the latter embodiments, the one or more seed-applied substances that are applied to the seeds during the planting operation can be stored in one or more substance receptacles 38. In such

5 embodiments, the one or more substance receptacles 38 can be located in many different locations on the planter implement 10. In some exemplary embodiments, a substance receptacle 38 can be associated with a particular row unit 16 of the planter 10, as shown illustratively in Fig. 2A. In other exemplary embodiments, each row unit 16 can have a plurality of substance receptacles 38 associated with it. In some exemplary embodiments,

10 some row units 16 could have only one substance receptacle 38 associated with them while other row units 16 could have more than one substance receptacles 38 associated with them. In other exemplary embodiments, a single substance receptacle 38 could be associated with and/or used for all applicable row units 16.

Each substance receptacle 38 can contain one or more seed-applied substances. In

15 embodiments with multiple substance receptacles 38, any particular substance receptacle 38 can contain any seed-applied substance regardless of what another substance receptacle 38 contains. For example, any two or more substance receptacles 38 could contain the exact same seed-applied substances, completely different seed-applied substances and/or have some of the same seed-applied substance and some different seed-applied substances.

20 Furthermore, while the present disclosure contemplates that most combinations will have both a seed and at least one seed-applied substance, the present disclosure also contemplates that some seeds could be planted without any seed-applied substances without deviating from the spirit and scope of the present disclosure.

In some embodiments, one or more of the substance receptacles 38 can be

25 partitioned into sub-receptacles. In some of those embodiments, the sub-receptacles could contain a plurality of seed-applied substances. In other embodiments, the sub-receptacles could each contain one or more of the same seed-applied substances, and typically would be transport those same seed-applied substances to different locations on the planter implement 10.

30 In another exemplary embodiment, at least a portion of the bulk input device 22 can comprise a substance receptacle 38. In some embodiments, the bulk input device 22 can be connected to one or more of the row units 16 and/or can supply the seed-applied substance

to the same. In other of such embodiments, a bulk input device 22 could be connected to other locations on the planter implement 10 (e.g., seed delivery tubes 40) to supply the seed-applied substance to the same.

In still another exemplary embodiment, the substance receptacle 38 can comprise a partitioned receptacle 38. In some of those embodiments, the partitioned substance receptacle 38 could contain one or more seed-applied substances, as shown illustratively in Fig. 3, which will be discussed in detail below. In other embodiments, the partitioned substance receptacles 38 could each contain one or more of the same seed-applied substances, and typically could transport those same seed-applied substances to different locations on the planter implement 10.

Another primary object of the present disclosure—enabling a broader range of seed-applied substances for farmers—can be accomplished by, *inter alia*, applying the seed-applied substances during the planting operation. Certain embodiments of the present disclosure contemplate exposing seed-applied substances to air or other potentially harmful conditions just prior to planting the combination of seed and seed-applied substance(s). After the combination is planted, it is typically covered by soil, which allows some substances that otherwise would not be capable of being seed-applied substances to be used. In other words, the present disclosure can enable a much broader scope of seed-applied substances.

Similarly, at least in part because the present disclosure enables a broader range of biological seed-applied substances, it also can accomplish another of its primary objects—reducing the reliance on and/or amount used of chemical seed-applied substances. For example, some of the current and future biological products can essentially replace the use of similar chemical alternatives and thus in some embodiments biological seed-applied substances can be used instead of chemical alternatives.

Another primary object of the present disclosure is to make a prescriptive selection of which combination of seed and one or more seed-applied substances to plant based all and/or in part on one or more conditions.

An exemplary system for achieving one or more of the primary objects of the present disclosure is illustrated in Fig. 3. According to this exemplary embodiment, the system can comprise one or more seed flow paths and substance flow paths. A seed flow path can take many forms, but typically can comprise the initial storage area of the seeds

on the planter implement and the path through which the seed passes prior to landing in the furrow and/or other location where the seed is planted. In some embodiments, the seed flow path can be comprised of one or more of the bins 20, one or more seed delivery tubes 40, one or more seed hoppers 24, one or more seed meters 26, and/or one or more seed drop tubes 28. The substance flow path can also take many forms, but typically can comprise the initial storage area of the seed-applied substances on the planter implement 10 (e.g., typically a substance receptacle 38 or compartment thereof) and the path through which the seed-applied substances pass prior to being applied to the seed. In some embodiments, the substance flow path can be comprised of one or more substance receptacles 38, one or more substance delivery tubes 52, and/or one or more substance applicators 42. In an exemplary operation, a seed can be dispensed from the bin 20, after which it can enter the seed delivery tube 40. The seed can be any seed type selected prior to and/or during the planting operation. The present disclosure contemplates that each iteration of a seed being dispensed from the bin 20 can be of the same or different seed type. According to one exemplary embodiment, one or more seed-applied substances can be dispensed from one or more of the substance receptacles 38 into one or more of the substance delivery tubes 52. One or more of the seed-applied substances can be applied to the seed by one or more substance applicators 42, which can be located in many locations including locations interior, exterior and/or proximate to the seed delivery tube 40. Indeed, in some exemplary embodiments, the seed-applied substance can be applied to the seed just prior to the seed entering, within, as the seed leaves and/or otherwise proximate to one or more seed delivery tubes 40. The seed-applied substance can be applied through many means, including means commonly known in the art. In an exemplary embodiment, one or more seed-applied substances can be applied by one or more substance applicators 42 operatively connected to the seed delivery tube 40, as shown illustratively in Fig. 3.

Exemplary substance applicators 42 for embodiments where one or more substance applicators 42 are located at and/or proximate to one or more seed delivery tubes 40 as well as at and/or proximate to other locations on the planter 10 can include many different types of spraying and/or applying technologies, including atomizers, jet nozzles, wheel nozzles, rotary spray heads, and the like. In some embodiments, an exemplary substance applicator 42 can include spray technology that allows seed-applied substance(s) to be mixed at the point of spray without altering the spray characteristics. As one example of how to do so,

low-pressure air can be combined with low pressure seed-applied substance(s) in a cyclone chamber, producing shear between swirling air and the seed-applied substance(s) to produce the desired droplet size for spraying. Such an exemplary substance applicator 42 can provide control over chemical composition and enable more precise application. In
5 some embodiments, it may be preferable to use one or more substance applicators 42 that can increase the accuracy of the application, minimize the amount of residue in the system and/or minimize the amount of potential dust off and/or other off target impacts from seed-applied substances.

In some embodiments, one or more metering mechanisms 50, including valves,
10 gates, orifices and the like, can be operatively connected to the one or more substance applicators 42. One or more of these metering devices 50 can control the flow of one or more of the seed-applied substances and/or assist in synchronizing the flow of the seed-applied substances to one or more of the substance applicators 42 in time with the seed being in the right position at the right time so that the substance applicator 42 can apply the
15 right type and/or amount of seed-applied substance to the seed.

In some embodiments, after the seed-applied substance is applied to the seed, the combination of seed and seed-applied substance can be delivered to an insertion and/or dispersion device. In embodiments where the application occurs prior to the seed entering the seed hopper, the combination can enter the seed hopper 24, be transferred to the seed
20 meter 26, be discharged through the seed drop tube 28, and be planted into the field. As will be discussed in detail below, the system provides for numerous configurations whereby the combination of seed and type and/or amount of seed-applied substance can be prescriptively selected based, at least in part, on the field, region, batch, row, and/or seed position.

In lieu of or in addition to applying one or more of the seed-applied substances just
25 prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to one or more seed delivery tubes 40, the same can occur just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to any number of components within the seed flow path. For example, one or more of the seed-applied substance can be applied to the
30 seed just prior to the seed entering, within, as the seed leaves and/or otherwise proximate to one or more seed hoppers 24, seed meters 26, and/or seed drop tubes 28. Some examples of such are shown illustratively in Figs. 4 and 5.

By way of example, one or more seed-applied substances could be applied just prior to entering, within, as the seed leaves and/or otherwise proximate to one or more seed hoppers 24. Typically, seed hoppers 24 generally store lesser amounts of seeds than the bins 20. Thus, additional concerns could arise as a result of applying the seed-applied substance in the seed hopper. For example, these embodiments could increase the risk of agglomeration of seeds, cross-contamination of seeds with different seed-applied substances, and/or buildup of residue build up in the hopper itself. The buildup of residue can potentially increase defect rates in delivering seed to the seed meter 26). As a result, certain adjustments and/or additional functionalities may be appropriate in some seed hopper 24 application embodiments.

By way of example, to decrease the likelihood of seeds sticking together, many different options are available. For example, one or more of the seed-applied substances could be a substance that initiates quick drying and/or prevents and/or limits stickiness (e.g., sealants, coatings, talc's and the like) of the other seed-applied substances. Further, a rotating and/or other moving agitator could be added to a seed hopper 24 to cause the seeds therein to constantly be moving and thus decrease the likelihood of clumping of seeds.

By way of further example, to avoid seeds with different seed-applied substances rubbing off on each other, many options are available. One option could be to include multiple different compartments within a seed hopper 24 and have a lever and/or other segregating device that forces seeds of different types into the different compartments thereby segregating them. Further, some type of control mechanism could be employed and synchronized with the seed-applied substances and substance applicators 42 to actuate the lever and/or other segregating device to ensure the accuracy of the segregation.

By way of even further example, to avoid residue build up and/or to further decrease the likelihood of cross-contamination in a seed hopper 24, many options are available. By way of example, the substance applicator 42 could be housed and thus the application could occur in a self-contained compartment just prior to the seed entering, within, as the seed is within, as the seed is leaving, and/or the seed is otherwise proximate to one or more seed hoppers 24. Similarly, some type of flushing mechanism could be used when the seed hopper 24 and/or self-contained compartment is empty and/or idle and/or at regular intervals.

In some embodiments, one or more seed-applied substances can be applied to the seed just prior to the seed entering, as the seed is within, as the seed is leaving, and/or the seed is otherwise proximate to one or more seed meters 26. Some seed meters have holes that aid in singulating seeds just prior to dropping such seeds down the seed drop tube 28.

5 In some embodiments, these same holes could be used to hold seeds in place while one or more substance applicators 42 apply one or more seed-applied substances. Further, in some of these embodiments, no agitation mechanism may be necessary as seeds typically would transfer into and through one or more seed drop tubes 28 and be planted without touching any other seed. However, given parts of seed meters 26 could be metal in certain
10 embodiments, unless the one or more substance applicators 42 are very precise, waste and/or residue may build up on the metal and/or other parts, such that some flushing, cleaning, monitoring and/or replacement mechanism may be necessary. If the substance applicators are located at and/or near the exit point of the seed meter 26 (*e.g.*, just after the seeds are transferred off the seed meter 26), the need for such mechanism could be
15 reduced. For example, a self-contained substance applicator 42 could be employed at and/or near the exit point of the seed meter 26.

One of the preferred locations where seed-applied substances could be applied pursuant to the present disclosure is the seed drop tube 28. In some exemplary
20 embodiments, one or more of the seed-applied substances can be applied to the seed just prior to the seed entering, as the seed is within, as the seed is leaving, and/or the seed is otherwise proximate to one or more seed drop tubes 40.

Figs. 6A-6D, 7A-7C, and 8A-8D illustrate a few exemplary embodiments of seed drop tubes 28. Seed drop tubes 28 can take many forms but typically are designed to allow seed to move from a seed meter 26 (or another component of a planter implement 10) to a
25 field. In some embodiments, seed drop tubes 28 can be an elongated structure disposed substantially vertically beneath one or more seed meters 26. A seed meter 26 often can eject a seed into a seed drop tube 28, which by air pressure, vacuum pressure, hydraulics, electric motors, force of gravity, belts, gears, and/or the like, travels through the seed drop tube 28 to the planting location. During its progression through the seed drop tube 28, the
30 seed can receive a seed-applied substance from one or more substance applicators 42, which can be located in many different locations, but often would be part of and/or connected and/or otherwise affixed to the seed drop tube 28. Further, one or more

metering mechanisms 50 can be operatively connected to one or more substance applicators 42. The application of one or more seed-applied substances in the seed drop tube 28 can provide for improved application of the seed-applied substance(s) than in-furrow applications of the same type of substances, of which only a small fraction, if any, comes in contact the seeds. Moreover, many in-furrow application substances cannot be and/or be combined with seed-applied substances because those substances actually can be harmful to seeds and/or the growth thereof. In fact, many in-furrow applications apply in-furrow substances away from the locations where the seed is to be planted to ensure the substances do not touch the seed when the seed is in the furrow.

Further, any excess seed-applied substance discharged by the substance applicators 42 can be collected and/or recycled, potentially saving a farmer significant expense. Still further, in embodiments where one or more of the seed-applied substances are applied within the seed drop tube 28, the configuration can advantageously minimize the buildup of residue from the seed-applied substances in the components of the seed flow path and/or other upstream system components.

In some exemplary embodiments, including some of those illustrated in Figs. 4 and 5, the substance receptacle 38 can be comprised of a plurality of compartments and/or sub-receptacles 46. Each of the plurality of compartments 46 can be adapted to receive any type of one or more seed-applied substances. For example, a plurality of compartments 46 can be adapted to receive a different type of seed-applied substance. Alternatively, two or more of the compartments 46 can receive the same type of seed-applied substance. Moreover, a compartment 46 could contain a plurality of seed-applied substances (e.g., mixtures). Additionally, a compartment 46 could contain one more of the same seed-applied substances as another compartment 46, and it could also contain one or more different seed-applied substances from that other compartment 46.

The compartments 46 can be filled with the seed-applied substance(s) prior to and/or during the planting operation in any way, including manually and/or automatically. In an exemplary embodiment, the substance receptacle 38, and more particularly the compartments 46, can be configured to hold uniformly sized containers having one or more of the seed-applied substance(s). In some embodiments, the containers can be installed, refilled, removed and/or replaced prior to and/or during the planting operation.

In some embodiments, the sub-receptacles could transport those same seed-applied substances to either different locations on the planter implement 10 or the same location (e.g., as a backup and/or alternative for a different sub-receptacle containing the same seed-applied substance).

5 In some embodiments, one or more of the compartments 46 can be in fluid connection with one or more mixing chambers 48 via one or more substance delivery tubes 52, and one or more mixing chambers 48 can receive a prescribed amount of one or more seed-applied substances from one or more of the compartments 46. Similarly, in some
10 embodiments, one or more of the metering mechanisms 50 can control the flow of the seed-applied substances. In some embodiments, one or more metering mechanisms 50 can be operably connected to one or more of the compartments 46. One or more of the seed-applied substances can be transferred to components of the system through any means. For example, such transfer can be accomplished by means commonly known in the art, including, pneumatics (*e.g.*, squeeze pump, and/or other positive and/or negative pressure
15 mechanisms), hydraulics, chutes, channels, and/or mechanical conveyances (*e.g.*, conveyor, belts, etc.).

In some embodiments, based, at least in part, on the needs of a specific seed location and/or other condition(s), a controller 54 can actuate one or more of the metering mechanisms 50 to release one or more seed-applied substances to one or more of the
20 mixing chambers 48. In some embodiments, one or more of the seed-applied substance(s) can mix within and/or proximate to one or more of the mixing chambers 48, either through a natural confluence and/or through other means (*e.g.*, mixer, agitator, etc.), after which the mixture can be transferred to one or more substance applicators 42, which can be in operable connection with one or more components of the seed flow path (*e.g.*, seed
25 delivery tubes 40, seed hoppers 24, seed meters 26, and/or seed drop tubes 28).

In some embodiments, mixing chambers may not be needed for many reasons. For example, if synchronized properly, the mere pressure of a pumping mechanism can cause multiple seed-applied substances to mix without the need of a separate mixing chamber 48. In some of such embodiments, more than one of the seed-applied substances could be
30 transferred to one or more of the substance applicators 42 and be mixed in the substance flow path without using a mixing chamber, and the pumping mechanism could be set up to force the proper mixing of the seed-applied substances before one or more substance

applicators 42 applies such mixed substance to the seed, as illustrated in Fig. 6D. In some embodiments, the compartments 46 could deliver their seed-applied substances to the same substance delivery tube 52 and the mixing could occur as those multiple seed-applied substances are transferred to one or more substance applicators 42. In some of such

5 embodiments, one or more controllers 54 and/or other mechanisms could control the flow and/or timing of the delivery of the seed-applied substances to ensure the proper amount of each seed-applied substance to be applied to a particular seed is delivered to the substance flow path at the proper time to ensure such seed-applied substances are mixed and then applied by one or more substance applicators 42.

10 Additionally, as set forth in exemplary embodiments illustrated in Figs. 6A, 6B and 6D, the substance flow path can be constructed in a manner where the seed-applied substances do not mix in a mixing chamber and/or a substance delivery tube 52 prior to application by one or more substance applicators 42. For example, one or more of the substance delivery tubes 52 of one or more compartments 46 could connect to one or more

15 substance applicators 42 only connected to one substance delivery tube 52 and/or compartment 46. In one such construction, each compartment 46 could have one substance delivery tube 52 that connects to one substance dispensing mechanism in a one-to-one fashion. In some configurations, the multiple substance dispensing mechanisms can be arranged along one or more components of the planter implement 10. In one such

20 example, the multiple substance dispensing mechanisms can be arranged along the length seed drop tube 28. In another example, seed-applied substances can be successively applied from any number of substance dispensing mechanisms as the seed is traversing through the seed drop tube 28, and one or more controllers 54 and/or other mechanisms can be employed to control whether the seed, based, at least in part, on one or more

25 planting conditions, needs the seed-applied substances that correlated with the series of substance dispensing mechanisms and could cause only those substance dispensing mechanisms that correlate with the seed-applied substances needed for such seed to trigger and/or apply the relevant seed-applied substances to the seed. The seed-applied substances correlated with the substance dispensing mechanisms can be of any type, including

30 multiple different types of a particular class of seed-applied substance. For example, a first substance dispensing mechanism can be associated with insecticide seed-applied substance, a second substance dispensing mechanism with a fungicide seed-applied

substance, and a third substance dispensing mechanism with a nematicide seed-applied substance, and based, at least in part, on one or more conditions, one or more controllers 54 and/or other mechanisms can determine whether the seed being planted at a particular field location requires such insecticide, fungicide and/or a nematicide. If, for example, one or
5 more controllers 54 and/or other mechanisms determine only the insecticide and nematicide are needed for a particular seed, as the seed transfers through the appropriate portion of the seed drop tube 28, the first substance dispensing mechanism and the third substance dispensing mechanism can be activated to apply the associated substances to the seed. In this particular example, the seed can receive successive applications, layers and/or
10 coatings of seed-applied substances. One or more substance applicators 42 can be closely grouped, as illustrated in Figs. 6A and 6B, and/or spaced at any distance so as to apply the seed-applied substance to the seed.

The present disclosure contemplates the seed-applied substance can be applied in any fashion, including in serial, in parallel, and/or any combination of the two, and/or one
15 or more substance applicators 42 can apply seed-applied substances to the seed at any location, including just prior to the seed entering, within as the seed leaves and/or otherwise proximate to a particular component. For example, one or more substance applicators 42 within a seed drop tube 28 could apply one or more seed-applied substances at the same location (Fig. 6B) and/or in multiple locations (Fig. 6A). In some
20 embodiments, one or more substance applicators can be situated such that for a particular seed they all trigger simultaneously and/or nearly so and/or create a mist that is applied to such seed essentially at the same time. Additionally, in some embodiments, the substance dispensers can all face the same direction, as illustrated in Figs. 6A-6D), and/or face multiple directions (*e.g.*, multiple sides of the seed drop tube 28), as illustrated in Figs. 7A-
25 7C.

In still another exemplary embodiment illustrated in Fig. 6C, the substance delivery tubes 52 can be configured to mix within and/or proximate to a mixing chamber, and can be further configured to be a single substance applicator 42. In yet another exemplary embodiment, the substance delivery tubes 52 can be connected or otherwise joined into a
30 singular substance delivery upstream of the substance applicator 42, as shown illustratively in Fig. 6D. Further, in some embodiments, the substance delivery tubes 52 can be combined prior to or at the substance applicator 42. In some embodiments, the substance

applicator 42 could simultaneously apply the seed-applied substances to the seed and/or could quickly individually apply each of the relevant seed-applied substances from each of the relevant substance delivery tubes 52 as the seed traverses past the substance applicator 42. Similar to the serial application configuration previously expressed herein, one or
5 more controllers 54 and/or other mechanisms can actuate the metering mechanisms 50 associated only with the substances to be dispensed to a particular seed at a particular seed location in particular embodiments.

Due to some of its advantages, the present disclosure contemplates additional exemplary configurations of when the seed-applied substance is applied just prior to the
10 seed entering, within, as the seed leaves, and/or otherwise proximate to the seed drop tube 28. Notably, any type of seed drop tube 28 (including multiple different types of seed drop tubes 28) can be used pursuant to present disclosure, including air tubes, brush tubes, seed accelerators and the like. Further, though seed drop tubes 28 are often oriented so the seed can travel down with the flow of gravity, any orientation of the seed drop tubes 28 can be
15 used without deviating from the objects of the present disclosure. Embodiments with air tubes are relatively simple. For example, air tubes typically comprise just a simple tube without many, if any, additional parts, and the simple tubes often can be made of simple materials including rubber, plastic, non-corrosive metals and the like. In some air tube embodiments, one or more substance applicators 42 can be located just about anywhere
20 along the seed drop tube 28. For example, one or more substance applicators could be affixed to the middle portion of the air tube and apply the seed-applied substances to the seed as it traverses past one or more of the substance applicators 42. For further example, one or more substance applicators 42 could be located at and/or proximate to the bottom of the seed drop tube 28.

25 Embodiments with a brush tube and/or a seed accelerator can be somewhat more complicated. For example, some brush tubes comprise one or more brushes that are designed to attempt to singulate seeds typically after they leave one or more seed meters, and such brushes attempt to push a single seed down the brush tube (typically having the capability of doing so at a rate faster than gravity). Because the brushes would typically be
30 made of materials that could absorb and/or collect seed-applied substances and thus potentially become less effective with residue build up and/or be difficult to clean, substance applicators preferably would be situated such that the seed-applied substances

they dispense come in minimal, if any, contact with the brushes. For example, one or more substance applicators 42 could be located at the bottom of the brush tube and/or in a separate application chamber.

According to some embodiments, including some of those illustrated in Figs. 8A-8D, the seed drop tube 28 can be comprised of one or more seed accelerators comprising one or more accelerator belts 56 typically having a plurality of sections 58 that can be separated by a plurality of ridges 62, each of the sections 58 can be configured to preferably transport one seed. In some embodiments, the accelerator belt 56 can be articulated and extend between two or more gears 60, at least one of which can be driven by a motor (not shown) and/or any other means commonly known in the art. In operation, one of the sections 58 of the accelerator belt 56 typically can receive a seed dispensed from one or more seed meters 26, and the accelerator belt 56 typically can accelerate (*e.g.*, at a speed greater than the seed would fall due to the force of gravity) the seed through the seed drop tube 28, during which the seed typically remains within the section 58 due at least in part to the adjacent ridges 62 and/or the closely conforming housing of the seed drop tube 28. At the base of the seed drop tube 28, the accelerator belt 56 can be inverted and the seed can disengage from the seed accelerator belt 56 by various means, including, in this particular example, the force of gravity, after which the seed can traverse towards the furrow. In some embodiments, prior to, while and/or just after leaving the seed drop tube 28, one or more substance applicators 42 can apply one or more seed-applied substances to the seed, as shown illustratively in Fig. 8A and 8D.

In the exemplary embodiment of Fig. 8B, one or more substance applicators 42 can apply one or more seed-applied substances to the seed prior to disengagement of the seed from one or more accelerator belts 56. Fig. 8B illustrates that one or more substance applicators 42 can be located in a middle portion of one or more seed drop tubes 28; however, the present disclosure contemplates that one or more substance applicators 42 can be located at any point along the seed flow path (*e.g.*, along one or more seed drop tubes 28) without deviating from the objects of the present disclosure. For example, just as with air tubes and brush tubes, in some seed accelerator embodiments including the one illustrated in Fig. 8D, one or more substance applicators 42 can be located at, below, and/or proximate to the bottom of one or more seed accelerators and/or other seed drop tubes 28.

Regardless of the type of seed drop tube 28, in some embodiments, one or more of the substance applicators 42 could be positioned at and/or proximate to the bottom of one or more seed drop tubes 28 to apply one or more seed-applied substances to seed in many different ways. As previously expressed herein, the seed-applied substances can be applied
5 just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to one or more seed drop tubes 28, as the seed is leaving the one or more seed drop tubes 28, and/or even after the seed has left one or more seed drop tubes 28. Notably, the present disclosure avoids applying the seed-applied substances to the furrow itself for a variety of reasons. For example, in-furrow applications of seed-applied substances can decrease the
10 effectiveness of seed-applied substances, as the seed typically does not reap as much of the benefit of seed-applied substances when applied in the furrow and typically in-furrow applications do not cover and/or otherwise touch as much of the surface of the seed. Further, in-furrow applications could increase the likelihood that the seed-applied substances could be mixed with other in-furrow applications, many of which are
15 potentially harmful to the seed and/or its health, emergence, growth and/or vigor.

Furthermore, any configuration of one or more substance applicators 42 discussed above (including those illustrated in Figs. 6A-6D), can be incorporated into one or more seed drop tubes 28 having one or more accelerator belts 56. Regardless of what type of seed drop tube(s) 28 are being used, due to the location of one or more substance
20 applicators 42, it is possible that a portion of one or more seed-applied substance(s) being applied to one or more seeds can contact components of one or more seed drop tubes 28, including one or more accelerator belts 56, resulting in accumulation of residue. Further, as the prescriptive nature of the present disclosure can in some embodiments benefit from certain seed locations receiving different substances and/or mixture of substances, one or
25 more flushing mechanisms 64 can be associated with the seed drop tube 28. In some embodiments, including the one illustrated in Fig. 8B, one or more flushing mechanisms 64 may be located on a side opposite one or more substance applicators 42. One or more flushing mechanisms 64 can be in fluid connection with one or more flushing reservoirs 66 that can contain one or more substances configured to reduce and/or remove any residue
30 from the relevant component (*e.g.*, the accelerator belt 56).

In some embodiments, one or more containment chambers 68 can be associated with one or more seed drop tubes 28 and enclose a portion of the relevant component (*e.g.*,

the accelerator belt 56 in this example) proximate to one or more substance applicators 42. In some embodiments, one or more accelerator belts 56 can enter and/or exit one or more containment chambers 68 through openings, which in this example are located in the upper and lower portions of the same, respectively. One or more containment chambers 68 can
5 be configured to minimize the exposure of the components within and/or proximate to one or more seed drop tubes 28 to the seed-applied substance(s). While in this particular example the containment chambers 68 were used in connection with seed drop tubes 28, one would understand that similar concepts could be adapted and/or applied to embodiments where one or more substance applicators 42 are located at and/or proximate
10 to other components of a planter implement 10, including seed delivery tubes 40, seed hoppers 24 and seed meters 26. The present disclosure contemplates that the containment chambers 68 can comprise a portion of the seed flow path and/or the substance flow path regardless of whether they are part of or proximate to any other components of the seed flow path (*e.g.*, seed delivery tubes 40, seed hoppers 24, seed meters 26 and/or seed drop
15 tubes 28) and/or substance flow path.

Referring to Fig. 8C, still another exemplary embodiment of a seed drop tube 28 is illustrated. In this illustrative embodiment, the seed drop tube 28 comprises an accelerator belt 56, a substance application belt 70 and one or more deflectors 72, and the accelerator belt 56 is configured to receive a seed of a particular seed type from one or more seed
20 meters 26 as previously discussed herein. In the illustrated embodiment of Fig. 8C, the accelerator belt 56 rotates in a clockwise direction, but the present disclosure contemplates that the accelerator belt 56 could rotate in any direction. In this particular embodiment, upon the detection and/or presence of a condition triggering a seed to receive one or more seed-applied substances, one or more deflectors 72 can be actuated by one or more
25 controllers 54 and/or other mechanisms to transfer the seed from the accelerator belt 56 to the substance application belt 70. The ridges 62 of the accelerator belt 56 can be comprised of any material, but rubber or similarly elastic material may be used such that the deflector effectively captures the seed couched in the section 58 of the accelerator belt 56. In the illustrated embodiment of Fig. 8C, the substance application belt 70 rotates in a
30 counterclockwise direction, but the present disclosure contemplates that the substance application belt 70 can rotate in any direction so long that it can function smoothly with the accelerator belt 56. As a result, the seed in this example that is transferred from the

accelerator belt 56 to the substance application belt 70 travels past the substance applicator 42, during which one or more seed-applied substances are applied to at least a portion of the seed. The combination of a seed and seed-applied substance can be dispensed from the seed drop tube 28 and/or transferred to the accelerator belt 56 via a second deflector 74.

5 Similar to the operation of the deflector 72, one or more controllers 54 and/or other mechanisms can actuate the second deflector 74 to capture the seed from the substance application belt 70. In instances where the combination of seed and seed-applied substance is returned to the accelerator belt 56 pursuant this example, the combination can be dispensed from the accelerator belt 56 and the seed drop tube 28. The present disclosure
10 contemplates that the flushing reservoir 66 and mechanism 64 of Fig. 7B can be implemented into many different embodiments of the present disclosure, including the embodiment of Fig. 7D. Furthermore, any configuration of the substance application 42 discussed above (for example those illustrated in Figs. 6A-6C), can be incorporated into the seed drop tube 28 having an accelerator belt 56 and substance application belt 70.

15 The present disclosure contemplates that the seed-applied substances could be applied all at the same component of the planter implement (*e.g.*, all at the seed drop tubes 28, all at the seed meters 26, all at the seed hoppers 24, all at the seed delivery tubes 40 and the like), but the present disclosure also contemplates other embodiments. For example, the seed-applied substances could be applied at more than one component of the planter
20 implement 10. Fig. 5 illustrates an exemplary embodiment where one or more seed-applied substances can be applied just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to one or more seed hoppers 24, seed meters 26, and/or seed drop tubes 28. In some of such configurations, different seed-applied substances could be applied at different components for a variety of reasons including because of the needs of
25 the application. For example, based, at least in part, on one or more conditions discussed below, an insecticide could be applied just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to the seed hopper 24, a fungicide can be applied just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to the seed meter 26, and an inoculant can be applied just prior to the seed entering, within, as the
30 seed leaves, and/or otherwise proximate to the seed drop tube 28. Similarly by way of illustration, a base fungicide could be applied to all seeds just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to the seed delivery tubes 40 and/or

seed hopper 24, but unique combinations of other seed-applied substances could prescriptively be applied just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to other locations (*e.g.*, at one or more seed meters and/or seed drop tubes 28) based, at least in part, on one or more conditions. This could decrease the need to address cross-contamination concerns in the seed hoppers 24 (*e.g.*, seed hoppers 24 would only be exposed to one type of seed-applied substance) while still allowing for prescriptive treatments of seed. Some of these embodiments may be helpful in embodiments where certain seed-applied substances may not mix well together, but can be applied serially.

While many of the embodiments of the present disclosure contemplate planter implements 10 with multiple individual row units 16 typically including seed hoppers 24, seed meters 26 and/or seed drop tubes 28, the present disclosure also contemplates planter implements 10 with only one row unit 16, with row units 16 not including all of such components and even without row units. For example, in some embodiments, the planter 10 can be a drill planter. In some drill planter embodiments, one or more seeds can be stored in one or more bins (typically a single large bin that can extend across the width of the back of the planter) that typically transfer one or more seeds to one or more insertion and/or dispersion devices (typically a series of seed drop tubes) that plant one or more seeds (typically in rows) in a manner similar to that described above, but such embodiments typically do not have seed hoppers and sometimes do not have seed meters. In some drill planter embodiments, while one or more substance applicators could still be located anywhere along the seed flow path, they preferably would be located at and/or proximate to the seed drop tubes.

Further, in some embodiments, the planter 10 can be a broadcast planter, which may not have any row units. In some broadcast embodiments, seeds will be stored in a bin and be transferred to one or more metering wheels and/or other insertion and/or dispersion devices typically via one or more slide gates. Further, in some broadcast embodiments, the applicable metering wheel(s) and/or other seed insertion and/or dispersion device(s) plant the seed by spraying and/or otherwise inserting and/or dispersing the seeds (typically a group of seeds at the same time). In some broadcast embodiments, while the substance applicators could still be located anywhere along the seed flow path, they preferably would be located at and/or proximate to one or more slide gates and/or metering wheels. For

example, one or more substance applicators could be situated to apply the seed-applied substances to one or more seeds as they leave one or more slide gates and/or as they leave one or more metering wheels. Moreover, in some embodiments, the planting location of the seed could be the range of the broadcasting of the seed (*e.g.*, broadcast radius) via the applicable metering wheel (and/or other insertion and/or dispersion device) rather than a single specific seed location or could use algorithms to calculate where each seed will land and use such as the planting location on a seed-by-seed basis.

Moreover, the present disclosure contemplates the seeds to which seed-applied substances are applied can be already treated with one or more seed-applied substances (*e.g.*, be pre-treated), have been treated with no prior seed-applied substance and/or combinations of the same. In some of the former embodiments, for example, some seed-applied substances may not be sufficiently durable to apply prior to planting, but provide significant value to a farmer. However, some seed companies, distributors and/or retailers may choose to sell only seed that is pre-treated with at least a base package of seed-applied substances for all and/or a majority of its seed (for example, this is typical with corn). For these and other reasons, the present disclosure also contemplates farmers selecting a combination of seed and seed-applied substances where one or more of the seed-applied substances are applied to one or more seeds prior to the planting operation and one or more seed-applied substances are applied to one or more seeds during the planting operation.

One primary object of the present disclosure is to reduce the potential negative dust off, off target or other environmental or other sustainability impacts that may result from planting seeds with seed-applied substances. Pursuant to some embodiments of the present disclosure, neonicotinoid dust off potentially could be reduced if such substance was not applied to seeds prior to loading them onto the planter. However, some seed and/or chemistry companies and other industry participants have suggested that neonicotinoid seed-applied substances can have strong yield and/or other benefits. Thus, it is another objective of the present disclosure to enable the potential benefit of neonicotinoid seed-applied substances while reducing the potential harm from dust off incurred during the pre-planting seed loading operation. In some embodiments, this could be accomplished by applying the neonicotinoid seed-applied substances during the planting operation (*e.g.*, in one of the many ways described herein or as otherwise consistent with the present disclosure) rather than loading seeds pre-treated with neonicotinoids onto a planter.

Further, while a blower and/or other drying mechanism could potentially be used in combination with various aspects of the present disclosure, many embodiments of the present disclosure do not necessarily need the use of a blower or other drying mechanism to dry the seed-applied substances for many reasons, examples of some of which are
5 discussed above and examples of some of which are set forth below. For example, in embodiments where one or more substance applicators 42 are located in one or more seed meters 26 or seed drop tubes 28, the seeds typically have been singulated and no longer come in contact with any other seed in the seed flow path, such that the need to blow or otherwise dry them to avoid clumping or otherwise is significantly reduced. Similarly, in
10 embodiments with very precise and accurate substance applicators, the amount of seed-applied substances (*e.g.*, active ingredients) necessary to accomplish its desired impact (*e.g.*, fighting diseases for a fungicide) can be potentially reduced, such that the amount of seed-applied substances to be applied to the seeds during the planting process could be decreased, which in turn typically allows such seed-applied substances to dry quicker as
15 they travel through the seed flow path.

Another primary object of the present disclosure is to prescriptively select a combination of seed and/or seed-applied substances to be planted. As previously expressed herein, one exemplary method of doing so is through applying one or more of the seed-applied substance(s) during a planting operation. Another exemplary method of
20 doing so is by applying the one or more substances to a seed prior to the seed being loaded onto a planter 10 and prescriptively selecting, from the loaded seed during the planting operation, the desired seeds having the desired one or more seed-applied substances for planting.

Some embodiments involving pre-treated seed that is loaded onto the planter 10
25 before the planting operation can be described by referring to the planter 10 of Fig. 1B. For example, the bins 20 can be loaded prior to the planting operation to contain some combination of one or more seeds of one or more seed types (*e.g.*, one or more hybrids and/or varieties) treated with one or more seed-applied substances where one or more seed-applied substance(s) can be applied prior to loading the bins 20 with the seeds. Many
30 different methods of pre-treating seeds with seed-applied substances and/or loading them onto a planter 10 can be used, and most of those methods are commonly known in the art and/or are readily apparent in light of the structure of the applicable seed type and/or

planter 10. The present disclosure contemplates any combination of seeds and seed-applied substances. In one particular example, a portion and/or batch of the seeds can be treated in bulk with an insecticide, a fungicide and an inoculant, another portion and/or batch of the seeds can be treated with just a fungicide and another portion and/or batch of the seeds can be treated with just an insecticide. Each of these batches of seeds can be loaded into one or more of the bins 20. In some embodiments, each of the bins 20 can contain a different combination of seed and seed-applied substance(s), but multiple bins 20 can contain the same combination of seed and seed-applied substance(s) in other embodiments. Based, at least in part, on one or more conditions, a combination of seed and seed-applied substance(s) can be selected from the different combinations of seed and seed-applied substance(s) in many different ways, but is most often accomplished by one or more controllers, the details of some examples of which will be discussed below.

One or more controllers can operate many different components in the present disclosure. Here, for example, one or more controllers can operate components associated with the bins 20 to deliver the selected combination from the bins 20 through the seed flow path (*e.g.*, to one or more row units 16 of the planter 10), after which it can be dispensed and planted consistent with the present disclosure previously discussed herein. The selected combination of seed and seed-applied substance can be based, at least in part, on any planting condition(s), but the selection typically will take into account at least the type of the seed, the type of the seed-applied substance(s), and/or the application rate of the seed-applied substance(s). Keeping with the example discussed above, if a particular row and/or other location does not need any fungicide and/or inoculant, but could benefit from a particular type of seed (*e.g.*, a particular hybrid and/or variety) treated with just an insecticide, one or more controllers could cause one of the bins 20 containing such combination of seed and insecticide to dispense a seed and cause it to be delivered through the seed flow path and be planted. In some embodiments, the selected combination could be dispensed from a particular seed bin 20, delivered via a seed delivery tube 40 to the row unit 16 corresponding with where the seed is to be planted. In some of such embodiments, the seed will go through a seed hopper 24, one or more seed meters 26 and a seed drop tube 28 prior to being planted at the desired location, which is typically a location in a furrow in a field. However, if, in such example, a particular row and/or other location benefits from a particular type of seed treated with an insecticide, fungicide and an

inoculant, one or more controllers could cause one of the bins 20 containing such combination of seed and insecticide, fungicide and inoculant to dispense a seed and be delivered through the seed flow path and be planted.

5 In embodiments where only one bin 20 contains all of a particular combination of seed and seed-applied substance(s), that particular bin 20 will always be selected when such combination is selected. However, in embodiments where more than one bin 20 contains a particular combination of seed and seed-applied substance(s), the selection from amongst the multiple bins 20 containing the combination can be performed in many different ways. For example and referring to Fig. 2A, in some embodiments, each row unit
10 16 could have its own bin 20, set of bins 20 (and/or one or more partitioned bins) having all possible combinations of seed and seed-applied substances. In such embodiments, the selection of the appropriate bin 20 typically will correspond to the bin 20 that is associated with the row unit 16 where the combination is to be planted. However, it is possible to have some bins 20 that deliver a particular combination of seed and seed-applied
15 substances to more than one row unit 16, but not all row units 16 on the planter 10. In some of such embodiments, the bins 20 could have multiple seed delivery tubes 40 that connect to multiple different row units 16.

Additionally, in some embodiments, it is possible for one or more row units 16 to be capable of receiving one or more combinations of seeds and seed-applied substance(s)
20 from more than one bin 20. In some of such embodiments, the bins 20 could have multiple different seed delivery tubes 40 and typically would have one seed delivery tube 40 for each row unit 16 to which it is configured to deliver the relevant combination of seed and seed-applied substance(s). In some embodiments, one or more controllers could be used to control various functions, including which of the possible bins 20 containing the selected
25 combination of seed and seed-applied substance(s) should deliver the combination (typically to a particular row unit 16) and through which seed delivery tube 40 such combination should be delivered. In some embodiments, the selection of which of multiple possible bins 20 to deliver the seed could be based, at least in part, on the inventory levels of the combinations of seed and seed-applied substance(s) in the applicable potential bins
30 20.

In lieu of or in addition to the bins and/or seed receptacles 20 of Fig. 9, the planter 10 can be comprised of one or more partitioned bins and/or seed receptacles 20. Each

partition of such bin 20 can receive a particular combination of seed type and/or seed-applied substance and function similarly to that described above in connection with bins 20 having only one compartment and containing only one combination of seed and seed-applied substance. For example, based, at least in part, on the absence and/or presence of
5 one or more conditions, one or more controllers can select a combination of seed type and seed-applied substance and cause the appropriate partition of the bin 20 to dispense the selected combination and then be planted, and the dispensing of the selected combination of seed and seed-applied substance(s) can be accomplished through any means commonly known in the art, including methods previously expressed herein.

10 Similar to as described above, the exemplary embodiment of pre-treating seeds and prescriptively selecting a combination of seed and seed-applied substances can be used in lieu of and/or in addition to the exemplary embodiment of applying the seed-applied substance during the planting operation. In other words, in an instance where one, more than one, and/or all of the bins 20 are loaded with seed pre-treated with one or more seed-
15 applied substances, the planter 10 can also apply one or more seed-applied substances within the seed drop tube 28 (and/or other components in and/or proximate to the seed flow path) during operation of the planter 10 consistent with the methods previously discussed herein.

A primary object of the present disclosure is to generate a prescribed combination
20 of seed type and seed-applied substance prior to planting based, at least in part, on one or more conditions. The present disclosure contemplates that the prescribed combination can be generated in many different ways.

In some embodiments, generating a combination of seed and seed-applied substance for planting at a particular location based, at least in part, on one or more
25 planting conditions, can be correlated to a particular farmer's objectives and sometimes a prioritization of those objectives. For example, a particular farmer's objectives can vary greatly, but many farmers' objectives are yield optimization, yield and/or other risk mitigation, and/or financial and/or operational considerations. Many farmers focus solely on and/or otherwise prioritize yield potential and/or optimizing yield. In some cases,
30 farmers can accomplish this objective, at least in part, by selecting the inputs that potentially have a high (and preferably the highest) yield potential under the predicted and/or most common circumstances. By way of example, a farmer could focus on yield

potential and/or optimizing yield by selecting a seed type that has the highest yield potential for a particular location under common weather (*e.g.*, temperature, wind and rain) conditions for the location even if that seed type may have very poor performance under other conditions (*e.g.*, under extreme drought and/or flooding conditions that typically don't occur very often). Similarly, a farmer could focus on yield potential and/or optimizing yield by selecting the amount and/or types of seed-applied substance(s) that provide the highest yield potential for a particular location under common insect, disease and other pest conditions for the location even if that amount and type of seed-applied substance(s) may have very poor performance under other conditions (*e.g.*, under extreme (high and/or low) disease, insect and/or other pest pressures). In some embodiments, if a farmer's only objective is to optimize yield, then the selected combination of seed and amount and/or type of seed-applied substance(s) can be based, at least in part, on data and/or experience concerning which particular combination could provide the highest potential yield under the predicted and/or most common circumstances, and such determination typically can be by individual location, zone, region, field and/or across multiple fields and/or farming operations. Thus, in some embodiments, yield potential and/or optimization can be an objective that may influence which conditions to be taken into consideration, at least in part, when selecting which combination of seed and seed-applied substances to plant in a particular location.

In some instances, other objectives may drive a farmer's decisions. By way of illustration, a particular farmer may be more risk adverse and could focus solely on and/or prioritize mitigating risk in many different ways. In some cases, a particular farmer may want to even out the cyclical and dynamic nature of the annual farming business. For example, field, weather and other conditions can vary drastically year to year from farm to farm and even within a farm. These variations can have a dramatic impact on the success of a farmer, and sometimes certain conditions may be more influential than others. By way of example, certain extreme field (*e.g.*, disease, insects and other pests) and/or weather (*e.g.*, extreme drought and/or flooding and/or wind) conditions can dramatically negatively impact yield for certain combinations of inputs, but it may not have as much impact on other combinations of inputs (though those combinations of inputs may not have as high of a yield potential under common and/or predicted conditions). In some situations, a particular farmer may want to mitigate the risk of having a very poor yield (or not making

a net profit) and desire the combination of inputs that will increase the likelihood of maintain a certain level of yield regardless of the weather, field and/or other conditions that particular year. In some embodiments, if a farmer's objective is to mitigate risk, then the selected combination of seed and amount and/or type of seed-applied substance(s) can be
5 based, at least in part, on data and/or experience concerning which particular combination could provide a high likelihood (preferably the highest likelihood) of obtaining a particular level of yield under many different possible circumstances even if such combination may not have as high of a yield potential under common and/or predicted conditions, and such determination can again be at the individual location, zone, region, field, multiple field
10 and/or farming operation level. By way of example, the combination selected for some more risk adverse farmers could be a more durable hybrid and/or variety seed treated with a relatively higher amount of fungicide and/or insecticide than would otherwise be projected to provide the highest yield potential and/or the best return on investment. Thus, in some embodiments, risk mitigation can be an objective that may influence which
15 conditions to be taken into consideration, at least in part, when selecting which combination of seed and seed-applied substance(s) (*e.g.*, type and/or amount) to plant in a particular location.

In addition to yield potential and risk mitigation, some farmers may focus on and/or prioritize financial (*e.g.*, reducing and/or minimizing costs, optimizing profits and/or the
20 like) and/or other operational considerations (*e.g.*, inventory management, sustainability, land and/or water use, long term effectiveness of active ingredients and/or traits, labor considerations and/or the like) when making decisions. In some situations, a particular farmer may not look just to yield potential, but may weigh yield potential against the potential costs for obtaining such yield potential, and typically such a farmer can attempt to
25 increase and/or optimize profitability of the farm operation by selecting the type and amount of inputs and other consideration that are projected to net higher and preferably the highest profit. By way of example, a particular farmer may discern how much potential yield benefit many different types of seed (*e.g.*, hybrids and/or varieties), seed-applied substances and other inputs have, compare the potential yield benefits of such seeds and
30 seed-applied substances and their projected revenues (*e.g.*, by projecting increased bushels per acre and/or hectare and multiplying them by projected commodity prices of the relevant crop) to the relative costs of such combination to make decisions on which seeds

and the type and/or amount of seed-applied substance(s) to purchase and/or plant. In some embodiments, if a farmer's only objective is profit potential and/or optimization, then the selected combination of seed and amount and/or type of seed-applied substance(s) can be based, at least in part, on data and/or experience concerning which particular combination
5 could provide the highest potential profit under the predicted and/or most common circumstances, and while such determination typically can be at the individual location, zone, region, field and/or across multiple fields and/or farming operation level, it preferably is at the farming operation level.

Further, a particular farmer may already have a pre-existing inventory of an input
10 (*e.g.*, seed and/or seed-applied substance) from prior growing seasons and/or from other operations. In some situations, a particular farmer may want to use such inventory prior to it becoming non-viable and/or otherwise not being appropriate for planting. In some embodiments, a farmer may make decisions based, at least in part, upon conditions that impact the level of existing seed and/or seed-applied substance(s) inventories. Notably, in
15 some embodiments, once pre-existing inventories are used up, a different objective and/or prioritization could be employed.

For another example, a particular farmer may wish to be able to run its farm operations in a manner that could be considered and/or qualify as organic, non-GMO and/or more sustainable, land and/or water use efficient and/or the like. In fact, in some
20 situations, farmers may even be financially and/or otherwise incented and/or legally and/or otherwise obligated to do so. Thus, in some situations, a particular farmer may select and/or prioritize inputs that decrease and/or eliminate the use of technologies sometimes having negative connotations in the market (*e.g.*, GMO traits, chemistries and/or other substances alleged to have negative impacts on non-target organisms and/or water quality
25 and/or the like) and/or qualify for statuses including non-GMO and/or organic. Some farmers may select either lesser amounts of and/or different types of inputs than other objectives (*e.g.*, yield potential and/or optimization, yield and/or other risk mitigation and/or net profit potential and/or optimization) may otherwise suggest. In some such embodiments, the selected combination of seed and amount and/or type of seed-applied
30 substance(s) can be based, at least in part, on data, knowledge and/or experience concerning which particular combination could decrease and/or eliminate the use of technologies sometimes having negative connotations in the market and/or qualify for

statuses (including non-GMO and/or organic) and select either lesser amounts of and/or different types of seeds and/or seed-applied substances than other objectives would suggest, and such determination typically can be at the individual location, zone, region, field and/or across multiple fields and/or farming operation level, but preferably would be at a level where the farmer can track its compliance with relevant governmental, NGO and/or other standards. By way of example, a particular farmer could choose to use biological insecticides rather than chemistry-based neonicotinoid class insecticides, which have been claimed by some to impact bee health. Similarly, a particular farmer could just decide to use a lower rate of neonicotinoid class insecticides for the same and/or other reasons.

Thus, in some embodiments, net profit potential, other financial considerations, inventory management, sustainability and/or other operational considerations can be objectives that may influence which conditions to be taken into consideration, at least in part, when selecting which combination of seed and seed-applied substances (*e.g.*, type and/or amount) to plant in a particular location, and such determination typically can be at the individual location, zone, region, field and/or across multiple fields and/or farming operation level. The selected combination can vary on a field-by-field, region-by-region, row-by-row, column-by-column, zone-by-zone, batch-by-batch, and/or seed-by-seed basis.

Furthermore, in some embodiments, a particular farmer can use an approach comprising any combination of the above strategies. For example, a particular farmer could take multiple of the above-described objectives into account when determining which conditions should be used, at least in part, when making selection decisions, and such a farmer could use a weighting and/or other prioritization system to be able to make decisions when the various objectives conflict and/or do not correlate easily. In some embodiments, prioritization of objectives and/or conditions could be preset by an algorithm and/or system, but in other embodiments it could be input and/or adjusted by a farmer and/or other entity at certain times (*e.g.*, during set up, loading the planter and/or the like), periodically and/or regularly. Similarly, in some embodiments, the prioritization can be the same for the entire planting operation, but in other embodiments the prioritization can be adjusted (*e.g.*, automatically by an algorithm and/or system, manually by a farmer and/or other user and/or otherwise) at any time (*e.g.*, real-time, in between planting operations and/or otherwise). The selection criterion can be as simple (*e.g.*, planting date

and available seeds and/or seed-applied substances) and/or complex (*e.g.*, a multi-objective approach that prioritizes the objectives depending on the field and/or location and thus adjusts the numerous conditions to be considered and the prioritization thereof as the planter goes through the field) as possible.

5 In an exemplary embodiment, a particular farmer could use and/or prioritize a yield and/or net profit potential and/or optimization strategy in regions of the field with the best soil types with historically consistent yields (*e.g.*, typically low disease, insect and/or other pest pressure and otherwise low yield variability risk) and a risk mitigation strategy in
10 regions of the field associated with increased risks (*e.g.*, poor draining soil types, low and/or wet areas and/or otherwise high moisture levels and thus, typically higher insect, disease and/or other pest pressures, etc.).

 As discussed above, many different conditions can be used in the seed-by-seed-applied-substance combination selection process in various different embodiments, and there are many ways that the various conditions can be measured, captured and/or
15 otherwise assessed, including through records, sensors, gauges, monitors and the like, any of which can be located in many locations, including in and/or around the field, comprising and/or associated with satellite, drone and/or aerial devices, comprising and/or associated with devices that pass through, over and/or around the field, and wearable, mobile and/or other digital and/or electronic devices. Moreover, conditions can be measured, captured
20 and/or otherwise assessed based, at least in part, on prior (*e.g.*, inputted and/or other pre-existing data and/or information), real-time and/or predictive and/or other analytical means. For example, geographical locations (*e.g.*, of the system and/or one or more planting locations) can be based, at least in part, on many different sources, including visual observation, GPS coordinates, (*e.g.*, historic, predictive and/or real-time GPS coordinates)
25 and/or prescription field maps. Similarly, some soil, water, moisture, disease, insect, other pest and other field-related measurements can be obtained through many ways, including visual observation, historical records and/or knowledge, and soil and/or other field sampling (including periodic core and other sampling and in-field, pass-over, aerial and/or other real-time sensors).

30 In some embodiments, certain conditions can impact which seed a particular farmer may select for a particular location. By way of example, some conditions may impact what crop, hybrid and/or variety and/or native and/or transgenic traits to select. For example, if

certain conditions indicate and/or suggest a higher level of a particular disease, insect, nematode and/or other pest pressure and/or low nitrogen levels, then some embodiments may cause seeds with native and/or transgenic traits relevant to the same to be selected. By way of example, if certain conditions indicate an increased presence or likelihood of corn rootworm (CRW), then some embodiments may select crops other than corn and/or corn hybrids with one or more transgenic and/or other modes of action against CRW, and some conditions indicating or predicting extremely high levels of CRW may cause certain embodiments to select corn hybrids with two or more transgenic and/or other modes of action against CRW. Similarly, if certain conditions indicate certain highly productive soil types (*e.g.*, silt and/or other loam and/or the like), then some embodiments may select hybrids and/or varieties with the highest yield potential; but if certain conditions indicate certain less productive soil types (*e.g.*, sand, clay and/or the like), then some embodiments may select hybrids and/or varieties with more defensive native and/or transgenic traits (*e.g.*, disease and/or insect tolerance and/or resistance). While not exhaustive, Table 1 reports various potential exemplary conditions, ways to measure such conditions and potential actions related to selecting a combination of seed and seed-applied substance(s) that are contemplated by the present disclosure. In some embodiments, Table 1 and/or portions thereof could be used, at least in part, in the selection of the combination of seed and seed-applied substances to be planted at a particular location, and the selection of which condition(s) to use, how to measure them, the relative weighting and/or prioritization of them and how they impact the selection of the combination of the seed and seed-applied substance(s) can vary from embodiment to embodiment.

Potential Condition	Potential Ways to Measure	Potential Actions Taken in Response to Presence of Condition
Dry Soil	Soil moisture gauges and/or sensors; soil sampling; aerial, visual and/or other observation; weather forecast.	Select seeds with better emergence in dry soil; select high vigor seeds; apply water; increase amount of water applied to seed; apply fungicides, insecticides, plant growth promoters and/or inoculants; increase the rate and/or number of the fungicides, insecticides, plant growth promoters and/or inoculants.

Cold Soil	Soil temperature gauges and/or sensors; soil sampling; ambient air temperature gauges and/or sensors with soil temperature conversions; aerial temperature observations; weather forecasts; early season and/or colder region planting; high crop residue in field.	Select seeds with better native and/or transgenic disease resistance traits; apply fungicides and/or insecticides; and/or increase the rate and/or number of fungicides and/or insecticides; apply brady rhizobium, plant growth promoters, and/or other inoculant and/or increase the rate and/or number of the same.
Wet Soil	Soil moisture gauges and/or sensors; soil sampling; aerial, visual and/or other observation, weather forecast; soil type; field terrain; tiling in the field; knowledge of prior flooding zone.	Select seeds with better native and/or transgenic disease resistance traits; apply fungicides and/or increase the rate and/or number of fungicides.
Wet Then Dry Soil	Soil moisture gauges and/or sensors; soil sampling; aerial, visual and/or other observation, weather forecasts; knowledge of soil type; field terrain; tiling in the field; knowledge of prior flooding zone.	Select seeds with better native and/or transgenic Rhizoctonia resistance traits; apply Rhizoctonia fungicides and/or increase the rate and/or number of the Rhizoctonia fungicides.
Chemical Residue Levels	Soil chemistry gauges and/or sensors; soil sampling; knowledge of past years' chemical application rates.	Apply safeners, fungicides, plant growth promoters, and/or inoculants, and/or increase the rate and/or number of the same.
Mild Winters	Knowledge of past seasons' temperatures, wind chills and precipitation.	Select seeds with better native and/or transgenic insect resistance traits; apply insecticides, and/or increase the rate and/or number of insecticides.
Insect Pressure	Soil sampling (<i>e.g.</i> pheromone-baited traps), gauges and/or sensors.	Select seeds with better native and/or transgenic insect resistance traits (can vary depending on the insect and the level of pressure); apply insecticides, and/or increase the rate and/or number of insecticides. If high levels of CRW, apply fungicides (<i>e.g.</i> , root rot) and/or increase the rate and/or number of fungicides.

Early Vegetation In and/or Near Field	Knowledge of vegetation (<i>e.g.</i> , sod/grass, weeds, soy/small grains) in adjacent and/or nearby fields and/or prior year's crops in the field to be planted; aerial, visual and/or other observation; soil/in-field gauges and/or sensors.	Select seeds with better native and/or transgenic insect resistance traits; apply insecticides, and/or increase the rate and/or number of insecticides.
Monoculture	Knowledge of prior year's crops planted in the same field.	Select seeds with better native and/or transgenic insect, disease and nematode (<i>e.g.</i> , Soybean Cyst Nematode (SCN) for soybeans) resistance and/or nitrogen use efficiency (NUE) traits; apply fungicides, insecticides and/or nematicides and/or increase the rate and/or number of the same. Apply brady rhizobium, plant growth promoters, inoculant and/or other nitrogen fixing bacteria, biologicals, and/or other materials and/or increase the rate and/or number of the same.
High Crop Residue	Knowledge of the farm management practices, crops, and/or level of crop residue; aerial, visual and/or other observation; soil gauges and/or sensors; soil sampling; residue sampling.	Select seeds with better native and/or transgenic insect, disease and nematode resistance and/or NUE traits; apply fungicides, insecticides and/or nematicides and/or increase the rate and/or number of the same. Apply brady rhizobium, plant growth promoters, inoculant and/or other nitrogen fixing bacteria, biologicals, and/or other materials and/or increase the rate and/or number of the same.
High Temperature and Humidity During Seed Storage	Knowledge of seed storage conditions, including temperature, moisture and insect levels. Knowledge of whether germination and/or vigor of seeds are still acceptable.	Apply fungicides, plant growth promoters, inoculants and/or increase the rate and/or number of the same. If seed grain insect levels are high, apply insecticides and/or increase the rate and/or number of the same.
Aggressive Handling of Seed Prior to Planting	Knowledge of seed handling practices. Knowledge of whether germination and/or vigor of seeds are still acceptable.	Apply fungicides, plant growth promoters, inoculants and/or increase the rate and/or number of the same. If seed grain insect levels are high, apply insecticides and/or increase the rate and/or number of the same.

Low Seeding Rate	Seeding rate sensor. Knowledge of productivity history of particular zones of field. Knowledge of seeding rate of equipment and/or prescription algorithm.	Select lower cost seeds; select higher yielding seeds; apply fungicides, insecticides, nematicides, plant growth promoters, inoculants and/or other seed treatment actives, and/or increase the rate and/or number of the same.
Inconsistent Planting Depth	Planting depth sensors; knowledge of past years' planting depth.	Apply fungicides, plant growth promoters, and/or inoculants, and/or increase the rate and/or number of the same.
Sandy Soil and/or High Level of Nematodes	Soil sampling, gauges and/or sensors for nematode levels; knowledge of soil types; weather forecasts.	Select seeds with better native and/or transgenic nematode resistant and/or NUE traits; apply nematicides and/or increase the rate and/or number of the same; apply and/or include brady rhizobium, plant growth promoters, inoculant and/or other nitrogen fixing bacteria, biologicals and/or other materials and/or increase the rate and/or number of the same.
Spring-applied Manure	Knowledge of farm management practices.	Select seeds with better native and/or transgenic insect resistant traits; apply insecticides, and/or increase the rate and/or number of the same.
Corn Planted Two Years After Pasture	Knowledge of farm management practices.	Select seeds with better native and/or transgenic insect resistant traits; apply insecticides, and/or increase the rate and/or number of the same.
Corn Planted After Pasture	Knowledge of farm management practices.	Select seeds with better native and/or transgenic insect resistant traits; apply insecticides, and/or increase the rate and/or number of the same.
Field Adjacent to Cottonwood and/or Willow Trees	Knowledge of adjacent fields.	Select seeds with better native and/or transgenic insect resistant traits; apply insecticides, and/or increase the rate and/or number of the same.
Cool Spring Forecast	Weather forecasts.	Select seeds with better native and/or transgenic insect resistant traits; apply insecticides, and/or increase the rate and/or number of the same.
Nitrogen Deficiency	Soil sampling; soil nitrogen gauges and/or sensors; aerial and/or other observation.	Select seeds with better native and/or transgenic NUE traits; apply and/or include brady rhizobium, plant growth promoters, inoculant and/or other nitrogen fixing bacteria, biologicals and/or other materials and/or increase the rate and/or number of the same.

Minimal Fertilizer Applied, Heavy Rainfall after Fertilization, and/or Saturated Soils	Knowledge of farm management practices; moisture gauges and/or sensors; weather pattern data for rainfall; knowledge of soil types; soil sampling gauges and/or sensors.	Select seeds (<i>e.g.</i> , hybrids) with better native and/or transgenic NUE traits; apply nitrogen fixing bacteria, biologicals and/or other materials and/or increase the rate and/or number of the same; apply brady rhizobium and/or other inoculant and/or increase rate and/or number of the same.
Potassium Deficiency	Soil sampling, gauges and/or sensors.	Apply and/or include phosphorus and/or increase the rate of the same.
Early Planting Date	Knowledge of farm management practices, current growing season weather conditions and local weather patterns; weather pattern data and forecasts.	Select seeds with later maturity; select seeds with better native and/or transgenic disease resistance traits; apply fungicides; and/or increase the rate and/or number of fungicides; apply brady rhizobium and/or other inoculants and/or increase the rate and/or number of them.
Late Planting Date	Knowledge of farm management practices, current growing season weather conditions and local weather patterns; weather pattern data and forecasts.	Select seeds with earlier maturity; decrease the rate and/or number of fungicides; decrease the rate and/or number of brady rhizobium and/or other inoculants.

Table 1: Prescriptive Seed Treatment(s) for Measured Conditions

In some embodiments, the system can generate and/or select a prescribed combination of seed and seed-applied substance(s) prior to planting based, at least in part, on one or more conditions in many ways, including through the use of one or more controllers. For example, one or more controllers could store default settings and/or allow a particular farmer to change (*e.g.*, regarding that farmer's objectives) the settings. One or more controllers could also store and/or perform an algorithm that can prioritize, based at least in part on the farmer's objectives, the conditions and/or the actions to take based, at least in part, on those conditions. Similarly, one or more controllers could store pre-existing and/or predictive data; gather and/or assess real-time data; and/or analyze predictive information and/or data related to the relevant conditions. One or more controls could use the relevant information and/or data to perform the algorithm that can select the prescribed combination of seed and seed-applied substances. Further, one or more

controllers could communicate with the applicable other components of the planter and/or control them to generate the combination in many different ways depending on the particular embodiment. By way of example, one or more controllers could determine which seed bin should deliver the selected seed and/or could communicate with such seed

5 bin and/or trigger such seed bin to deliver one or more seeds through the seed flow path. In some embodiments, one or more controllers could control one or more timing mechanisms that can be used to synchronize the delivery of the seed through the seed flow path in an effort to plant the seed at the desired location. In embodiments where one or more seeds can receive seed-applied substances during the planting operation, one or more

10 controllers could determine the types and amounts of seed-applied substances to apply to the seed and/or which one or more substance applicators to apply a seed-applied substance(s). Similarly, one or more controllers could determine which substance receptacle (and potentially which compartment within the substance receptacle) should deliver the prescribed seed-applied substance(s). One or more controllers could

15 communicate with a substance receptacle and/or control one or more metering devices to cause the appropriate amount(s) of such seed-applied substances to be delivered through the substance flow path to the appropriate substance applicator(s). In some embodiments, one or more controllers could control one or more timing mechanisms that can be used to synchronize the delivery of the applicable seed-applied substance(s) through the substance

20 flow path. Doing so is one way to enable the applicable substance applicator(s) to apply the prescribed seed-applied substance(s) to the seed at the proper time so that the combination can be planted at the desired location. Further, one or more controllers could control the applicable substance applicator(s) to apply the selected type and/or amount of seed-applied substance(s) to the selected seed at the calculated time so the combination can

25 be planted at the proper location. One or more controllers could also control any pumping and/or other substance delivery mechanisms. One or more controllers could control any mixing devices to mix the applicable seed-applied substances in a manner to be applied to the applicable seed by the applicable substance applicator(s). The present disclosure contemplates that one or more controllers can control any other component(s) of the

30 system, including but not limited to, the seed hopper, the seed meter, the one or more accelerator belts, and the flushing mechanism(s), as previously discussed herein. Furthermore, the present disclosure contemplates being able to interoperate with existing

planter/planting, farm management, prescription management and other agriculture software, hardware, firmware and other systems farmers use in their daily farm operations, and one or more controllers could be used to interoperate with such. In some embodiments, one or more algorithms can be used to direct one or more of the actions of one or more controllers.

In addition to those set forth above, the present disclosure contemplates that one or more controllers could be used with many other features and/or components of the system and typically could be used to cause many of the various system functionalities discussed throughout this disclosure to occur. Regardless of the feature or functionality, one or more controllers can be of many different types, including a programmable logic controller (PLC) and any other mechanism capable of receiving digital, electronic and/or mechanical inputs and causing actions to occur based, at least in part, thereon, including adjusting, activating, deactivating and/or moving nozzles, orifices, gates, wheels, levers, dividing mechanisms, pumping mechanisms, metering mechanisms, spraying or other substance dispensing mechanisms, and/or vacuums and/or other pneumatic mechanisms. In some embodiments, one or more controllers can be located in various locations within and/or proximate to the planter (e.g., in the cab of the tractor). In some embodiments, one or more controllers could be wearable and/or other mobile devices capable of use in the planter and/or other locations. In some embodiments, one or more controllers could even be located remotely from the planter, including home, farm and/or office computers. In some embodiments, one or more controllers may interoperate with other controllers and/or systems, including those related to other aspects of the planting operation and/or other farming operations.

Further, in some embodiments, the planter 10 can be a broadcast planter, which may not have any row units. An exemplary broadcast planter 11 is illustrated in Fig. 9. In some broadcast embodiments, seeds will be stored in a seed bin 20. In an exemplary embodiment, a seed-applied substance can be applied to the seed prior to loading the seed into the seed bin 20 via the methods previously discussed. The seed bin 20 can be of any suitable size and shape so as to supply seeds to a desired region or field. In the exemplary embodiment illustrated in Fig. 9, a portion of the seed bin 20 is a frustum of a cone so as to funnel the seeds to the base 21 of the seed bin 20. The seeds can be transferred to one or more metering wheels 23 and/or other insertion and/or dispersion devices typically via one

or more slide gates 25. Further, in some broadcast embodiments, the applicable metering wheel(s) 23 and/or other seed insertion and/or dispersion device(s) plant the seed by spraying the seeds (typically a group of seeds at the same time). The metering wheel(s) 23 can be rotated on a rotor 27 by a motor 29, after which the seeds can collide with the
5 metering wheel(s) and disperse.

In some broadcast embodiments, while the substance applicators 42 can be located anywhere along the seed flow path, they preferably would be located at and/or proximate to one or more slide gates 25 and/or metering wheels 23. For example, one or more substance applicators 42 and/or substance delivery tubes 52 could be situated to apply the
10 seed-applied substances to one or more seeds as they leave one or more slide gates 25 and/or as they leave one or more metering wheels 23. Any of the configurations of substance applicators 42 and/or substance delivery tubes 52 previously expressed herein (*e.g.*, illustrated in Figs. 6A-7C) can be incorporated into the broadcast planter 11. Further, a substance chamber 68 (Fig. 8B) can be incorporated proximate to the slide gate(s) 25
15 and/or metering wheel(s) 23 to control and/or recycle any seed-applied substance not applied to the seeds.

In further broadcast embodiments, the broadcast planter 11 can have a plurality of substance applicators 42 configured to apply substance(s) to the seeds while briefly positioned on (*i.e.*, in contact with or proximate to) the metering wheel 23. The metering
20 wheel 23 can have a plurality of radial fins creating a plurality of radial slots 31 within the metering wheel 23. Each of the plurality of substance applicators 42 can be associated with one of a plurality of radial slots 31 extending outwardly from a center of the metering wheel 23. In such a configuration, one or more seed-applied substances can be applied to portions of the metering wheel 23. In some embodiments, an algorithm could be used to
25 approximate where each seed will land within a broadcast radius and/or use such to calculate a planting location.

Though the present disclosure contemplates many embodiments as is evident from the above description, two additional examples of how the system could operate are provided below. However, the examples described below are merely illustrative and not
30 intended to limit the present disclosure in any way.

Referring to Fig. 10, another exemplary method for performing some of the objects of the present disclosure is illustrated. One or more controllers 54 can be operably

connected to one or more graphic user interfaces (GUI) 76 such as a display monitor, laptop computer, desktop computer, tablet, and/or any other wearable, handheld, mobile and/or related digital, electronic or mechanical device. The applicable GUI's 76 can be preferably located and/or be capable of being operated within the cabin of the tractor 12, but can be located at any location on and/or even remote from the planter 10 without deviating from the objects of the present disclosure. The applicable GUI's 76 can receive data and/or information (*e.g.*, directions, instructions and the like) from the farmer, including inputs related to one or more of the measured and/or known conditions and can transmit the applicable input to the applicable controller(s) 54. As previously expressed herein, the input can be many different types of information and/or data, including a prescription map of the field and any number of other conditions associated with the planting operation. For example, based, at least in part on previous soil sampling and/or otherwise, the farmer could input that a certain portion of the field is associated with nitrogen deficiency. For another example, a farmer could input a list of different combinations of seed and seed-applied substances associated with each of the plurality of bins (or portions of a partitioned bin). The applicable controller(s) 54 can also use inputted and/or acquired information and/or data, including commodity and/or other market conditions, and the like, inputted prior to and/or updated during the planting operation. Any of such inputs could be manually provided by a farmer and/or could be obtained otherwise, including via digital, electronic, mechanical and/or other access to public and/or private sources of static and/or dynamic data and/or information relevant to the applicable conditions.

Similarly, the applicable controller(s) 54 can use data and/or information gathered by one or more measuring devices, including sensors 78, field sensors and/or by observations of the farmer during the planting operation. The sensor(s) 78 can be based at least in part on inputted and/or predictive data and/or information and/or based at least in part on real-time and/or predictive sensors. The field sensors can be located in many different locations, including in, above and/or otherwise around the field. The field sensors can comprise and/or be associated with many different devices, including satellite, drone and/or other aerial devices, and/or devices that pass through, over and/or around the field. The sensors and/or field sensors can collect data about conditions.

Further, the applicable controller(s) 54 can be operably connected to GPS 80. The GPS 80 can be configured to track the position of the planter 10 and/or the position of each or a portion of the seed being planted. In particular, the applicable controller(s) can use GPS to calculate a location where the seed will be planted by the insertion and/or

5 dispersion device. In another embodiment, the seed location of the seed to be planted can be based, at least in part, on manual observation and/or operation of the insertion and/or dispersion device by the farmer. In some embodiments, the farmer can engage a button, switch and/or other device, provide an input to the GUI 76, GPS 80, and/or other input, and/or otherwise signal to the applicable controller(s) 54 and/or component of the planter

10 10 to apply a particular seed-applied substance and/or otherwise dispense a combination of seed and seed-applied substance(s). Upon instruction from the farmer, one or more insertion and/or dispersion devices can deliver selected combinations of seed and seed-applied substance(s) to be planted. Furthermore, the applicable controller(s) 54 can use seed singulation, GPS 80 and/or other means to determine the prescribed combination of

15 seed and seed-applied substance(s) on a seed-by-seed, row-by-row, column-by-column, zone-by-zone, region-by-region, field-by-field and/or across multiple fields and/or farming operations. Still further, the applicable controller(s) 54 can be operably connected to one or more timing mechanisms 82 and one or more metering mechanisms 50. The applicable controller(s) 54 can control the metering mechanism 50 associated with one or more

20 substance receptacles 56 and/or can adjust the rate of flow of the applicable seed-applied substance(s). In an exemplary example, the applicable metering mechanism(s) 50 can be adjustable, whereby the mechanism can adjust the size of the opening and/or otherwise adjust the amount of the applicable seed-applied substance(s) permitted to enter one or more substance delivery tubes 52. In other exemplary embodiments, the applicable

25 metering mechanism(s) 50 can be adjusted manually by the farmer. The applicable timing mechanism(s) 82 can calculate and/or coordinate the delivery time of the seed-applied substance to one or more substance applicator(s) for one or more seeds at the appropriate point in the seed flow path. As one way to do so, the applicable timing mechanism(s) 82 could calculate a delivery time for the selected seed to travel from the seed receptacle 20 to

30 location(s) of the seed flow path where the applicable application(s) will occur, the delivery time(s) for the selected seed-applied substances to travel through the substance flow path to the applicable substance applicator(s) and/or a delivery time for combination

of the seed and seed-applied substance to travel from the applicable portion of the seed flow path to the insertion and/or dispersion device. In some embodiments, the applicable timing mechanism(s) 82 can calculate a delivery time for the seed and/or seed-applied substance from the applicable seed receptacle 20 and/or substance receptacle 38,

5 respectively, to any other component within the seed flow path and/or substance flow path, respectively. As previously discussed herein, many different components are possible, but can include one or more seed delivery tubes 52, seed hoppers 24, seed meters 26, and/or seed drop tubes 28. In an exemplary embodiment, the applicable timing mechanism(s) 82 can be synchronized with the delivery of the seed to the insertion and/or dispersion device.

10 Using GPS 80, the applicable controller(s) 54 can perform the step 84 of determining the location of the planter 10 and/or the seed planting location. At any given seed location, the applicable controller(s) can perform 54 the step 86 of determining whether one or more seed-applied substance(s) are required. Using the above example, if the planter 10 is positioned in the portion of the field where nitrogen levels are adequate
15 for the applicable crop, the applicable controller(s) 54 can proceed in the negative and performs the step 88 of dispensing the seed to the seed location. If the planter 10 is positioned in the portion of the field with nitrogen deficiency (*e.g.*, the applicable sensor(s) 78 measure or predict a nitrogen deficiency), the applicable controller(s) 54 can perform the step 90 of determining the type and/or amount of seed-applied substance to apply to the
20 seed for the applicable seed planting location. In this particular example of nitrogen deficiency, the type of substance could be one or more nitrogen fixing bacteria (*e.g.*, *Azospirillum brasilense*, *brady rhizobium*, etc.). The amount and number of seed-applied substance(s) can be based, at least in part, on the extent of the condition (*e.g.*, level of nitrogen deficiency). In an exemplary embodiment, the applicable controller(s) 54 can be
25 programmed with predetermined rates with which to apply specific seed-applied substances (*e.g.*, how much of a particular active ingredient and/or mixture) based at least in part on the applicable condition(s). For example, the applicable controller(s) 54 could determine whether to apply a low rate, mid-rate and/or high rate of the applicable seed-applied substance(s) to the seed based at least in part on the applicable condition(s).

30 In some situations, more than one different type of seed-applied substance may be prescribed for applications to one or more particular seeds. In such situations, the same process could take place for all of the applicable seed-applied substances. Additionally, if

a mixer and/or multiple substance applicators are used, the applicable controller(s) could control the mixing of the applicable seed-applied substances within the mixer, and the applicable timing mechanism(s) 82 would need to take into consideration these additional steps.

5 The applicable controller(s) 54 can perform the step 92 of applying the seed-applied substance to the seed during the planting operation. As one way to do so, the applicable controller(s) 54 could operably control the applicable metering mechanism(s) 50 and timing mechanism(s) 82 consistent with the present disclosure previously expressed herein. The step 92 of applying the seed-applied substance can be performed by any of the
10 methods and/or just prior to the seed entering, within, as the seed leaves, and/or otherwise proximate to any of the components previously expressed herein. The applicable controller(s) 54 can perform the step 94 of dispensing the combination of seed and seed-applied substance to the seed location in numerous ways, including those previously expressed herein.

15 Fig. 11 illustrates another exemplary method for performing some of the objects of the present disclosure. Similar to the exemplary embodiment illustrated in Fig. 10, one or more controllers 54 can be operably connected to the applicable GUI's 76, sensor(s) 78, global positioning system(s) 80, timing mechanism(s) 82, and metering mechanism(s) 50. Further, the applicable controller(s) 54, and more particularly the applicable metering
20 mechanism(s) 50, can be operably connected to the applicable seed receptacle(s) 38. In the exemplary embodiment illustrated in Fig. 11, however, seeds can be treated with one or more seed-applied substance(s) before loading into a plurality of seed receptacles 38 and/or one or more partitioned seed receptacles 20, and one or more seed receptacle(s) and/or partitions of seed receptacles 38 can contain the different combinations of seed and seed-
25 applied substances.

 The applicable controller(s) 54 can perform the step 84 of determining the location of the planter 10 and/or the seed planting location. Based at least in part on one or more conditions discussed above, including, for example, those input by the farmer and/or otherwise, and/or through the applicable GUI's 76 and/or measured by the applicable
30 sensor(s) 78, the applicable controller(s) 54 can perform the step of 96 selecting a combination of seed and seed-applied substance. In the foregoing example involving nitrogen deficiency, the farmer could have proactively pre-loaded the planter with at least

one hybrid with improved NUE native and/or transgenic traits and/or nitrogen fixing bacteria and/or biological already applied. Further, the farmer could have proactively pre-loaded the planter with at least one hybrid without such improved NUE native and/or transgenic traits and/or nitrogen fixing bacteria and/or biological already applied. If a

5 particular seed location is associated with the nitrogen deficiency, the applicable controller 54 could select the combination of seed type and seed-applied substance(s) comprising one of the hybrids with improved NUE native and/or transgenic traits and/or nitrogen fixing bacteria and/or biological already applied from the different combinations of seed and seed-applied substance(s) contained in one or more seed receptacles 38 and/or cause the

10 seed receptacle 38 to deliver the applicable combination of seed and seed-applied substance(s). Similarly, if a particular seed location is one where nitrogen levels are adequate for the applicable crop, the applicable controller 54 could select the above combination of seed type and seed-applied substance(s) comprising one of the hybrids without improved NUE native and/or transgenic traits and/or nitrogen fixing bacteria

15 and/or biological already applied and/or the seed receptacle 38 to deliver the applicable combination of seed and seed-applied substance(s). The applicable controller(s) 54 can cause the selected seed receptacle 38 to dispense the selected combination of seed type and seed-applied substance(s) and/or deliver it to the insertion and/or dispersion device. The applicable metering mechanism(s) 50 can be operably connected to the applicable seed

20 receptacles 38 to perform the step 98 of dispensing the selected combination seed type and seed-applied substance(s). The applicable controller(s) 54 can thus perform the step 94 of dispensing the selected combination of seed type and seed-applied substance to the seed location.

The disclosure is not to be limited to the particular embodiments described herein.

25 In particular, the disclosure contemplates numerous variations in the type of ways in which embodiments of the disclosure can be applied to a prescriptive seed treatment and method. The foregoing description has been presented for purposes of illustration and description. It is not intended to be an exhaustive list and/or limit any of the disclosure to the precise forms disclosed. It is contemplated that other alternatives and/or exemplary aspects that

30 are considered included in the disclosure. The description is merely examples of embodiments, processes and/or methods of the disclosure. It is understood that any other modifications, substitutions, and/or additions can be made, which are within the intended

Agent Ref. No. P11431WO00

spirit and scope of the disclosure. For the foregoing, it can be seen that the disclosure accomplishes at least all that is intended.

The previous detailed description is of a small number of embodiments for implementing the disclosure and is not intended to be limiting in scope. The following

5 claims set forth a number of the embodiments of the disclosure with greater particularity.

What is claimed is:

1. A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed, and a seed-applied substance;
calculating a location where the seed will be planted by the planter;
5 selecting, based at least in part on a condition, a combination of seed and seed-applied
substance to plant at the location;
generating the combination of the seed and seed-applied substance prior to the combination
being planted at the location; and
planting the combination of the seed and seed-applied substance.
10
2. The method of Claim 1 wherein:
the step of selecting, based at least in part on the condition, the combination of seed and
seed-applied substance to plant at the location further comprises selecting an
amount of the seed-applied substance to be applied to the seed;
15 the step of generating the combination of the seed and seed-applied substance prior to the
combination being planted at the location further comprises:
 - (a) providing a substance receptacle, a substance flow path, a seed flow path
and a substance applicator;
 - (b) delivering the amount of the seed-applied substance from the substance
20 receptacle through the substance flow path to the substance applicator; and
 - (c) using the substance applicator to apply the amount of the seed-applied
substance to the seed within the seed flow path.
3. The method of Claim 1 wherein the step of generating the combination of the seed
25 and seed-applied substance prior to the combination being planted at the location further
comprises:
providing a plurality of seed receptacles, wherein at least two of the plurality of seed
receptacles contains a different combination of seed and seed-applied substance;
generating the different combination of seed and seed-applied substance prior to placement
30 into the at least two of the plurality of seed receptacles;
selecting a seed receptacle from the plurality of seed receptacles containing the selected
combination of seed and seed-applied substance; and

delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter.

4. The method of Claim 1 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance.

5. The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type.

6. The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles.

7. The method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance.

8. The method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance.

9. The method of Claim 2 further comprising the steps of:
providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and a seed drop tube;
storing the seed in the seed receptacle;
transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube;
transferring the seed from the seed hopper to the seed meter; and
delivering the seed from the seed meter to the seed drop tube.

10. The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube.
- 5 11. The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters.
- 10 12. The method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path.
- 15 13. The method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises:
inputting a list of the different combinations associated with the at least two of the plurality
of seed receptacles into a control system; and
wherein the control system identifies the seed receptacle having the selected combination
of seed and seed-applied substance.
- 20 14. The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a metering device; and
25 metering the amount of the seed-applied substance from the substance receptacle through
the substance flow path to the substance applicator with the metering device.
- 30 15. The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a timing mechanism; and

calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path.

- 5 16. The method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following:
providing a metering device and a timing mechanism;
metering flow of the selected combination of seed and seed-applied substance from the one
10 of the plurality seed receptacles with the metering device; and
calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter.
- 15 17. A method for seed treatment on a planter, the method comprising the steps of:
providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller;
determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller;
20 transferring the seed-applied substance from the substance receptacle into the substance flow path;
transferring the seed from the seed receptacle into the seed flow path; and
applying the seed-applied substance to the seed within the seed flow path,
wherein the amount of the seed-applied substance is based, at least in part, on the
25 condition.
18. The method of Claim 2 further comprising the steps of:
providing a mixer in fluid communication with the substance receptacle and the substance flow path; and
30 mixing the seed-applied substance prior to the seed-applied substance being applied to the seed.

19. The method of Claim 17 further comprising the steps of:
providing a seed hopper configured to receive the seed from the seed receptacle;
transferring the seed into the seed hopper; and
applying the seed-applied substance to the seed within the seed hopper.
- 5
20. The method of Claim 18 further comprising the steps of:
providing a seed meter configured to receive the seed from the seed hopper and transfer the
seed further through the seed flow path;
transferring the seed into the seed meter; and
10 applying the seed-applied substance to the seed within the seed meter.
21. The method of Claim 17 further comprising the step of:
adjusting a mixture ratio of the seed-applied substance during operation of the planter.
- 15 22. The method of Claim 17 further comprising the step of:
providing a substance applicator in fluid connection with the substance receptacle, the
substance applicator adapted to prescriptively treat the seed.
23. The method of Claim 22 wherein the substance applicator is associated with at
20 least one of:
- a. a mixer in fluid communication with the substance receptacle and the
substance flow path;
 - b. a seed hopper configured to receive the seed from the seed receptacle;
 - c. a seed meter configured to receive the seed from the seed hopper and further
25 transfer it through the seed flow path; and
 - d. the seed drop tube.
24. The method of Claim 18 further comprising the steps of:
providing a seed drop tube that is part of the seed flow path;
30 transferring the seed into the seed drop tube; and
applying the seed-applied substance to the seed proximate to or within the seed drop tube.

25. The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles.

- 5 26. The method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either:
- always the same amount of seed-applied substance; or
 - only either one specific amount of seed-applied substance or no amount of the seed-applied substance.

10

27. The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed.

ABSTRACT

An improved method for prescriptive seed treatment is provided. A location can be calculated where a combination of seed and one or more types and/or amounts of seed-applied substances will be planted. The combination is selected, based at least in part, on one or more conditions. The combination is generated prior to being planted. The method can further include selecting a type of seed and/or a type and/or amount of the one or more seed-applied substances to be applied. One or more applicators can apply the seed-applied substance(s) to the seed within a seed flow path during operation. A plurality of seed receptacles can contain different combinations of seed and/or seed-applied substances generated prior to being placed into the receptacles. The method could further include selecting a seed receptacle containing a selected combination, and delivering the selected combination from the selected seed receptacle to be planted by the planter.

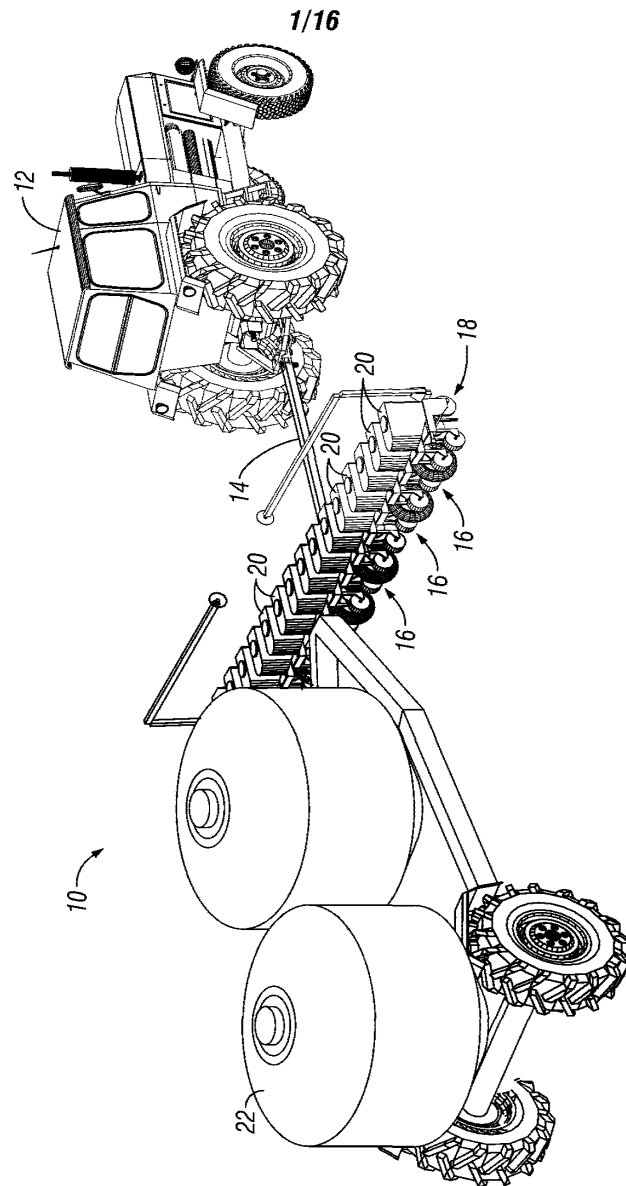


FIG. 1A

2/16

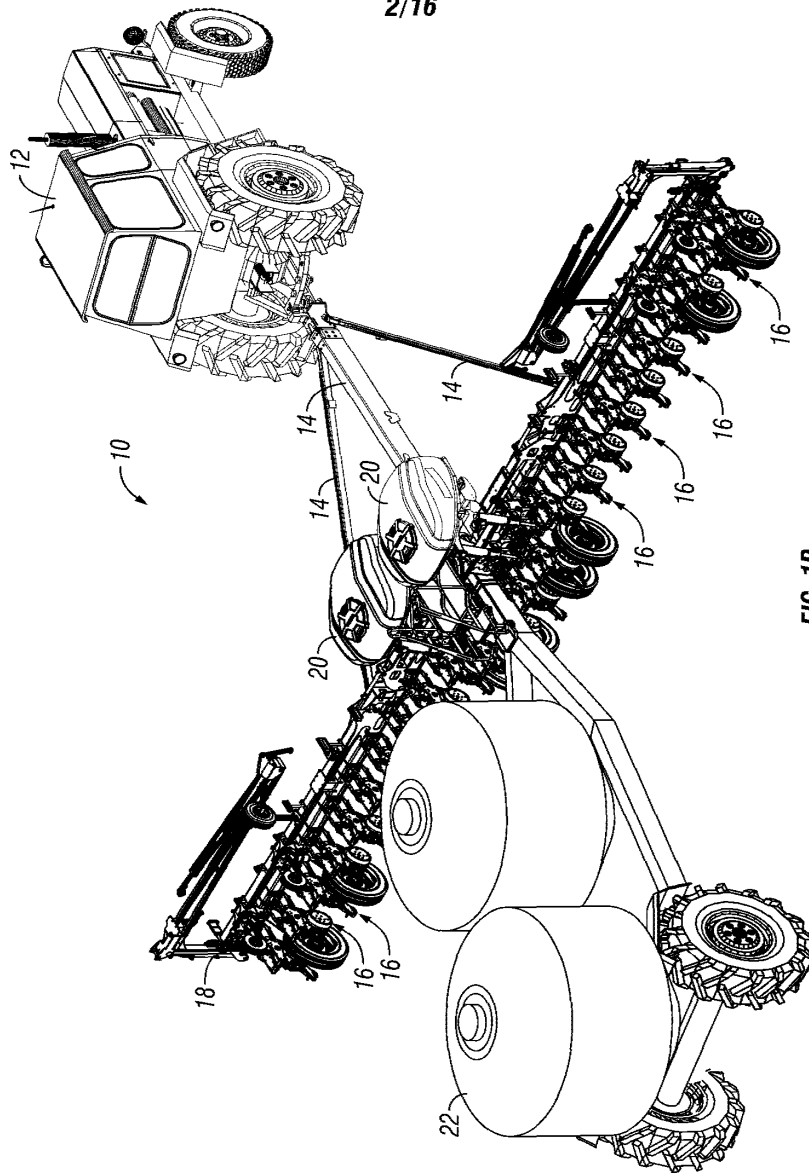


FIG. 1B

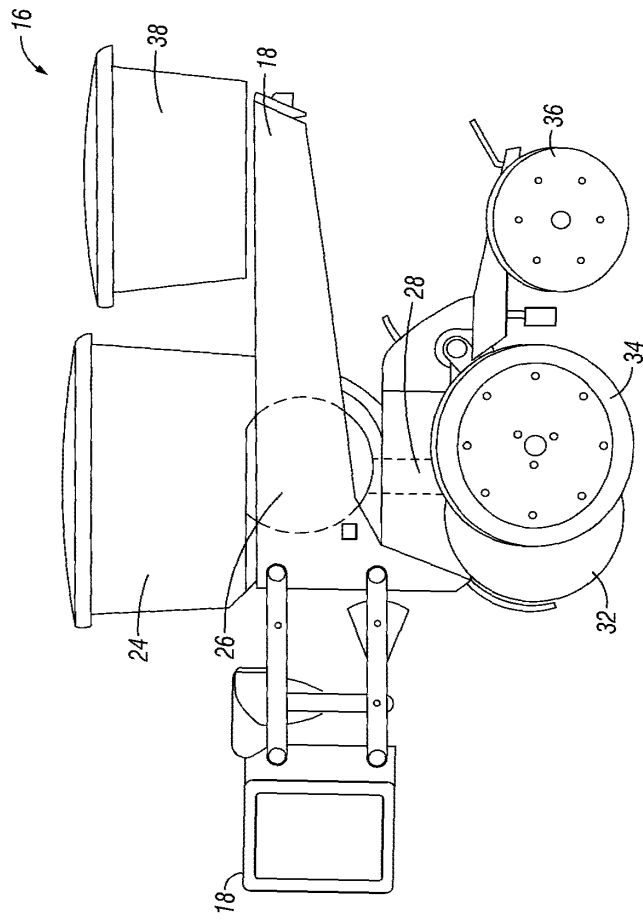
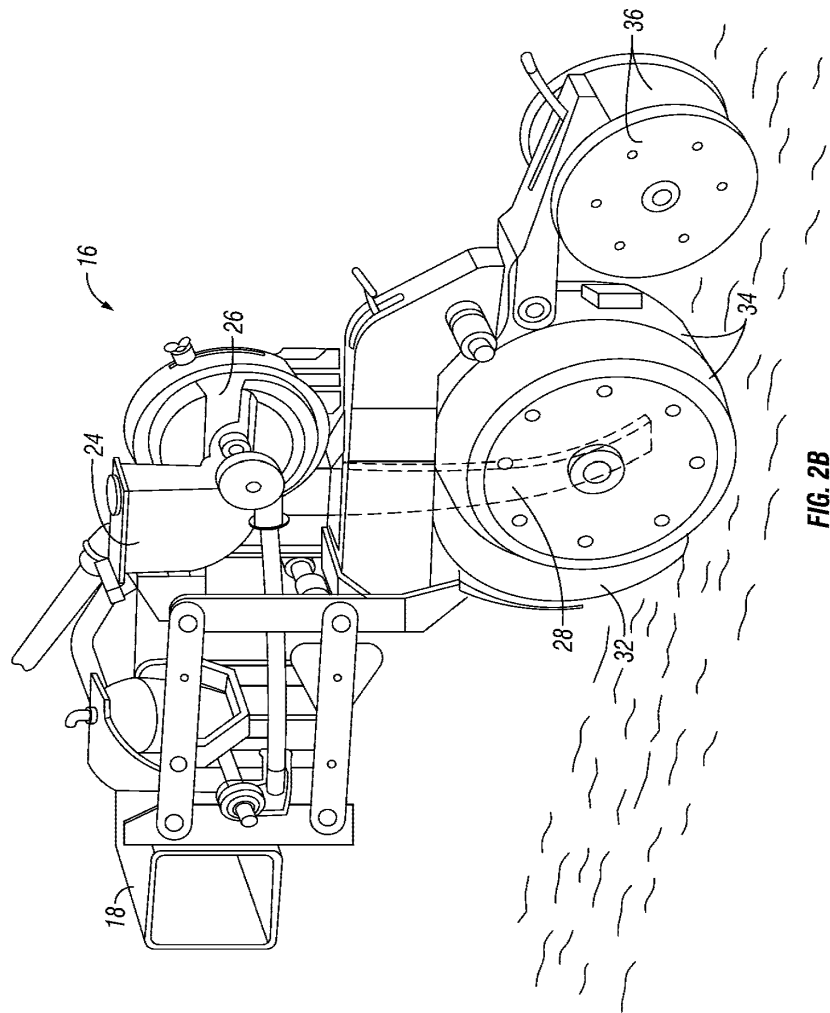


FIG. 2A



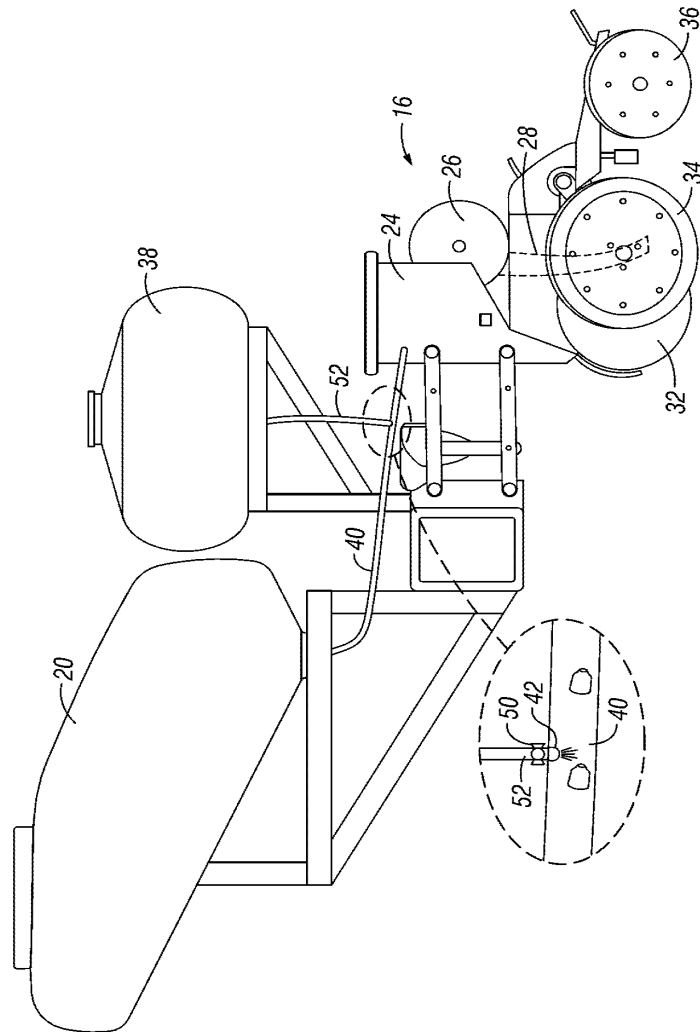


FIG. 3

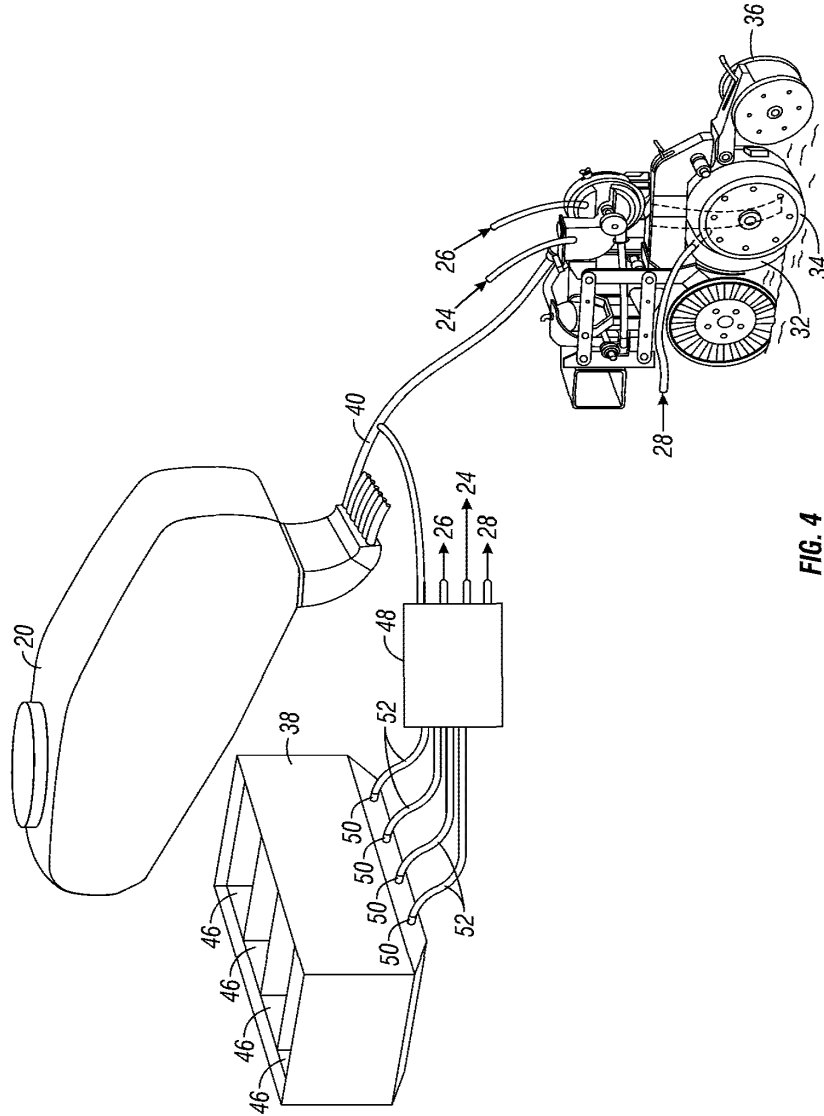


FIG. 4

7/16

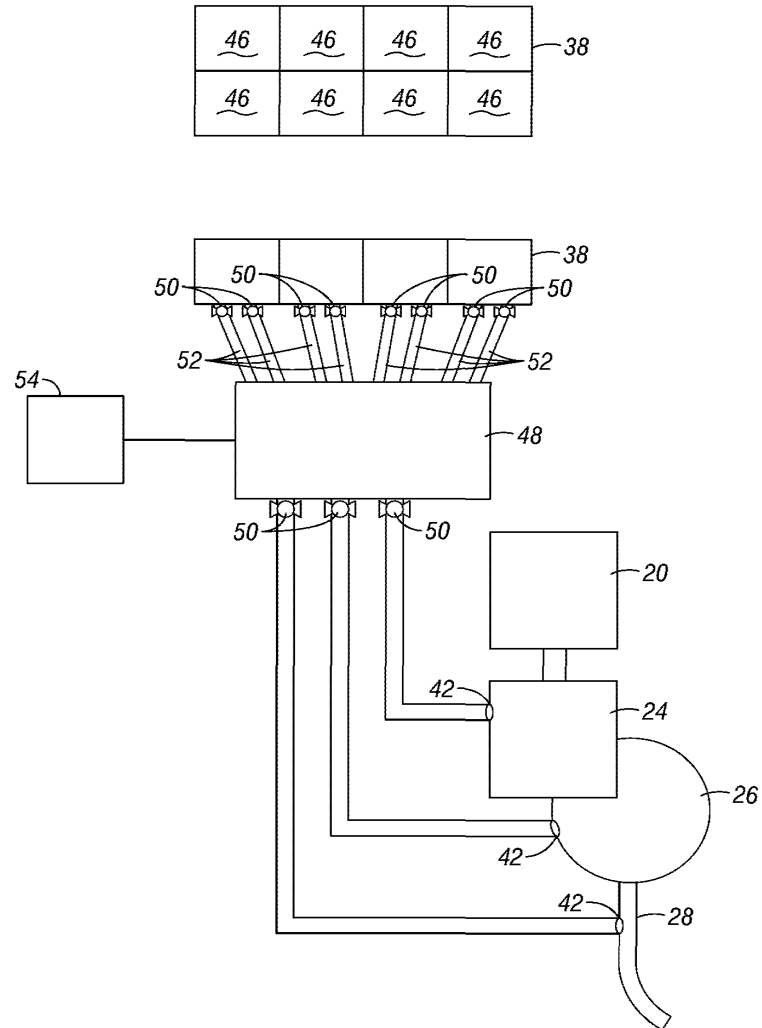
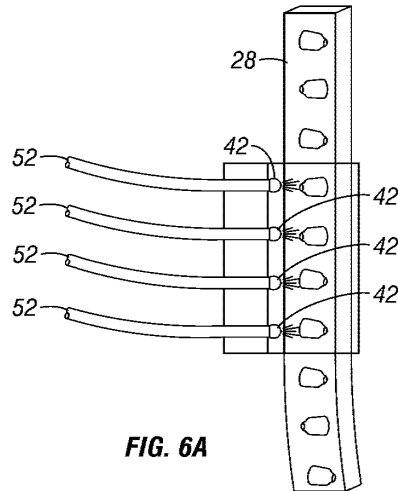
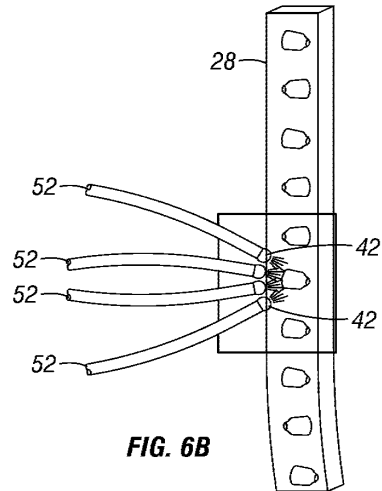
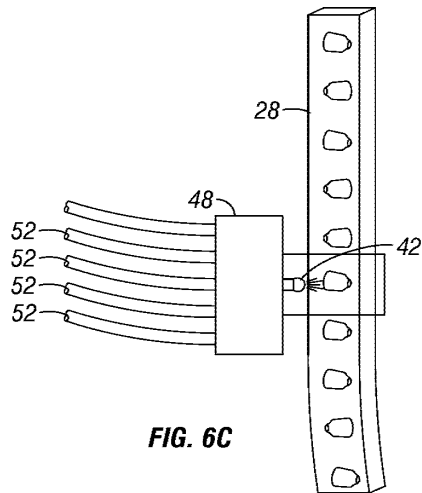
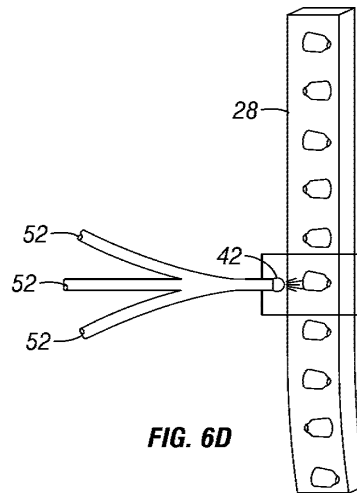


FIG. 5



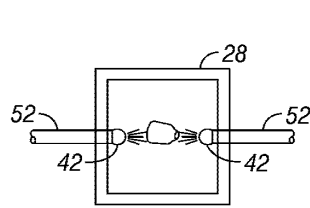


FIG. 7A

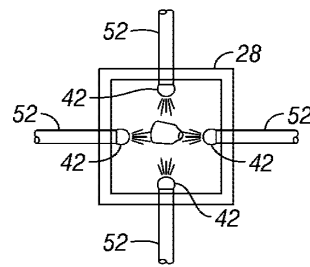


FIG. 7B

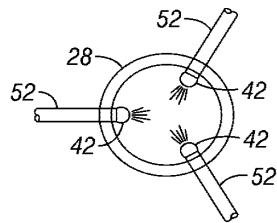


FIG. 7C

10/16

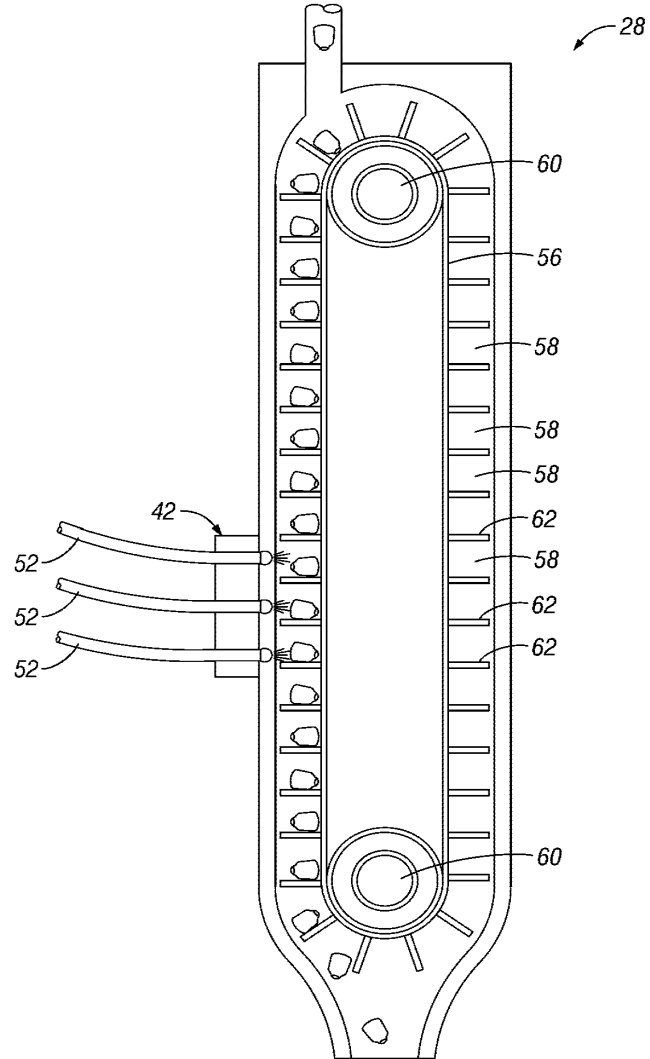


FIG. 8A

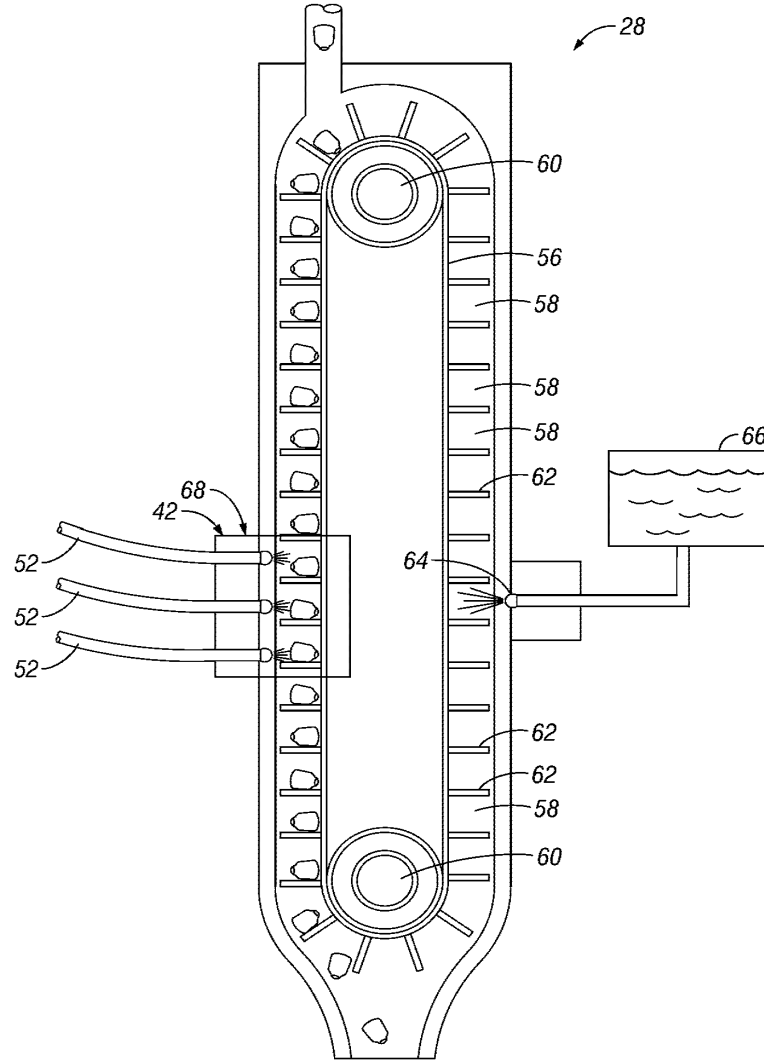


FIG. 8B

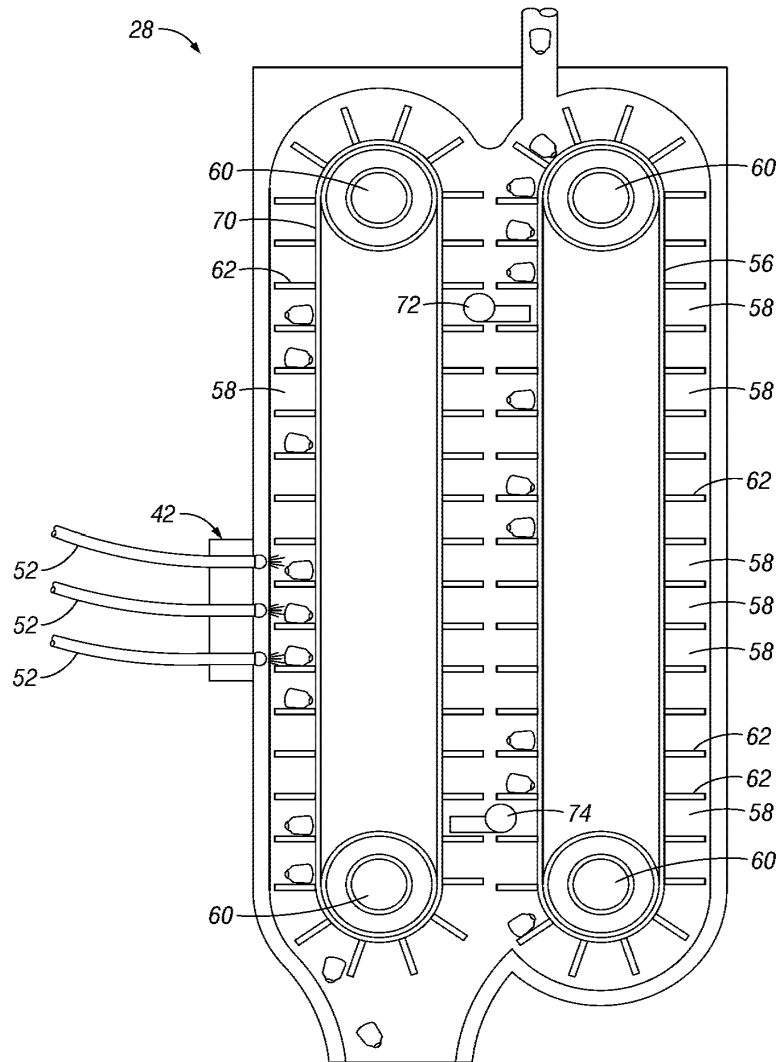


FIG. 8C

13/16

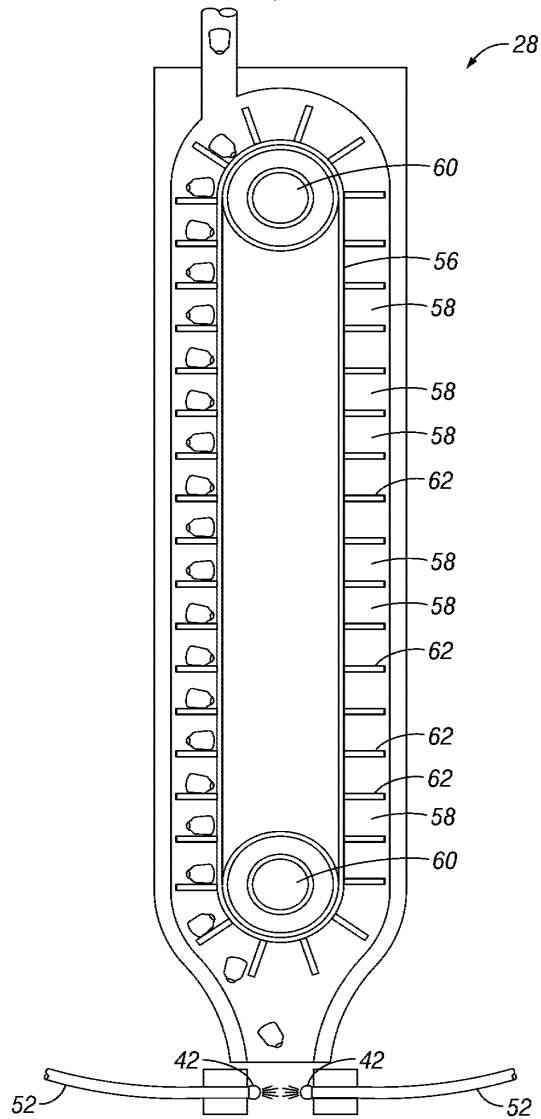


FIG. 8D

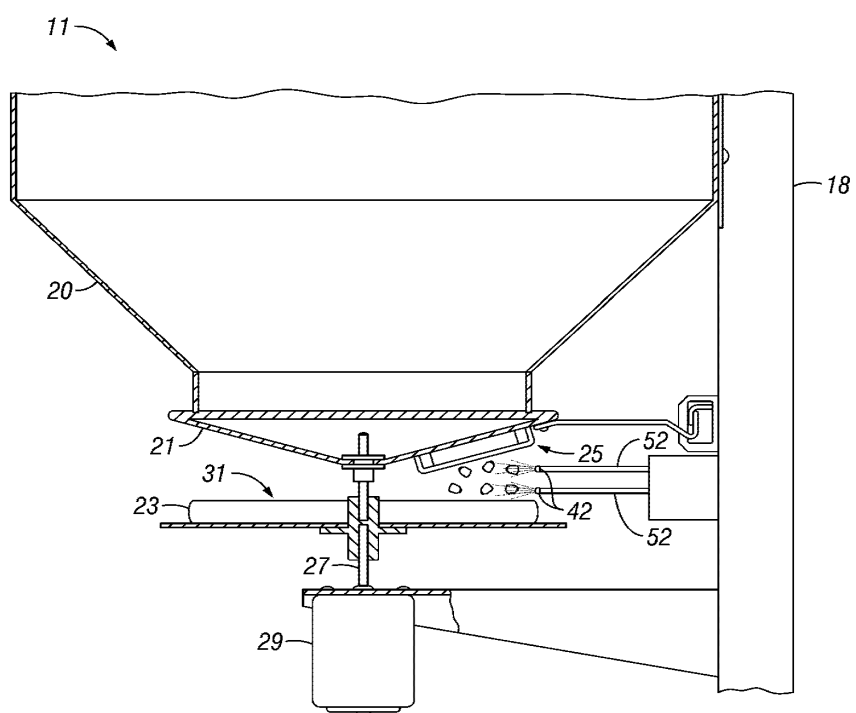


FIG. 9

15/16

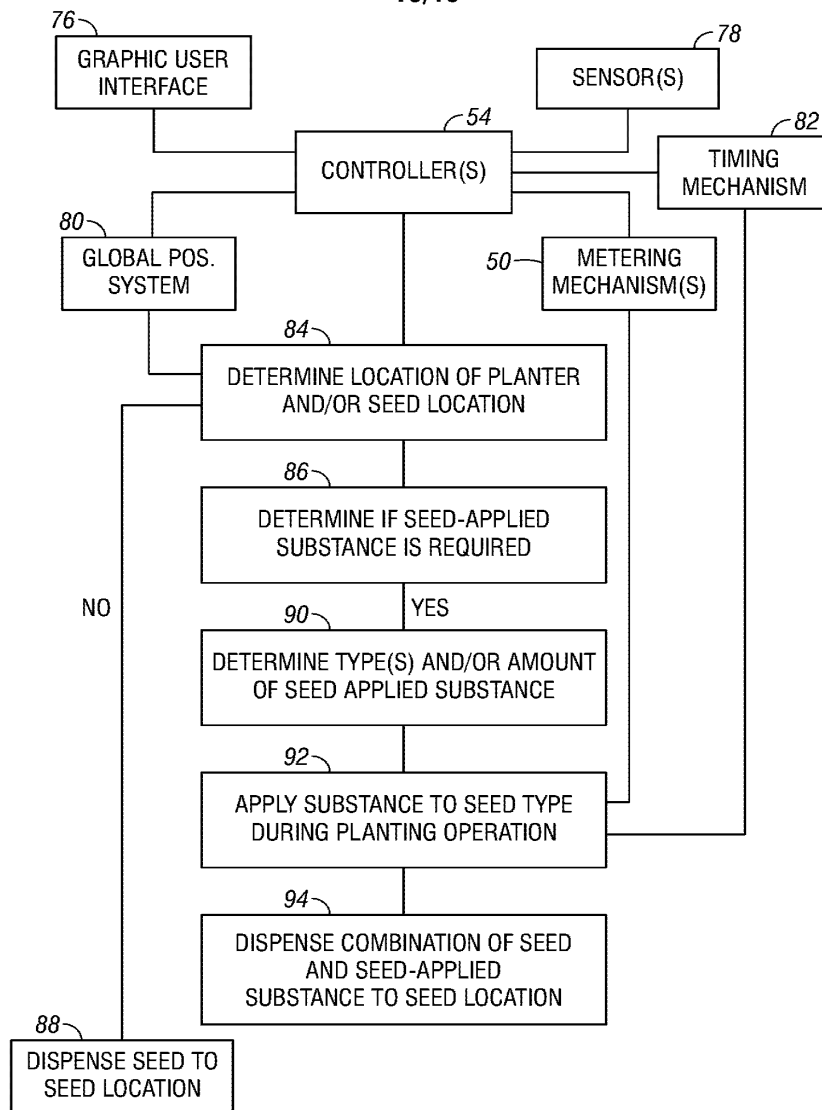


FIG. 10

16/16

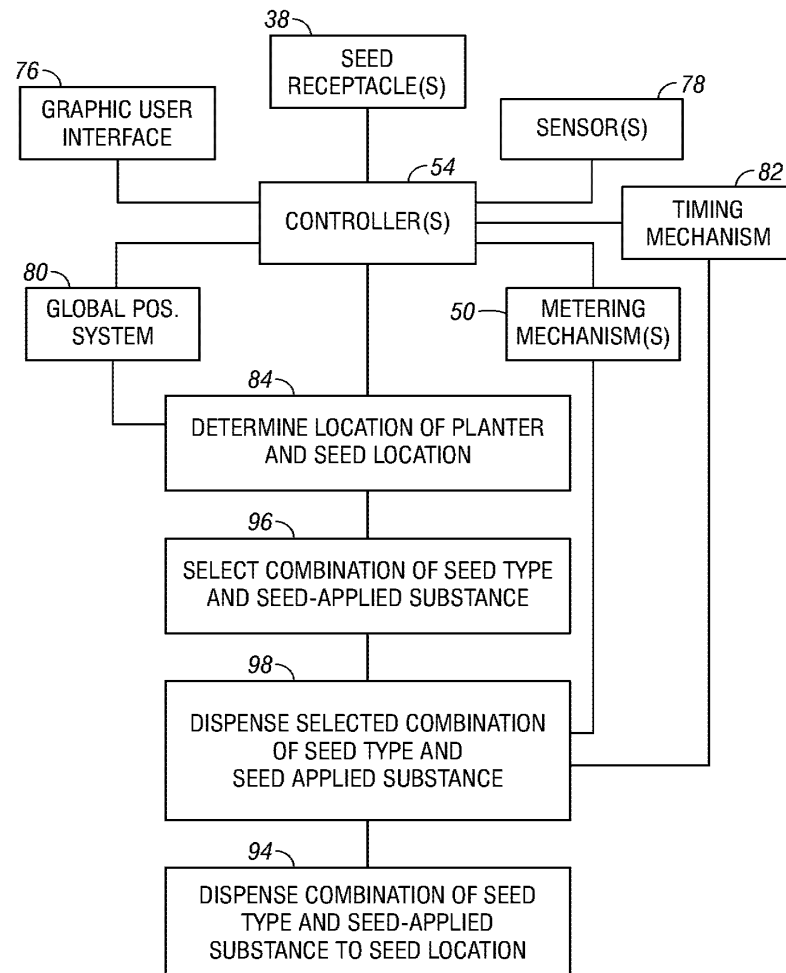


FIG. 11

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P11431US00_NP

U.S.PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	4356934	A	1982-11-02	Knake	col 1, ln 20-43; col 5, ln 21-26	
	2	5915313	A	1999-06-29	Bender et al.	col 3, ln 16-43	
	3	5931882	A	1999-08-03	Fick et al.	Fig 2; col 2, ln 13 to col 3, ln 39; col 5, ln 30 to col 6, ln 15; col 6, ln 54 to col 7, ln 18; col 9, ln 31-58; col 11, ln 39-30	
	4	5956255	A	1999-09-21	Flamme	Abstract; figs 1-2; col 4. ln 3-54	

If you wish to add additional U.S. Patent citation information please click the Add button.

Add

U.S.PATENT APPLICATION PUBLICATIONS							Remove
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	20130121101	A1	2013-05-16	Ochampaugh et al.	Abstract; figs 1-3; para [0009]-[0013]	

If you wish to add additional U.S. Published Application citation information please click the Add button.

Add

FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		15739606
	Filing Date		2017-12-22
	First Named Inventor	Steven P. Smith	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		P11431US00_NP

	1						
--	---	--	--	--	--	--	--

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	INTERNATIONAL SEARCH REPORT AND WRITTEN OPINION OF PCT/US15/37230 (09/16/2015).	

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P11431US00_NP

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/KYLE S. COLEMAN/	Date (YYYY-MM-DD)	2018-01-16
Name/Print	Kyle S. Coleman	Registration Number	66257

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: KYLE S. COLEMAN
MCKEE, VOORHEES & SEASE, P.L.C.
801 GRAND AVENUE
SUITE 3200
DES MOINES, IA 50309-2721

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year)	16 SEP 2015
Applicant's or agent's file reference P11431WO00	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US 15/37230	International filing date (day/month/year) 23 June 2015 (23.06.2015)
Applicant INFLEXION POINT TECHNOLOGIES, LLC	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

How? Directly to the International Bureau of WIPO preferably through ePCT or on paper to, 34 chemin des Colombettes
1211 Geneva 20, Switzerland. Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 - 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3. ☐ With regard to any protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices. In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Within 19 months from the priority date, the applicant may request that a supplementary international search be carried out by a different International Searching Authority that offers this service (Rule 45bis.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the ISA/
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-8300

Authorized officer

Lee W. Young

PCT Helpdesk: 571-272-4300
Telephone No. PCT DSP: 571-272-7774

Form PCT/ISA/220 (July 2014)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P11431WO00	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/US 15/37230	International filing date (day/month/year) 23 June 2015 (23.06.2015)	(Earliest) Priority Date (day/month/year)
Applicant INFLEXION POINT TECHNOLOGIES, LLC		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed.

☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☐ Unity of invention is lacking (see Box No. III).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. 1A

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 15/37230

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A01G 31/02 (2015.01)

CPC - A01G 13/043, A01G 9/24, A01G 13/0225

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - A01G 31/02 (2015.01)

CPC - A01G 13/043, A01G 9/24, A01G 13/0225

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

USPC - 47/65

Patents and NPL (classification, keyword, search terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Pat Base (AU BE BR CA CH CN DE DK EP ES FI FR GB IN JP KR SE TH TW US WO), Google Patent, Google Scholar, Free Patents Online, Search Terms: tractor, planter, seed, treatment, applicator, spray, nozzle, atomizer, controller, meter, global positioning system, GPS, prescriptive, prescribed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	US 5,931,882 A (Fick et al.) 03 August 1999 (03.08.1999) Fig 2; col 2, in 13 to col 3, in 38; col 5, in 30 to col 6, in 15; col 6, in 54 to col 7, in 18; col 9, in 31-58; col 11, in 39-40	1-5, 7-11, 13-18, 20-27 ----- 6, 12, 19
Y	US 5,915,313 A (Blender et al.) 29 June 1999 (29.06.1999) col 3, in 16-43	6
Y	US 4,356,934 A (Knake) 02 November 1982 (02.11.1982) col 1, in 20-43; col 5, in 21-26	12, 18
Y	US 2013/0121101 A1 (Champaugh et al.) 16 May 2013 (16.05.2013) abstract; Figs 1-3; para [0009]-[0013]	1-27
Y	US 5,956,255 A (Fiamme) 21 September 1999 (21.09.1999) abstract; Figs 1-2; col 4, in 3-54	1-27

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"Z" document member of the same patent family

Date of the actual completion of the international search

24 August 2015 (24.08.2015)

Date of mailing of the international search report

16 SEP 2015

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-8300

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: KYLE S. COLEMAN
MCKEE, VOORHEES & SEASE, P.L.C.
801 GRAND AVENUE
SUITE 3200
DES MOINES, IA 50309-2721

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year)

16 SEP 2015

Applicant's or agent's file reference
P11431WO00

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/US 15/37230

International filing date (day/month/year)

23 June 2015 (23.06.2015)

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - A01G 31/02 (2015.01)

CPC - A01G 13/043, A01G 9/24, A01G 13/0225

Applicant INFLEXION POINT TECHNOLOGIES, LLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-8300

Date of completion of this opinion

24 August 2015 (24.08.2015)

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (January 2015)

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 15/37230

Box No. 1 Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
- ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a)).
3. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of a sequence listing:
- a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 15/37230

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	6, 12, 19	YES
	Claims	1-5, 7-11, 13-18, 20-27	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-27	NO
Industrial applicability (IA)	Claims	1-27	YES
	Claims	None	NO
2. Citations and explanations:			
<p>Claims 1-5, 7-11, 13-18, 20-27 lack novelty under PCT Article 33(2) as being anticipated by US 5,931,882 A to Fick et al. (hereinafter "Fick").</p> <p>Regarding Claim 1, Fick discloses a prescriptive seed treatment method (abstract, col 2, in 13-48) comprising the steps of: providing a planter, a seed, and a seed-applied substance (Fig 2; col 3, in 9-12; col 6, in 54 to col 7, in 13); calculating a location where the seed will be planted by the planter (col 3, in 34-36; col 9, in 32-40 and 52-58); selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location (col 3, in 16-34; col 5, in 30-42); generating the combination of the seed and seed-applied substance prior to the combination being planted at the location (col 5, in 53-57; col 7, in 9-12); and planting the combination of the seed and seed-applied substance (col 9, in 48-51; col 11, in 39-40).</p> <p>Regarding Claim 2, Fick discloses the method of Claim 1 wherein: the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed (col 3, in 16-34; col 5, in 30-42); the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator (Fig 2); (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator (Fig 2; col 5, in 53 to col 6, in 15); and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path (col 6, in 54 to col 7, in 18).</p> <p>Regarding Claim 3, Fick discloses the method of Claim 1 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance (col 3, in 9-12; col 5, in 53-57; col 6, in 58-60; col 7, in 9-12); generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles (Fig 2; col 5, in 53 to col 6, in 15; col 6, in 54 to col 7, in 18); selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance (Fig 2; col 5, in 53 to col 6, in 15); and delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter (col 6, in 54 to col 7, in 18).</p> <p>Regarding Claim 4, Fick discloses the method of Claim 1 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance (col 5, in 30-42).</p> <p>Regarding Claim 5, Fick discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type (col 5, in 30-42; col 5, in 53 to col 6, in 15).</p> <p>Regarding Claim 7, Fick discloses the method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance (col 3, in 16-34; col 5, in 30-42).</p> <p>Regarding Claim 8, Fick discloses the method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance (col 2, in 13-48; col 2, in 59 to col 3, in 3; col 3, in 16-34; col 5, in 30-42).</p> <p>—Please See Supplemental Box—</p>			

Form PCT/ISA/237 (Box No. V) (January 2015)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 15/37230

Supplemental Box

In case the space in any of the preceding boxes is not sufficient,

Continuation of:

-----Continuation of Box V-----

Regarding Claim 9, Fick discloses the method of Claim 2 further comprising the steps of:
providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and a seed drop tube;
storing the seed in the seed receptacle;
transferring the seed from the seed receptacle to the seed hopper via the a seed delivery tube;
transferring the seed from the seed hopper to the seed meter; and
delivering the seed from the seed meter to the seed drop tube (Fig 2; col 5, in 53 to col 6, in 15; col 6, in 54 to col 7, in 18).

Regarding Claim 10, Fick discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube (Fig 2; col 5, in 53 to col 6, in 15; col 6, in 54 to col 7, in 18; from the line mixing device 30 through the booms 12 and spray or injection conduits/dispersing nozzles 14).

Regarding Claim 11, Fick discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters (Fig 2; col 5, in 53 to col 6, in 15; col 6, in 54 to col 7, in 18; from the line mixing device 30 through the booms 12 and spray or injection conduits/dispersing nozzles 14).

Regarding Claim 13, Fick discloses the method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises:
inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system (col 2, in 58 to col 3, in 3; col 3, in 17-39); and
wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance (Fig 2; col 3, in 9-12; col 5, in 30-42; col 5, in 53 to col 6, in 15; col 6, in 54 to col 7, in 18).

Regarding Claim 14, Fick discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a metering device; and
metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device (flow meter 34).

Regarding Claim 15, Fick discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a timing mechanism; and
calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path (col 3, in 7 to col 6, in 25; col 9, in 32 to col 10, in 21).

Regarding Claim 16, Fick discloses the method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following:
providing a metering device and a timing mechanism;
metering flow of the selected combination of seed and seed-applied substance from the one of the plurality seed receptacles with the metering device; and
calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter (col 3, in 7 to col 6, in 25; col 9, in 32 to col 10, in 21).

Regarding Claim 17, Fick discloses a method for seed treatment on a planter, the method comprising the steps of:
providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller (Fig 2; col 6, in 54 to col 7, in 18);
determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller (col 3, in 6-39);
transferring the seed-applied substance from the substance receptacle into the substance flow path (col 5, in 30 to col 6, in 25);
transferring the seed from the seed receptacle into the seed flow path (col 5, in 30 to col 6, in 25); and
applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on the condition (col 7, in 9-18).

Regarding Claim 18, Fick discloses the method of Claim 2 further comprising the steps of:
providing a mixer in fluid communication with the substance receptacle and the substance flow path; and
mixing the seed-applied substance prior to the seed-applied substance being applied to the seed (col 7, in 9-13).

Regarding Claim 20, Fick discloses the method of Claim 18 further comprising the steps of:
providing a seed meter configured to receive the seed from the seed hopper and transfer the seed further through the seed flow path;
transferring the seed into the seed meter; and
applying the seed-applied substance to the seed within the seed meter (Fig 2, col 7, in 14-18; flow meter 34).

Regarding Claim 21, Fick discloses the method of Claim 17 further comprising the step of:
adjusting a mixture ratio of the seed-applied substance during operation of the planter (col 9, in 35-39).

Regarding Claim 22, Fick discloses the method of Claim 17 further comprising the step of:
providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed (Fig 2; col 6, in 54 to col 7, in 18).

--Please See Supplemental Box--

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 15/37230

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

---Continuation of previous supplemental page---

Regarding Claim 23, Fick discloses the method of Claim 22 wherein the substance applicator is associated with at least one of:

a. a mixer in fluid communication with the substance receptacle and the substance flow path;

b. a seed hopper configured to receive the seed from the seed receptacle;

c. a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and

d. the seed drop tube (Fig 2; col 6, in 54 to col 7, in 16).

Regarding Claim 24, Fick discloses the method of Claim 18 further comprising the steps of:

providing a seed drop tube that is part of the seed flow path;

transferring the seed into the seed drop tube; and

applying the seed-applied substance to the seed proximate to or within the seed drop tube (Fig 2; col 6, in 54 to col 7, in 18; spray or injection conduits/dispersing nozzles 14).

Regarding Claim 25, Fick discloses the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles (Fig 2; col 3, in 8-12; col 6, in 54-60).

Regarding Claim 26, Fick discloses the method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either:

always the same amount of seed-applied substance; or

only either one specific amount of seed-applied substance or no amount of the seed-applied substance (col 3, in 15-34).

Regarding Claim 27, Fick discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed (col 3, in 16-34).

Claim 6 lacks inventive step under PCT Article 33(3) as being obvious over Fick in view of US 5,915,313 A to Bender et al. (hereinafter "Bender").

Regarding Claim 6, Fick does not specifically disclose the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles. However, Bender discloses different seed types in the at least two of the plurality of seed receptacles (col 3, in 16-32). It would have been obvious to a person of ordinary skill in the art to include different seed types of Bender in the two or more storage reservoirs of Fick in order to selectively dispense multiple seed types, as suggested by Bender (col 3, in 33-43), because Fick and Bender are directed to seed treatment methods and systems.

Claims 12 and 19 lack inventive step under PCT Article 33(3) as being obvious over Fick in view of US 4,356,934 A to Krake.

Regarding Claim 12, Fick does not specifically disclose the method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path. However, Krake discloses a substance applicator comprising a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path (col 5, in 21-26). It would have been obvious to a person of ordinary skill in the art to replace the in line mixing device of Fick with the spray nozzle applicator of Krake to assure that the coating is dried on the seed before it enters the planting tubes to avoid clogging thereof, because Fick and Krake are directed to seed treatment methods and systems.

Regarding Claim 19, Fick does not specifically disclose the method of Claim 17 further comprising the steps of:

providing a seed hopper configured to receive the seed from the seed receptacle;

transferring the seed into the seed hopper; and

applying the seed-applied substance to the seed within the seed hopper. However, Krake discloses spray treating seed as it enters the planter seed hopper (col 1, in 20-43). It would have been obvious to a person of ordinary skill in the art to apply the substance to the seed within the seed hopper to avoid dusting, because Fick and Krake are directed to seed treatment methods and systems.

Claims 1-27 have industrial applicability as defined by PCT Article 33(4) because the subject matter could be made or used in industry.

SEARCH HISTORY

Application Number	PCT/US 15/37230
Search Conducted By	DDS
Search Approved By	SV

US/IPC Classifications Searched	USPC – 47/65 IPC(8) – A01G 31/02 (2015.01) CPC – A01G 13/043, A01G 9/24, A01G 13/0225
Date Conducted	24 August 2015 (24.08.2015)

Documentation Searched	Patent Literature and Non-Patent Literature
Search Terms Used	tractor, planter, seed, treatment, applicator, spray, nozzle, atomizer, controller, meter, global positioning system, GPS, prescriptive, prescribed
Date Conducted	24 August 2015 (24.08.2015)

Electronic Database Searched	PatBase
Files Searched	Full-text: AU BE BR CA CH CN DE DK EP ES FI FR GB IN JP KR SE TH TW US WO Bibliographic: (Europe) AT BA BE BG CH CS CY CZ DD DK EE ES FI GE GR HR HU IE IS IT LT LU LV MC MD MT NL NO PL PT RO RS SE SI SK SM TR UA YU (Asia) EA GC HK ID IL IN KZ MN MY PH RU SG SU TH TJ TW UZ VN (North America) CA CR CU DO GT HN MX NI PA SV TT (South America) AR BR CL CO EC PE UY (Australasia) AU NZ (Africa) AP DZ EG KE MA MW OA ZA ZM ZW
Date Conducted	24 August 2015 (24.08.2015)
Search Logic:	
Search 1: PA=((Inflexion) W3 (Point) W3 (Tech#)) (Results 0)	

Search 2: ((Inflexion) W3 (Point) W3 (Tech#)) (Results 0)

Search 3: PA=((Inflexion) W3 (Tech#)) (Results 0)

Search 4: ((Inflexion) W3 (Tech#)) (Results 0)

Search 5: INV=((smith) W3 (stephen)) (Results 1527)

Search 6: INV=((iwig) W3 (nicholas)) (Results 0)

Search 7: INV=((iwig) W3 (mark)) (Results 2)

Search 8: INV=((parks) W3 (pat)) (Results 0)

Search 9: 5 OR 6 OR 7 OR 8 (Results 1529)

Search 10: 9 AND (seed# OR tractor#) (Results 89)

Search 11: 10 AND TA=(seed# OR tractor#) (Results 2)

Search 12: UC=(47/65) (Results 143)

Search 13: IC=(A01G31/02) (Results 8475)

Search 14: CPC=(A01G13/043 OR A01G9/24 OR A01G13/0225) (Results 844)

Search 15: 12 OR 13 OR 14 (Results 9354)

Search 16: 15 AND (tractor# OR planter#) (Results 5911)

Search 17: 16 AND (farm# OR agricultur# OR plant# OR crop# OR seed#) (Results 5910)

Search 18: 17 AND TA=(seed#) (Results 573)

Search 19: 18 AND ((seed#) W10 (treat# OR dress# OR coat# OR apply# OR applicat# OR spray# OR nozzle# OR atomiz#)) (Results 135)

Search 20: TAC=(tractor# OR planter#) (Results 100000)

Search 21: 20 AND TAC=((seed#) W5 (treat# OR pretreat# OR "pre-treat#" OR dress# OR coat# OR apply# OR applicat# OR spray# OR nozzle OR atomiz#)) (Results 8795)

Search 22: 21 AND TA=(tractor# OR planter#) (Results 7131)

Search 23: 22 AND TA=((seed#) W5 (treat# OR pretreat# OR "pre-treat#" OR dress# OR coat# OR apply# OR applicat# OR spray# OR nozzle OR atomiz#)) (Results 4467)

Search 24: 23 AND CL=(tractor# OR planter#) (Results 1226)

Search 25: 24 AND CL=((seed#) W5 (treat# OR pretreat# OR "pre-treat#" OR dress# OR coat# OR apply# OR applicat# OR spray# OR nozzle OR atomiz#)) (Results 917)

Search 26: 25 AND ("global position# system" OR "GPS") (Results 10)

Search 27: 26 AND (meter#) (Results 9)

Search 28: 24 AND ((seed#) W5 (prescript#)) (Results 3)

Electronic Database Searched	Google Chrome
Files Searched	Google Patents
Date Conducted	24 August 2015 (24.08.2015)
Search Logic:	
(tractor) (planter) About 774 results	
(tractor) (planter) (seed) (treatment) About 339 results	
(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) About 275 results	
(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) About 247 results	
(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) ("global positioning system" OR "GPS") About 46 results	

Electronic Database Searched	Free Patents Online
Files Searched	(US Pat, PgPub, EPO, JPO, WIPO, NPL: class, keyword)
Date Conducted	24 August 2015 (24.08.2015)
Search Logic:	
(tractor) (planter)	

4457 results

(tractor) (planter) (seed) (treatment)

456 results

(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer)

439 results

(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter)

430 results

(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter)
("global positioning system" OR "GPS")

177 results

Electronic Database Searched	Google
Files Searched	Google Scholar (Articles excluding patents)
Date Conducted	24 August 2015 (24.08.2015)
Search Logic:	
<p>(tractor) (planter) About 10,100 results</p> <p>(tractor) (planter) (seed) (treatment) About 8,680 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) About 2,980 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) About 763 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) ("global positioning system" OR "GPS") About 132 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) ("global positioning system" OR "GPS") (prescriptive OR prescribed) About 17 results</p>	

Electronic Database Searched	Google
Files Searched	Google Web
Date Conducted	24 August 2015 (24.08.2015)
Search Logic:	
<p>(tractor) (planter) About 705,000 results</p> <p>(tractor) (planter) (seed) (treatment) About 110,000 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) About 62,100 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) About 25,800 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) ("global positioning system" OR "GPS") About 7,390 results</p> <p>(tractor) (planter) (seed) (treatment) (applicator OR spray OR nozzle OR atomizer) (controller OR meter) ("global positioning system" OR "GPS") (prescriptive OR prescribed) About 919 results</p>	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	3643
	Examiner Name	Peter M POON
	Attorney Docket Number	P11431US00_NP

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	3848772	A	1974-11-19	Aanestad et al.	Entire Document		
	2	6112679	A	2000-09-05	Borstmayer et al.	Entire Document		
	3	6216615	B1	2001-04-17	Romans, William W	Entire Document		
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S. PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	8808244	WO	A1	1988-11-03	Erlands	Entire Document	×

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	3643
	Examiner Name	Peter M POON
	Attorney Docket Number	P11431US00_NP

If you wish to add additional Foreign Patent Document citation information please click the Add button			Add
NON-PATENT LITERATURE DOCUMENTS			Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	EUROPEAN PATENT OFFICE; "European Search Report (EESR)", PCT/US2015/037230, 03/20/2019, 12 pages.	
If you wish to add additional non-patent literature document citation information please click the Add button			Add
EXAMINER SIGNATURE			
Examiner Signature			Date Considered
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
<small> ¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached. </small>			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	3643
	Examiner Name	Peter M POON
	Attorney Docket Number	P11431US00_NP

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Kyle S. Coleman/	Date (YYYY-MM-DD)	2019-03-26
Name/Print	Kyle S. Coleman	Registration Number	66257

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	04/30/2020	EXAMINER	
Goodhue, Coleman & Owens, P.C.			LOUIE, MANDY C	
12951 University Ave				
Suite 201				
Clive, IA 50325			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			04/30/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17-27 rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 17 recites the limitation "the condition" in line 11. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

Claim(s) 1-5, 7-11, 13-18, 20-27 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Fick [US 5931882].

Claim 1: Fick teaches a prescriptive seed treatment method (recipe) [abstract, col 5, ln 30-50, col 3, ln 30-35] comprising providing a planter [col 4, ln 30] and seed, and seed-applied substance [abstract], calculating a location where the seed will be planted by the planter [Fig. 2, col 3, ln 26-40]; selecting based at least in part on a condition a combination of seed and seed-applied substance to plant at the location [col 2, ln 40-49, col 3, ln 16-34, col 5, ln 30-42]; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location [col 5, ln 53-57; col 7, ln 9-12] and planting the combination of the seed and seed-applied substance [col 9, ln 48-65; col 11, ln 39-49].

Claim 2: Fick teaches a method of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [col 3, ln 16-34; col 5, ln 30-42]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator [Fig. 2; col 5, ln 53-60]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [Fig. 2, col 5, ln 53 to col 6, ln 15]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path [col 6, ln 54 to col 7, ln 18; Fig. 2].

Claim 3: Fick teaches the method includes generating different combination of seed and seed-applied substance prior to planting and a combination of seed and seed-applied substance can be selected and delivered to a desired location to be planted [Fig. 2, col 5, ln 30 to col 6, ln 15 and col 6 ln 54 to col 7, ln 18]. Fick also teaches providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a

different combination of seed and seed-applied substance and placing the different combinations into at least plurality of seed receptacles [col 2, ln 41-50; col 3, ln 9-12; col 5, ln 53-57; col 7, ln 1-12, col 9, ln 40-57].

Regarding Claim 4, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance (col 5, ln 30-42).

Regarding Claim 5, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type (col 5, ln 30-42; col 5, ln 53 to col 6, ln 15).

Regarding Claim 7, Fick discloses the method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance (col 3, ln 16-34; col 5, ln 30-42).

Regarding Claim 8, Fick discloses the method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance (col 2, ln 13-48; col 2, ln 58 to col 3, ln 3; col 3, ln 16-34; col 5, ln 30-42).

Regarding Claim 9, Fick discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and a seed drop tube; storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube; transferring the seed from the seed hopper to the seed meter; and delivering the seed from the seed meter to the seed drop tube (Fig 2; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18).

Regarding Claim 10, Fick discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube (Fig 2; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18; from the line mixing device 30 through the booms 12 and spray or injection conduits/dispersing nozzles 14).

Regarding Claim 11, Fick discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper,

and the seed meters (Fig 2; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18; from the in line mixing device 30 through the booms 12 and spray or injection conduits/dispensing nozzles 14).

Regarding Claim 13, Fick discloses the method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises: inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system (col 2, ln 58 to col 3, ln 3; col 3, ln 17-39); and wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance (Fig 2; col 3, ln 9-12; col 5, ln 30-42; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18).

Regarding Claim 14, Fick discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a metering device; and metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device (flow meter 34).

Regarding Claim 15, Fick discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a timing mechanism; and calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path (col 3, ln 7 to col 6, ln 25; col 9, ln 32 to col 10, ln 21).

Regarding Claim 16, Fick discloses the method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following: providing a metering device and a timing mechanism; metering flow of the selected combination of seed and seed-applied substance from the one of the plurality seed receptacles with the metering device; and calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter (col 3, ln 7 to col 6, ln 25; col 9, ln 32 to col 10, ln 21).

Regarding Claim 17, Fick discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller (Fig 2; col 6, ln 54 to col 7, ln 18); determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller (col 3, ln 6-39); transferring the seed-applied substance from the substance receptacle into the substance flow path (col 5, ln 30 to col 6, ln 25); transferring the seed from the seed receptacle into the seed flow path (col 5, ln 30 to col 6, ln 25); and applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on the condition (col 7, ln 9-18).

Regarding Claim 18, Fick discloses the method of Claim 2 further comprising the steps of: providing a mixer in fluid communication with the substance receptacle and the substance flow path; and mixing the seed-applied substance prior to the seed-applied substance being applied to the seed (col 7, ln 9-13).

Regarding Claim 20, Fick discloses the method of Claim 18 further comprising the steps of: providing a seed meter configured to receive the seed from the seed hopper and transfer the seed further through the seed flow path; transferring the seed into the seed meter; and applying the seed-applied substance to the seed within the seed meter (Fig 2, col 7, ln 14-18; flow meter 34).

Regarding Claim 21, Fick discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (col 9, ln 35-39).

Regarding Claim 22, Fick discloses the method of Claim 17 further comprising the step of: providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed (Fig 2; col 6, ln 54 to col 7, ln 18).

Regarding Claim 23, Fick discloses the method of Claim 22 wherein the substance applicator is associated with at least one of: a) a mixer in fluid communication with the substance receptacle and the substance flow path; b) a seed hopper configured to receive the seed from the seed receptacle; c) a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and d) the seed drop tube (Fig 2; col 6, ln 54 to col 7, ln 18).

Regarding Claim 24, Fick discloses the method of Claim 18 further comprising the steps of: providing a seed drop tube that is part of the seed flow path; transferring the seed into the seed drop tube; and applying the

seed-applied substance to the seed proximate to or within the seed drop tube (Fig 2; col 6, ln 54 to col 7, ln 18; spray or injection conduits/dispersing nozzles 14).

Regarding Claim 25, Fick discloses the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles (Fig 2; col 3, ln 8-12; col 6, ln 54-60).

Regarding Claim 26, Fick discloses the method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either: always the same amount of seed-applied substance; or only either one specific amount of seed-applied substance or no amount of the seed-applied substance (col 3, ln 16-34).

Regarding Claim 27, Fick discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed (col 3, ln 16-34).

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

Claims 3-8 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 1 above, and further in view of Wendte [US 20150223391].

Teaching of the prior art is a forementioned, wherein Fick teaches the method includes generating different combination of seed and seed-applied substance prior to planting and a combination of seed and seed-applied substance can be selected and delivered to a desired location to be planted [Fig. 2, col 5, ln 30 to col 6, ln 15 and col 6 ln 54 to col 7, ln 18]. However, in the event that Fick does not appear to teach providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance and placing the different combinations into at least plurality of seed receptacles. Wendte is provided.

Claim 3: Wendte teaches providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance and placing the different combinations into at least plurality of seed receptacles [0043-0044]. It would have been obvious to one of ordinary

skill in the art to provide different combinations of seed and seed-applied substance into the seed receptacles since Wendte teaches such arrangement increases efficiency of the planting operation [0005-0008].

Regarding Claim 4, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance (col 5, ln 30-42).

Regarding Claim 5, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type (col 5, ln 30-42; col 5, ln 53 to col 6, ln 15). Wendte also teaches selecting a seed type [0043-0044].

Claim 6, Wendte teaches the different combination of seed and seed-applied substance comprises different seed types and different types of seed applied substances (different prescription) in the seed receptacles [0043-0044].

Regarding Claim 7, Fick discloses the method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance (col 3, ln 16-34; col 5, ln 30-42).

Regarding Claim 8, Fick discloses the method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance (col 2, ln 13-48; col 2, ln 58 to col 3, ln 3; col 3, ln 16-34; col 5, ln 30-42).

Claim 6 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 3 above, and further in view of Bender [US 5915313].

Regarding Claim 6, Fick does not specifically disclose the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles. However, Bender discloses different seed types in the at least two of the plurality of seed receptacles (col 3, ln 16-32). It would have been obvious to a person of ordinary skill in the art to include different seed types of

Bender in the two or more storage reservoirs of Fick in order to selectively dispense multiple seed types, as suggested by Bender (col 3, ln 33-43), because Fick and Bender are directed to seed treatment methods and systems.

Claims 12 and 19 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claims 2 and 17 above, and further in view of Knake [US 4356934].

Regarding Claim 12, Fick does not specifically disclose the method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path. However, Knake discloses a substance applicator comprising a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path (col 5, ln 21-26). It would have been obvious to a person of ordinary skill in the art to replace the in line mixing device of Fick with the spray nozzle applicator of Knake to assure that the coating is dried on the seed before it enters the planting tubes to avoid clogging thereof, because Fick and Knake are directed to seed treatment methods and systems.

Regarding Claim 19, Fick does not specifically disclose the method of Claim 17 further comprising the steps of: providing a seed hopper configured to receive the seed from the seed receptacle; transferring the seed into the seed hopper; and applying the seed-applied substance to the seed within the seed hopper. However, Knake discloses spray treating seed as it enters the planter seed hopper (col 1, ln 20-43). It would have been obvious to a person of ordinary skill in the art to apply the substance to the seed within the seed hopper to avoid dusting, because Fick and Knake are directed to seed treatment methods and systems.

Conclusion

Claims 1-27 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached on Monday to Friday 1:00PM to 4:00PM PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

<i>Notice of References Cited</i>	Application/Control No. 15/739,606		Applicant(s)/Patent Under Reexamination Smith et al.	
	Examiner MANDY C LOUIE		Art Unit 1715	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-5931882-A	08-1999	Fick; Douglas L.	A01B79/005	111/903
*	B	US-20150223391-A1	08-2015	Wendte; Keith W.	A01C7/04	111/177
*	C	US-5915313-A	06-1999	Bender; Timothy J.	A01B79/005	111/178
*	D	US-4356934-A	11-1982	Knake; Raymond P.	A01C1/06	111/174
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20200426

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	97	planter and different WITH prescrip\$6 and different WITH seed	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/27 01:20
L3	78	planter and different WITH prescrip\$6 same different WITH seed	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/27 01:25
L7	94	planter and different WITH prescrip\$6 and time SAME prescrip\$6	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/27 02:23
S1	8	("3848772" "6112679" "6216615" "20130121101" "4356934" "5915313" "5931882" "5956255").PN.	US-PGPUB; USPAT	OR	OFF	2020/04/25 19:22
S2	1	(15/739606).APP.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/04/25 19:25
S3	95	("4413685" "4414792" "4507910" "4573124" "4914593" "4918608" "5161472" "5184293" "5235511" "5260875" "5348226" "5453924" "Re35100").PN. OR ("5931882").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/04/26 03:58
S4	80	("3762603" "3848552" "3860146" "3885704" "4009799" "4013875" "4148414" "4225930" "4268825" "4277833" "4296409" "4333096" "4365672" "4369895" "4381036" "4413685" "4467872" "4488476" "4523280" "4530463" "4653410" "4721168" "4747301" "4803626" "5025951" "5220876" "5232054" "5260875" "5323721" "5392707" "5424957" "5431117" "5488817" "5498929" "5542364" "5574657" "5581235" "5598794"	US-PGPUB; USPAT; USOCR	OR	OFF	2020/04/26 19:13

		"5621666" "5635911" "5650609").PN. OR ("5956255").URPN.				
S5	275	planter SAME different near seed	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:30
S6	0	planter SAME different near seed (module or bin OR receptacle OR compartment OR hopper)	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:30
S7	0	planter SAME different near seed near (module or bin OR receptacle OR compartment OR hopper)	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:31
S8	18	planter SAME different near seed WITH combination	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:31
S9	24	planter and different near seed WITH combination	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:31
S10	543	planter and different adj seed	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:38
S11	243	planter SAME different adj seed	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:38
S12	78	planter and different near seed near type	US-PGPUB; USPAT; USOCR	ADJ	OFF	2020/04/26 19:38
S13	1	("5915313").PN.	USPAT; USOCR	OR	OFF	2020/04/26 19:58

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	7	inflexion near2 point.as. or (steven near2 smith.in. OR nicholas near2 iwig.in. OR mark near2 iwig.in. OR pat parks.in.) and planter and different WITH seed	US-PGPUB; USPAT	ADJ	OFF	2020/04/27 02:19
L5	1	inflexion near2 point.as. or (steven near2 smith.in. OR nicholas near2 iwig.in. OR mark near2 iwig.in. OR pat parks.in.) and planter and different WITH prescrip\$6	US-PGPUB; USPAT	ADJ	OFF	2020/04/27 02:19
L6	1	inflexion near2 point.as. or (steven near2 smith.in. OR nicholas near2 iwig.in. OR mark near2 iwig.in. OR pat parks.in.) and planter and different WITH chemical	US-PGPUB; USPAT	ADJ	OFF	2020/04/27 02:20

4/27/2020 2:37:26 AM

C:\Users\mlouie\Documents\EAST\Workspaces\15739606_prescriptive different seed treatments and planter.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of: Smith et al.	Confirmation No. 7148
Application No. 15/739,606	Group Art Unit: 1715
Filing Date: December 22, 2017	Examiner: Mandy C LOUIE
For: System and Method for Prescriptive Seed Treatment	

AMENDMENT

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

VIA EFS-WEB

Commissioner:

In reply to the Office Action mailed April 30, 2020, the shortened statutory period for response to which expires on July 30, 2020 and extends through October 30, 2020, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims in this paper.

Remarks follow the amendments section of this paper.

REMARKS

In the Office Action, the Examiner took the following actions:

- I. Rejected claims 17-27 under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention;
- II. Rejected claim(s) 1-5, 7-11, 13-18, 20-27 under 35 U.S.C. 102(a)(1) as being anticipated by Fick [US 5931882];
- III. Rejected claims 3-8 under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 1 above, and further in view of Wendte [US 20150223391];
- IV. Rejected claim 6 under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 3 above, and further in view of Bender [US 5915313]; and
- V. Rejected claims 12 and 19 under 35 U.S.C. 103 as being unpatentable over Fick as applied to claims 2 and 17 above, and further in view of Knake [US 4356934].

The Office Action may contain statements characterizing the cited art and/or the claims. Regardless of whether any such statement is expressly identified and/or

discussed herein, Applicant reserves the right to disagree with any such statement or characterization in the Office Action.

Applicant amends claims 17 to improve form. Claims 1-27 remain pending and under examination. For at least the following reasons, Applicant respectfully requests reconsideration and withdrawal of the rejections.

CLAIM REJECTIONS – 35 USC §112

Claims 17-27 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention. Specifically, claim 17 recites the limitation “the condition” in line 11. The office action contends that there is insufficient antecedent basis for this limitation in the claim.

Accordingly, applicant amends claim 17 to recite “a condition.” In view of the foregoing, applicant respectfully requests withdrawal of the 35 U.S.C. § 112 rejection of claim 17.

CLAIM REJECTIONS – 35 USC §102

Claims 1-5, 7-11, 13-18, 20-27 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Fick [US 5931882]. This rejection is respectfully traversed.

Independent claim 1 recites, “[a] prescriptive seed treatment method comprising the steps of: providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on

a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance.”

Independent claim 17 recites, “[a] method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller; transferring the seed-applied substance from the substance receptacle into the substance flow path; transferring the seed from the seed receptacle into the seed flow path; and applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on ~~the~~ a condition.

Applicant respectfully submits that the patent cited in the office action does not teach all the elements of either claim 1 or 17, such that independent claims 1 and 17 are novel in view of the cited patent.

Claims 2-5, 7-11, and 13-16 depend from independent claim 1. Claims 18 and 20-27 depend from independent claim 17. Applicant respectfully submits that all dependent claims are novel by dependency from novel independent claims 1 and 17, respectively.

CLAIM REJECTIONS – 35 USC §103

Claims 3-8 are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 1 above, and further in view of Wendte [US 20150223391]. This rejection is respectfully traversed.

Independent claim 1 recites, “[a] prescriptive seed treatment method comprising the steps of: providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance.”

Applicant respectfully submits that the patent and publication cited in the office action do not teach all the elements of claim 1, such that independent claim 1 is both novel and nonobvious when the cited patent and publication are taken alone or in combination with each other. Furthermore, applicant further respectfully submits that one of skill in the art would not be motivated to combine the cited patent and publication. Additionally, applicant also respectfully submits that independent claim 1 is nonobvious even when the cited patent and publication are combined with another for several reasons, including, but not limited to the applicant’s assertion that no one single reference teaches all the limitations of claim 1.

Claims 3-8 depend from independent claim 1. Applicant respectfully submits that all dependent claims are novel and nonobvious by dependency from a novel and nonobvious independent claim.

Claim 6 is rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 3 above, and further in view of Bender [US 5915313]. This rejection is respectfully traversed.

Independent claim 1 recites, “[a] prescriptive seed treatment method comprising the steps of: providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance.”

Applicant respectfully submits that the patents cited in the office action do not teach all the elements of independent claim 1, such that claim 1 is both novel and nonobvious when the cited patents are taken alone or in combination with each other. Furthermore, applicant further respectfully submits that one of skill in the art would not be motivated to combine the cited patents. Additionally, applicant also respectfully submits that claim 1 is nonobvious even when the cited patents are combined with another for several reasons, including, but not limited to the applicant’s assertion that no one single reference teaches all the limitations of claim 1.

Claim 6 depends from independent claim 1. Applicant respectfully submits that all dependent claims are novel and nonobvious by dependency from a novel and nonobvious independent claim.

Claim 6 is rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claims 2 and 17 above, and further in view of Knake [US 4356934]. This rejection is respectfully traversed.

Independent claim 1 recites, “[a] prescriptive seed treatment method comprising

the steps of: providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance.”

Independent claim 17 recites, “[a] method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller; transferring the seed-applied substance from the substance receptacle into the substance flow path; transferring the seed from the seed receptacle into the seed flow path; and applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on ~~the~~ a condition.

Applicant respectfully submits that none of the patents cited in the office action teach all of the elements of either claim 1 or 17, such that independent claims 1 and 17 are both novel and nonobvious when the cited patents are taken alone or in combination with each other. Furthermore, applicant further respectfully submits that one of skill in the art would not be motivated to combine the cited patents. Additionally, applicant also respectfully submits that independent claims 1 and 17 are nonobvious even when the cited patents are combined with another for several reasons, including, but not limited to the applicant’s assertion that no one single reference teaches all the limitations of claims

1 and 17.

Claim 6 depends from independent claim 1. Applicant respectfully submits that all dependent claims are novel and nonobvious by dependency from a novel and nonobvious independent claim.

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

This amendment accompanies a request for a three month extension of time in the amount of \$740 (small), the fee for which is being paid at the time of filing of this response. Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: October 30, 2020

By: /KYLE S. COLEMAN/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1 (Original): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed, and a seed-applied substance;

calculating a location where the seed will be planted by the planter;

selecting, based at least in part on a condition, a combination of seed and seed-

applied substance to plant at the location;

generating the combination of the seed and seed-applied substance prior to the

combination being planted at the location; and

planting the combination of the seed and seed-applied substance.

Claim 2 (Original): The method of Claim 1 wherein:

the step of selecting, based at least in part on the condition, the combination of seed

and seed-applied substance to plant at the location further comprises selecting

an amount of the seed-applied substance to be applied to the seed;

the step of generating the combination of the seed and seed-applied substance prior

to the combination being planted at the location further comprises:

(a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator;

(b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator;

and

- (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path.

Claim 3 (Original): The method of Claim 1 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance;

generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles;

selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance; and

delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter.

Claim 4 (Original): The method of Claim 1 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance.

Claim 5 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to

plant at the location further comprises selecting a seed type.

Claim 6 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 7 (Original): The method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance.

Claim 8 (Original): The method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance.

Claim 9 (Original): The method of Claim 2 further comprising the steps of:
providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and
a seed drop tube;
storing the seed in the seed receptacle;
transferring the seed from the seed receptacles to the seed hopper via the a seed

delivery tube;
transferring the seed from the seed hopper to the seed meter; and
delivering the seed from the seed meter to the seed drop tube.

Claim 10 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube.

Claim 11 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters.

Claim 12 (Original): The method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path.

Claim 13 (Original): The method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises:
inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and
wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance.

Claim 14 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a metering device; and
metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device.

Claim 15 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a timing mechanism; and
calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path.

Claim 16 (Original): The method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following:
providing a metering device and a timing mechanism;
metering flow of the selected combination of seed and seed-applied substance from the one of the plurality seed receptacles with the metering device; and

calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter.

Claim 17 (Currently amended): A method for seed treatment on a planter, the method comprising the steps of:

providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller;

determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller;

transferring the seed-applied substance from the substance receptacle into the substance flow path;

transferring the seed from the seed receptacle into the seed flow path; and

applying the seed-applied substance to the seed within the seed flow path,

wherein the amount of the seed-applied substance is based, at least in part, on ~~the a~~ condition.

Claim 18 (Original): The method of Claim 2 further comprising the steps of:

providing a mixer in fluid communication with the substance receptacle and the substance flow path; and

mixing the seed-applied substance prior to the seed-applied substance being applied to the seed.

Claim 19 (Original): The method of Claim 17 further comprising the steps of:
providing a seed hopper configured to receive the seed from the seed receptacle;
transferring the seed into the seed hopper; and
applying the seed-applied substance to the seed within the seed hopper.

Claim 20 (Original): The method of Claim 18 further comprising the steps of:
providing a seed meter configured to receive the seed from the seed hopper and
transfer the seed further through the seed flow path;
transferring the seed into the seed meter; and
applying the seed-applied substance to the seed within the seed meter.

Claim 21 (Original): The method of Claim 17 further comprising the step of:
adjusting a mixture ratio of the seed-applied substance during operation of the
planter.

Claim 22 (Original): The method of Claim 17 further comprising the step of:
providing a substance applicator in fluid connection with the substance receptacle, the
substance applicator adapted to prescriptively treat the seed.

Claim 23 (Original): The method of Claim 22 wherein the substance applicator is
associated with at least one of:

- a. a mixer in fluid communication with the substance receptacle and the

substance flow path;

- b. a seed hopper configured to receive the seed from the seed receptacle;
- c. a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and
- d. the seed drop tube.

Claim 24 (Original): The method of Claim 18 further comprising the steps of:

providing a seed drop tube that is part of the seed flow path;

transferring the seed into the seed drop tube; and

applying the seed-applied substance to the seed proximate to or within the seed drop tube.

Claim 25 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 26 (Original): The method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either:

always the same amount of seed-applied substance; or

only either one specific amount of seed-applied substance or no amount of the seed-applied substance.

Claim 27 (Original): The method of Claim 2 wherein the step of selecting, based at

least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	02/02/2021	EXAMINER	
Goodhue, Coleman & Owens, P.C. 12951 University Ave Suite 201 Clive, IA 50325			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			02/02/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

Claim(s) 1-5, 7-11, 13-18, 20-27 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Fick [US 5931882].

Claim 1: Fick teaches a prescriptive seed treatment method (recipe) [abstract, col 5, ln 30-50, col 3, ln 30-35] comprising providing a planter [col 4, ln 30] and seed, and seed-applied substance [abstract], calculating a location where the seed will be planted by the planter [Fig. 2, col 3, ln 26-40]; selecting based at least in part on a condition a combination of seed and seed-applied substance to plant at the location [col 2, ln 40-49, col 3, ln 16-34, col 5, ln 30-42]; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location [col 5, ln 53-57; col 7, ln 9-12] and planting the combination of the seed and seed-applied substance [col 9, ln 48-65; col 11, ln 39-49].

Claim 2: Fick teaches a method of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [col 3, ln 16-34; col 5, ln 30-42]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator [Fig. 2; col 5, ln 53-60]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [Fig. 2, col 5, ln 53 to col 6, ln 15]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path [col 6, ln 54 to col 7, ln 18; Fig. 2].

Claim 3: Fick teaches the method includes generating different combination of seed and seed-applied substance prior to planting and a combination of seed and seed-applied substance can be selected and delivered to a desired location to be planted [Fig. 2, col 5, ln 30 to col 6, ln 15 and col 6 ln 54 to col 7, ln 18]. Fick also teaches providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance and placing the different combinations into at least plurality of seed receptacles [col 2, ln 41-50; col 3, ln 9-12; col 5, ln 53-57; col 7, ln 1-12, col 9, ln 40-57].

Regarding Claim 4, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance (col 5, ln 30-42).

Regarding Claim 5, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type (col 5, ln 30-42; col 5, ln 53 to col 6, ln 15).

Regarding Claim 7, Fick discloses the method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance (col 3, ln 16-34; col 5, ln 30-42).

Regarding Claim 8, Fick discloses the method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition the

combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance (col 2, ln 13-48; col 2, ln 58 to col 3, ln 3; col 3, ln 16-34; col 5, ln 30-42).

Regarding Claim 9, Fick discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and a seed drop tube; storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube; transferring the seed from the seed hopper to the seed meter; and delivering the seed from the seed meter to the seed drop tube (Fig 2; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18).

Regarding Claim 10, Fick discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube (Fig 2; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18; from the line mixing device 30 through the booms 12 and spray or injection conduits/dispensing nozzles 14).

Regarding Claim 11, Fick discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters (Fig 2; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18; from the in line mixing device 30 through the booms 12 and spray or injection conduits/dispensing nozzles 14).

Regarding Claim 13, Fick discloses the method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises: inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system (col 2, ln 58 to col 3, ln 3; col 3, ln 17-39); and wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance (Fig 2; col 3, ln 9-12; col 5, ln 30-42; col 5, ln 53 to col 6, ln 15; col 6, ln 54 to col 7, ln 18).

Regarding Claim 14, Fick discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a metering device; and metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device (flow meter 34).

Regarding Claim 15, Fick discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a timing mechanism; and calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path (col 3, ln 7 to col 6, ln 25; col 9, ln 32 to col 10, ln 21).

Regarding Claim 16, Fick discloses the method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following: providing a metering device and a timing mechanism; metering flow of the selected combination of seed and seed-applied substance from the one of the plurality seed receptacles with the metering device; and calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter (col 3, ln 7 to col 6, ln 25; col 9, ln 32 to col 10, ln 21).

Regarding Claim 17, Fick discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller (Fig 2; col 6, ln 54 to col 7, ln 18); determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller (col 3, ln 6-39); transferring the seed-applied substance from the substance receptacle into the substance flow path (col 5, ln 30 to col 6, ln 25); transferring the seed from the seed receptacle into the seed flow path (col 5, ln 30 to col 6, ln 25); and applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on the condition (col 7, ln 9-18).

Regarding Claim 18, Fick discloses the method of Claim 2 further comprising the steps of: providing a mixer in fluid communication with the substance receptacle and the substance flow path; and mixing the seed-applied substance prior to the seed-applied substance being applied to the seed (col 7, ln 9-13).

Regarding Claim 20, Fick discloses the method of Claim 18 further comprising the steps of: providing a seed meter configured to receive the seed from the seed hopper and transfer the seed further through the seed

flow path; transferring the seed into the seed meter; and applying the seed-applied substance to the seed within the seed meter (Fig 2, col 7, ln 14-18; flow meter 34).

Regarding Claim 21, Fick discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (col 9, ln 35-39).

Regarding Claim 22, Fick discloses the method of Claim 17 further comprising the step of: providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed (Fig 2; col 6, ln 54 to col 7, ln 18).

Regarding Claim 23, Fick discloses the method of Claim 22 wherein the substance applicator is associated with at least one of: a) a mixer in fluid communication with the substance receptacle and the substance flow path; b) a seed hopper configured to receive the seed from the seed receptacle; c) a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and d) the seed drop tube (Fig 2; col 6, ln 54 to col 7, ln 18).

Regarding Claim 24, Fick discloses the method of Claim 18 further comprising the steps of: providing a seed drop tube that is part of the seed flow path; transferring the seed into the seed drop tube; and applying the seed-applied substance to the seed proximate to or within the seed drop tube (Fig 2; col 6, ln 54 to col 7, ln 18; sprayer or injection conduits/dispersing nozzles 14).

Regarding Claim 25, Fick discloses the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles (Fig 2; col 3, ln 8-12; col 6, ln 54-60).

Regarding Claim 26, Fick discloses the method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either: always the same amount of seed-applied substance; or only either one specific amount of seed-applied substance or no amount of the seed-applied substance (col 3, ln 16-34).

Regarding Claim 27, Fick discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed (col 3, ln 16-34).

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner

to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

Claims 3-8 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 1 above, and further in view of Wendte [US 20150223391].

Teaching of the prior art is a forementioned, wherein Fick teaches the method includes generating different combination of seed and seed-applied substance prior to planting and a combination of seed and seed-applied substance can be selected and delivered to a desired location to be planted [Fig. 2, col 5, ln 30 to col 6, ln 15 and col 6 ln 54 to col 7, ln 18]. However, in the event that Fick does not appear to teach providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance and placing the different combinations into at least plurality of seed receptacles. Wendte is provided.

Claim 3: Wendte teaches providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance and placing the different combinations into at least plurality of seed receptacles [0043-0044]. It would have been obvious to one of ordinary skill in the art to provide different combinations of seed and seed-applied substance into the seed receptacles since Wendte teaches such arrangement increases efficiency of the planting operation [0005-0008].

Regarding Claim 4, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance (col 5, ln 30-42).

Regarding Claim 5, Fick teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type (col 5, ln 30-42; col 5, ln 53 to col 6, ln 15). Wendte also teaches selecting a seed type [0043-0044].

Claim 6, Wendte teaches the different combination of seed and seed-applied substance comprises different seed types and different types of seed applied substances (different prescription) in the seed receptacles [0043-0044].

Regarding Claim 7, Fick discloses the method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance (col 3, ln 16-34; col 5, ln 30-42).

Regarding Claim 8, Fick discloses the method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance (col 2, ln 13-48; col 2, ln 58 to col 3, ln 3; col 3, ln 16-34; col 5, ln 30-42).

Claim 6 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 3 above, and further in view of Bender [US 5915313].

Regarding Claim 6, Fick does not specifically disclose the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles. However, Bender discloses different seed types in the at least two of the plurality of seed receptacles (col 3, ln 16-32). It would have been obvious to a person of ordinary skill in the art to include different seed types of Bender in the two or more storage reservoirs of Fick in order to selectively dispense multiple seed types, as suggested by Bender (col 3, ln 33-43), because Fick and Bender are directed to seed treatment methods and systems.

Claims 12 and 19 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claims 2 and 17 above, and further in view of Knake [US 4356934].

Regarding Claim 12, Fick does not specifically disclose the method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path. However, Knake discloses a substance applicator comprising a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path (col 5, ln 21-26). It would have been obvious to a person of ordinary skill in the art to replace the in line mixing

device of Fick with the spray nozzle applicator of Knake to assure that the coating is dried on the seed before it enters the planting tubes to avoid clogging thereof, because Fick and Knake are directed to seed treatment methods and systems.

Regarding Claim 19, Fick does not specifically disclose the method of Claim 17 further comprising the steps of: providing a seed hopper configured to receive the seed from the seed receptacle; transferring the seed into the seed hopper; and applying the seed-applied substance to the seed within the seed hopper. However, Knake discloses spray treating seed as it enters the planter seed hopper (col 1, ln 20-43). It would have been obvious to a person of ordinary skill in the art to apply the substance to the seed within the seed hopper to avoid dusting, because Fick and Knake are directed to seed treatment methods and systems.

Response to Arguments

35 USC 112 second paragraph rejection of claim 17 is withdrawn due to applicant's amendment.

Applicant's arguments filed 10/30/20 have been fully considered but they are not persuasive. Applicant's arguments that the prior art fails to teach all the claimed limitation were not persuasive and support can be found in the aforementioned 103 rejections.

Conclusion

Claims 1-27 are rejected.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory

action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached on Monday to Friday 1:00PM to 4:00PM PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1 (Original): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed, and a seed-applied substance;

calculating a location where the seed will be planted by the planter;

selecting, based at least in part on a condition, a combination of seed and seed-

applied substance to plant at the location;

generating the combination of the seed and seed-applied substance prior to the

combination being planted at the location; and

planting the combination of the seed and seed-applied substance.

Claim 2 (Original): The method of Claim 1 wherein:

the step of selecting, based at least in part on the condition, the combination of seed

and seed-applied substance to plant at the location further comprises selecting

an amount of the seed-applied substance to be applied to the seed;

the step of generating the combination of the seed and seed-applied substance prior

to the combination being planted at the location further comprises:

(a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator;

(b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator;
and

- (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path.

Claim 3 (Original): The method of Claim 1 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance;

generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles;

selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance; and

delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter.

Claim 4 (Original): The method of Claim 1 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance.

Claim 5 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to

plant at the location further comprises selecting a seed type.

Claim 6 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 7 (Original): The method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance.

Claim 8 (Original): The method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance.

Claim 9 (Original): The method of Claim 2 further comprising the steps of:
providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and
a seed drop tube;
storing the seed in the seed receptacle;
transferring the seed from the seed receptacles to the seed hopper via the a seed

delivery tube;
transferring the seed from the seed hopper to the seed meter; and
delivering the seed from the seed meter to the seed drop tube.

Claim 10 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube.

Claim 11 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters.

Claim 12 (Original): The method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path.

Claim 13 (Original): The method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises:
inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and
wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance.

Claim 14 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a metering device; and
metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device.

Claim 15 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a timing mechanism; and
calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path.

Claim 16 (Original): The method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following:
providing a metering device and a timing mechanism;
metering flow of the selected combination of seed and seed-applied substance from the one of the plurality seed receptacles with the metering device; and

calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter.

Claim 17 (Previously presented): A method for seed treatment on a planter, the method comprising the steps of:

providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller;

determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller;

transferring the seed-applied substance from the substance receptacle into the substance flow path;

transferring the seed from the seed receptacle into the seed flow path; and

applying the seed-applied substance to the seed within the seed flow path,

wherein the amount of the seed-applied substance is based, at least in part, on a condition.

Claim 18 (Currently Amended): The method of Claim 2-17 further comprising the steps of:

providing a mixer in fluid communication with the substance receptacle and the substance flow path; and

mixing the seed-applied substance prior to the seed-applied substance being applied

to the seed.

Claim 19 (Original): The method of Claim 17 further comprising the steps of:
providing a seed hopper configured to receive the seed from the seed receptacle;
transferring the seed into the seed hopper; and
applying the seed-applied substance to the seed within the seed hopper.

Claim 20 (Original): The method of Claim 18 further comprising the steps of:
providing a seed meter configured to receive the seed from the seed hopper and
transfer the seed further through the seed flow path;
transferring the seed into the seed meter; and
applying the seed-applied substance to the seed within the seed meter.

Claim 21 (Original): The method of Claim 17 further comprising the step of:
adjusting a mixture ratio of the seed-applied substance during operation of the
planter.

Claim 22 (Original): The method of Claim 17 further comprising the step of:
providing a substance applicator in fluid connection with the substance receptacle, the
substance applicator adapted to prescriptively treat the seed.

Claim 23 (Original): The method of Claim 22 wherein the substance applicator is
associated with at least one of:

- a. a mixer in fluid communication with the substance receptacle and the substance flow path;
- b. a seed hopper configured to receive the seed from the seed receptacle;
- c. a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and
- d. the seed drop tube.

Claim 24 (Original): The method of Claim 18 further comprising the steps of:
providing a seed drop tube that is part of the seed flow path;
transferring the seed into the seed drop tube; and
applying the seed-applied substance to the seed proximate to or within the seed drop tube.

Claim 25 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 26 (Original): The method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either:
always the same amount of seed-applied substance; or
only either one specific amount of seed-applied substance or no amount of the seed-applied substance.

Claim 27 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed.

REMARKS

In the Final Office Action, the Examiner took the following actions:

- I. Rejected claim(s) 1-5, 7-11, 13-18, 20-27 under 35 U.S.C. 102(a)(1) as being anticipated by Fick [US 5931882];
- II. Rejected claims 3-8 under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 1 above, and further in view of Wendte [US 20150223391];
- III. Rejected claim 6 under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 3 above, and further in view of Bender [US 5915313]; and
- IV. Rejected claims 12 and 19 under 35 U.S.C. 103 as being unpatentable over Fick as applied to claims 2 and 17 above, and further in view of Knake [US 4356934].

The Final Office Action may contain statements characterizing the related art and/or the claims. The dependency of claim 18 has been changed to independent claim 17. Regardless of whether any such statement is expressly identified and/or discussed herein, Applicant reserves the right to disagree with any such statement or characterization in the Final Office Action.

Claims 1-27 remain pending and under examination. For at least the following reasons, Applicant respectfully requests reconsideration and withdrawal of the rejections.

CLAIM REJECTIONS – 35 USC §102

Claim(s) 1-5, 7-11, 13-18, 20-27 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Fick [US 5931882]. This rejection is respectfully traversed.

Independent claim 1 is directed to a prescriptive seed treatment method. Two of the steps of the prescriptive seed treatment method recited in claim 1 require “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location” and “planting the combination of the seed and seed-applied substance.” Applicant’s specification defines the term “combination” as including one or more types and/or one or more amounts of seed-applied substances that are applied to a seed” p. 11, lines 19-20, underline emphasis added. Fick states that its invention “relates to agricultural chemical dispensing systems and more particularly to a grid recipe and depth control system for agricultural chemical injection systems and planting systems utilized in agricultural environments” col. 1, lines 14-19, underline emphasis added; see also FIG. 2 and the description for FIG. 2 provided in the Brief Description of the Drawings, col. 6, lines 30-32. Providing further background, Fick states that “[i]n many agricultural applications it is necessary to inject or spray chemicals either onto the soil or onto the plants growing on the soil, such as fertilizers, herbicides, pesticides, fumigants, etc., whereby Fick accomplishes by “in which the chemical is carried until it is metered out and dispensed through one or more spray nozzles carried on booms” col.1. lines 19-27, underline emphasis added. It logically follows, in Fick’s words, that, “[a]ccordingly, there is a need for a combination grid recipe and depth control system which simultaneously controls the rate of an application of a chemical such as a fertilizer or insecticide to a field”

col. 2, 65-67 – col. 3, line 1, underline emphasis added.

Noticeably absent from Fick is any teaching that a fertilizer or insecticide is applied to a seed. Therefore, Fick does not teach the required step of “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location” of claim 1. Also, noticeably absent from Fick is any teaching that a seed carrying a fertilizer or insecticide is planted. Therefore, Fick does not teach the required step of “planting the combination of the seed and seed-applied substance.”

The Office Action argues that Applicant’s step in claim 1 of “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location” is taught by Fick’s product application system because it includes “at least one seed reservoir, at least one chemical reservoir and at least one combination chemical and seed dispensing applicator” and “[a]n in line mixing device 30 may be used to assure that all of the products are thoroughly mixed and from the mixing device the flow is directed out through controlled valves 32 to the booms 12 and dispensing nozzles 14” Final Office Action mailed February 2, 2021, p. 2.

The disclosure in Fick teaches against the assertion in the Office Action that “at least one combination chemical and seed dispensing applicator” is equivalent to Applicant’s step of “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location”. Fick does not apply a seed-applied substance to a seed and then plant the treated seed; rather, Fick “appl[ies] chemicals simultaneously with the planting of seeds in a field [col. 2, lines 59-60; see also, col. 2, lines 65-67 – col. 3, line 1; col. 5, lines 30-34; col. 5, lines 34-38; col. 11, lines 38-40]” in the words of the specification and “simultaneously appl[ies] at least one chemical and

plant[s] at least one crop in the field [col. 13, lines 57-59]" in the words of the claims. In other words, Fick "provides a method of generating a grid recipe for both chemical application and planting depth and frequency for a field and simultaneously applying at least one chemical and planting at least one crop in the field simultaneously planting seed in a field and applying chemicals to the field" col. 5, lines 30-34, underline emphasis added; see also, col. 5, lines 34-42. Fick further teaches that chemicals being applied simultaneously with planting are being applied to the field and not for treating a seed that is then planted. In Fick's words, "there is a need for a combination grid recipe and depth control system which simultaneously controls the rate of an application of a chemical such as a fertilizer or insecticide to a field" col. 2, lines 65-67 – col. 3, line 1, underline emphasis added.

Fick also teaches that its "applicator rate is controlled relative to the width and speed of the applicator [col.3, lines 58-60; see also, col. 9, lines 51-52] and that "boom switches control the flow/no-flow to the boom sections. The stage of the switches is monitored to determine the width of the applicator (i.e., the greater the number of boom switches in the flow position, the great the width of the applicator area) [col. 9, lines 17-22]." The fact that the applicator area is increased with a greater number of boom switches in the flow position further confirms that the chemicals in Fick are applied to the field and not the seed. Fick also teaches that its "grid recipe control system (GRCS) is capable of controlling the application of liquid...at a programmed rate and depth" col. 9, lines 48-51. The fact that the GRCS in Fick is configured to control both the rate and depth of the application of liquid also further confirms that the liquid is being applied to the field and not to the seed as required by claim 1.

In view of the foregoing, Fick fails to teach or otherwise disclose the step of “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location” as recited by claim 1.

The Office Action also argues that Applicant’s step in claim 1 of “planting the combination of the seed and seed-applied substance” is taught by Fick’s grid recipe control system (GRCS) that is “capable of controlling the application of the liquid and/or granular products and/or seeds at a programmed rate and depth. The applicator rate is controlled relative to the width and speed of the applicator. The grid recipe system determines in which gridded area the applicator is located and by using this location (which is determined by the GPS), the recipe is downloaded from the data card to the control system to provide the proper application of multiple products to a particular gridded zone in the field based upon the grid recipe created by the farmer. Also shown in FIG. 4 is a data card. The data card is an electronic media storage device that contains the desired recipe information which is defined by the farmer. The recipe is delineated by the latitude and longitude in all the zoned areas of the field. Thus, a gridded field is used to make a “checkerboard” of the field in which the farmer may determine how much of each product to apply or at what depth the seeds are to be planted in each square of the checkerboard” and “[a] manual depth selection switch 111 is shown along the top edge of the console 110. However, the depth control may also be selected by the farmer when generating a grid recipe as discussed above. In the embodiment illustrated in FIG. 7, four sensors 15 are disposed on the boom 12 (see FIG. 1) and each sensor is represented by a light 112, 113, 114 or 115. The lights 116, 117, 118 and 119 represent the relative position of the left side and right side of the boom 12 respectively. Specifically, if the left

side of the boom 12 is raised, the light 116 will flash. If the left side of the boom 12 is lowered, the light 117 will flash.” Final Office Action mailed February 2, 2021, p. 2.

The disclosure in Fick teaches against the assertion in the Office Action that “controlling the application of the liquid and/or granular products and/or seeds at a programmed rate and depth” is equivalent to Applicant’s step of “planting the combination of the seed and seed-applied substance”. Fick does not plant the combination of the seed and seed-applied substance; rather, Fick “appl[ies] chemicals simultaneously with the planting of seeds in a field [col. 2, lines 59-60; see also, col. 2, lines 65-67 – col. 3, line 1; col. 5, lines 30-34; col. 5, lines 34-38; col. 11, lines 38-40]” in the words of the specification and “simultaneously appl[ies] at least one chemical and plant[s] at least one crop in the field [col. 13, lines 57-59]” in the words of the claims. Planting a seed at the same time as chemical is applied in the field is not that same as “planting the combination of the seed and seed-applied substance” recited by claim 1.

In view of the foregoing, Fick fails to teach or otherwise disclose the step of “planting the combination of the seed and seed-applied substance” as recited by claim 1.

It is therefore respectfully requested that the 35 USC § 102 rejection be withdrawn and claim 1 be allowed. Claims 2-5, 7-11, 13-16, and 25-27 depend from claim 1 and should be allowable as depending from an allowable base claim.

Independent claim 17 is directed to “[a] method for seed treatment on a planter”. Two of the steps of the seed treatment recited in claim 1 require “determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller” and “applying the seed-applied substance to the seed within the seed flow path” underline emphasis added. Fick states that its invention “relates to agricultural

chemical dispensing systems and more particularly to a grid recipe and depth control system for agricultural chemical injection systems and planting systems utilized in agricultural environments” col. 1, lines 14-19, underline emphasis added; see also FIG. 2 and the description for FIG. 2 provided in the Brief Description of the Drawings, col. 6, lines 30-32. Providing further background, Fick states that “[i]n many agricultural applications it is necessary to inject or spray chemicals either onto the soil or onto the plants growing on the soil, such as fertilizers, herbicides, pesticides, fumigants, etc., whereby Fick accomplishes by “in which the chemical is carried until it is metered out and dispensed through one or more spray nozzles carried on booms” col.1. lines 19-27, underline emphasis added. It logically follows, in Fick’s words, that, “[a]ccordingly, there is a need for a combination grid recipe and depth control system which simultaneously controls the rate of an application of a chemical such as a fertilizer or insecticide to a field” col. 2, 65-67 – col. 3, line 1, underline emphasis added.

Noticeably absent from Fick is any teaching that a fertilizer or insecticide is applied to a seed. Therefore, Fick does not teach or otherwise disclose the required steps in claim 17 of “determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller” and “applying the seed-applied substance to the seed within the seed flow path”.

The Office Action argues that Applicant’s step in claim 17 of “applying the seed-applied substance to the seed within the seed flow path” is taught by Fick’s product application system because it has “[a]n in line mixing device 30 may be used to assure that all of the products are thoroughly mixed and from the mixing device the flow is directed out through controlled valves 32 to the booms 12 and dispensing nozzles 14.”

Final Office Action mailed February 2, 2021, p. 5.

The disclosure in Fick teaches against the assertion in the Office Action that “[a]n in line mixing device 30 may be used to assure that all of the products are thoroughly mixed and from the mixing device the flow is directed out through controlled valves 32 to the booms 12 and dispensing nozzles 14” is equivalent to Applicant’s step of “applying the seed-applied substance to the seed within the seed flow path”. Fick does not apply a seed-applied substance to a seed; rather, Fick “appl[ies] chemicals simultaneously with the planting of seeds in a field [col. 2, lines 59-60; see also, col. 2, lines 65-67 – col. 3, line 1; col. 5, lines 30-34; col. 5, lines 34-38; col. 11, lines 38-40]” in the words of the specification and “simultaneously appl[ies] at least one chemical and plant[s] at least one crop in the field [col. 13, lines 57-59]” in the words of the claims. In other words, Fick “provides a method of generating a grid recipe for both chemical application and planting depth and frequency for a field and simultaneously applying at least one chemical and planting at least one crop in the field simultaneously planting seed in a field and applying chemicals to the field” col. 5, lines 30-34, underline emphasis added; see also, col. 5, lines 34-42. Fick further teaches that chemicals being applied simultaneously with planting are being applied to the field and not for treating a seed that is then planted. In Fick’s words, “there is a need for a combination grid recipe and depth control system which simultaneously controls the rate of an application of a chemical such as a fertilizer or insecticide to a field” col. 2, lines 65-67 – col. 3, line 1, underline emphasis added.

Fick also teaches that its “applicator rate is controlled relative to the width and speed of the applicator [col.3, lines 58-60; see also, col. 9, lines 51-52] and that “boom switches control the flow/no-flow to the boom sections. The stage of the switches is

monitored to determine the width of the applicator (i.e., the greater the number of boom switches in the flow position, the great the width of the applicator area) [col. 9, lines 17-22].” The fact that the applicator area is increased with a greater number of boom switches in the flow position further confirms that the chemicals in Fick are applied to the field and not the seed. Fick also teaches that its “grid recipe control system (GRCS) is capable of controlling the application of liquid...at a programmed rate and depth” col. 9, lines 48-51. The fact that the GRCS in Fick is configured to control both the rate and depth of the application of liquid also further confirms that the liquid is being applied to the field and not to the seed as required by claim 17.

In view of the foregoing, Fick fails to teach or otherwise disclose the steps of “determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller” and “applying the seed-applied substance to the seed within the seed flow path” as recited by claim 17.

It is therefore respectfully requested that the 35 USC § 102 rejection be withdrawn and claim 17 be allowed. Claims 18 and 20-24 depend from claim 17 and should be allowable as depending from an allowable base claim.

CLAIM REJECTIONS – 35 USC §103

Claims 3-8 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 1 above, and further in view of Wendte [US 20150223391]. This rejection is respectfully traversed.

Fick fails to teach or otherwise disclose the steps of “generating the combination of the seed and seed-applied substance prior to the combination being planted at the

location” and “planting the combination of the seed and seed-applied substance” recited in independent claim 1. Therefore, the teachings in Fick are deficient. Wendte is directed to a “seed metering system that can be controlled at each of multiple row units to selectively plant different types or varieties of seed based on seed type or variety zones agricultural field” Abstract. Wendte fails to cure all the deficiencies identified in Fick. As such, independent claim 1 is patentable in view of the combination of Fick and Wendte. Claims 3-8 depend from claim 1 and should be allowable as depending from an allowable base claim.

It is therefore respectfully requested that the 35 USC § 103 rejection of claims 3-8 be withdrawn and claims 3-8 be allowed.

Claim 6 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claim 3 above, and further in view of Bender [US 5915313]. This rejection is respectfully traversed.

Fick fails to teach or otherwise disclose the steps of “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location” and “planting the combination of the seed and seed-applied substance” recited in independent claim 1. Therefore, the teachings in Fick are deficient. Bender is directed to “[a] system for dispensing multiple types of seed” Abstract. Bender fails to cure all the deficiencies identified in Fick. As such, independent claim 1 is patentable in view of the combination of Fick and Bender. Claim 6 depends from claim 1 and should be allowable as depending from an allowable base claim.

It is therefore respectfully requested that the 35 USC § 103 rejection of claim 6

be withdrawn and claim 6 be allowed.

Claims 12 and 19 is/are rejected under 35 U.S.C. 103 as being unpatentable over Fick as applied to claims 2 and 17 above, and further in view of Knake [US 4356934]. This rejection is respectfully traversed.

Claim 12 depends from independent claim 1, which recites, in part, “calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance”. Fick fails to teach or otherwise disclose all the steps of claim 1. Therefore, the teachings in Fick are deficient. Knake is directed to “[a]n in-the-field seed treating method and apparatus in which a treating fluid, such as an emulsion containing an insecticide, fungicide, or bactericide or the like, is sprayed onto seeds as they move from a seed hopper to a planting tube and into a planting furrow.” Abstract. Knake fails to cure all the deficiencies identified in Fick. As such, independent claim 1 is patentable in view of the combination of Fick and Knake. Claim 12 depends from claim 1 and should be allowable as depending from an allowable base claim.

It is therefore respectfully requested that the 35 USC § 103 rejection of claim 12 be withdrawn and claim 12 be allowed.

Regarding claim 19, Fick fails to teach or otherwise disclose the steps of “determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller” and “applying the seed-applied substance to

the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on a condition” recited in independent claim 17. Therefore, the teachings in Fick are deficient. Knake is directed to “[a]n in-the-field seed treating method and apparatus in which a treating fluid, such as an emulsion containing an insecticide, fungicide, or bactericide or the like, is sprayed onto seeds as they move from a seed hopper to a planting tube and into a planting furrow.” Abstract. Knake fails to cure all the deficiencies identified in Fick. As such, independent claim 17 is patentable in view of the combination of Fick and Knake. Claim 19 depends from claim 17 and should be allowable as depending from an allowable base claim.

The Final Office Action of February 2, 2021 asserts, “[r]egarding Claim 19, Fick does not specifically disclose the method of Claim 17 further comprising the steps of: providing a seed hopper configured to receive the seed from the seed receptacle; transferring the seed into the seed hopper; and applying the seed-applied substance to the seed within the seed hopper. However, Knake discloses spray treating seed as it enters the planter seed hopper (col 1, ln 20-43). It would have been obvious to a person of ordinary skill in the art to apply the substance to the seed within the seed hopper to avoid dusting, because Fick and Knake are directed to seed treatment methods and systems” p. 10, para 2. Knake’s own words rebut the obviousness assertion. Knake states that “[p]referably, the seeds are sprayed in the conduit, or transition section, interconnecting the seed hopper and the planting drum so that only seeds actually being distributed to an individual furrow are coated” col. 2, lines 24-28. “Additionally, as mentioned before, loss of excessive amounts of relatively expensive treating material and unnecessary treatment of seeds is readily avoided by practice of the method of the

present invention" col. 2, lines 60-64.

It is therefore respectfully requested that the 35 USC § 103 rejection of claim 19 be withdrawn and claim 19 be allowed.

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

A first RCE request in amount of \$680 (small entity) is included herewith; however, please grant any extensions of time required to enter this response and charge any additional required fees (including the fees under 37 C.F.R. §1.17(e)(1) for a first Request for Continued Examiner) to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: May 3, 2021

By: /KYLE S. COLEMAN/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	1715
	Examiner Name	Mandy C LOUIE
	Attorney Docket Number	P11431US00_NP

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S. PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1	20170049044	A1	2017-02-23	Stoller et al.	Entire Document		
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							
If you wish to add additional Foreign Patent Document citation information please click the Add button.							Add	
NON-PATENT LITERATURE DOCUMENTS							Remove	
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	1715
	Examiner Name	Mandy C LOUIE
	Attorney Docket Number	P11431US00_NP

1	
---	--

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	1715
	Examiner Name	Mandy C LOUIE
	Attorney Docket Number	P11431US00_NP

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/KYLE S. COLEMAN/	Date (YYYY-MM-DD)	2021-05-11
Name/Print	Kyle S. Coleman	Registration Number	66257

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	08/05/2021	EXAMINER	
Goodhue, Coleman & Owens, P.C. 12951 University Ave Suite 201 Clive, IA 50325			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			08/05/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/03/2021 has been entered.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Bardi [US 6148748] in view of Wendte [US 20150223391].

Claim 1: Bardi teaches a seed treatment method comprising the steps of providing a planter (air seeding implement) [abstract], a seed, and a seed-applied substance (seed treatment material) [abstract]. Although Bardi teaches the system can be a modular design to enable different modules for different seed types and give the farmer a number of seeding and fertilizing alternatives [col 3, ln 30-42] as also shown in Fig. 4 (where the different seeds and different treatment fluids can be used) [col 7, ln 32-44]; the prior art does not appear to teach calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance. Wendte is provided. Wendte teaches an automatic planting system which include a seed metering system that can be controlled at each row units to selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map [abstract]. Wendt further teaches seed location is managed

based upon characteristic(s) of the zone in the agricultural field [0011]. It would have been obvious to one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Bardi in order to optimize yield and planting throughput [0006-0008; abstract]. And although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt using the seed treatment system of Bardi to improve seed planting throughput and reduce special handling.

Claims 2-8, 13-14, 17, 21, 25-27 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101].

Teaching of the prior art is aforementioned, but does not appear to teach every specific detail of producing the seed prescription. Ochampaugh is provided.

Claim 2: Ochampaugh teaches the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [0032]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path (hopper tank, hopper tank evacuation mechanism, [0034]), a seed flow path and a substance applicator (seed treating system of Bardi) [col 7, ln 17-25]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [0034]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path (seed treating system of Bardi) [col 7, ln 17-25].

Claim 3: Wendt teaches wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance [0043]; generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles [Ochampaugh 0032]; selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance [Wendt, 0009]; and delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter [Wendt, 0009, 0011].

Claim 4: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type of type of seed-applied substance [0011; 0051].

Claim 5: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type [0051].

Claim 6: Wendt teaches wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substance in the at least two of the plurality of seed receptacles [0051].

Claim 7: wherein the combination of seed and seed applied substance varies based at least in part on one of the following: a type of seed, a type of the seed-applied substance, and an application rate of the seed-applied substance [Wendt, 0051; Ochampaugh, 0048].

Claim 8: wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location [Wendt 0006; Ochampaugh, 0032, 0048], generate the

combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance [Wendt, 0006; Ochampaugh, 0032, 0048].

Claim 13: Wendt discloses the method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises: inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance [0046].

Claim 14: **Ochampaugh** discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a metering device; and metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device [0031-0034].

Claim 17: **Ochampaugh** discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller [0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from the substance receptacle into the substance flow path [0030]; Bardi teaches transferring the seed from the seed receptacle into the seed flow path [col 7, in 15-30]; and applying the seed-applied substance to the seed within the seed flow path [col 7, in 15-30], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract].

Claim 21: **Ochampaugh** discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0057].

Claim 25: Ochampaugh discloses the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles [0010].

Claim 26: Wendt discloses the method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either: always the same amount of seed-applied substance; or only either one specific amount of seed-applied substance or no amount of the seed-applied substance [0043].

Claim 27: Ochampaugh discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed [0023].

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 9. Hunter and Aanestad are provided.

Claim 9: Hunter discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle (112), a seed delivery tube (114), a seed hopper (146), a seed meter (117); storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube; transferring the seed from the seed hopper to the seed meter [col 6, ln 18 to col 7, ln 67]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]. However, Hunter does not appear to teach further providing a seed drop tube and delivering the seed from the seed meter to the seed drop tube. Aanestad is provided. Aanestad teaches a seed treater that delivers treated seeds from a seed hopper to the ground via a flexible conduit (seed drop tube) [Fig. 2; 0013]. It would have been obvious to one of ordinary skill in the art to further provide a seed drop tube to a seed treater so as to precisely guide the treated seed to a specific location on the agricultural ground.

Claim 10: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube [Fig. 2; 0013] (where one could modify the flexible tubing 132 as similarly with the flexible seed drop conduit of Aanestad to deliver seeds to the ground).

Claim 11: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters [Fig. 2; col 6, ln 18 to col 7, ln 67].

Claim 19: Hunter and Aanestad teaches further comprising the steps of: providing a seed hopper configured to receive the seed from the seed receptacle; transferring the seed into the seed hopper; and applying the seed-applied substance to the seed within the seed hopper [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 22: Hunter and Aanestad discloses the method of Claim 17 further comprising the step of: providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 23: Hunter and Aanestad discloses the method of Claim 22 wherein the substance applicator is associated with at least one of: a) a mixer in fluid communication with the substance receptacle and the substance flow path; b) a seed hopper configured to receive the seed from the seed receptacle; c) a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and d) the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 24: Hunter and Aanestad discloses the method of Claim 18 further comprising the steps of: providing a seed drop tube that is part of the seed flow path; transferring the seed into the seed drop tube; and applying the seed-applied substance to the seed proximate to or within the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 18.

Claim 18: Reineccius discloses the method of Claim 2 further comprising the steps of: providing a mixer (agitator) in fluid communication with the substance receptacle and the substance flow path; and mixing the seed-applied substance prior to the seed-applied substance being applied to the seed [Fig. 1; 0041]. It would have been obvious to one of ordinary skill in the art to further provide a mixer in fluid communication with the substance receptacle and substance flow path, so as to further hold and thoroughly mix the chemical formulations [0073].

Claim 21: Reineccius discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0023-0024], wherein Reineccius allows to reduce the delay between seed treatment and planting [0024].

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 20. Borstmayer is provided.

Claim 20: Borstmayer discloses the method of Claim 18 further comprising the steps of: providing a seed meter configured to receive the seed from the seed hopper and transfer the seed further through the seed flow path; transferring the seed into the seed meter; and applying the seed-applied substance to the seed within the seed meter (two diameter metering screw is effective way to accurately meter, mix seed and liquid treatment and to discharge material to seeder) [col 1, ln 30-45]. It would have been obvious to one of ordinary skill in the art to mix the seed applied substance to the seed in the seed meter as suggested Borstmayer, so as to provide an effective way to accurately meter, mix seed and liquid treatment together to be delivered to the seeder.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 15-16. Ochampaugh2 is provided.

Claims 15 and 16: Ochampaugh2 discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: calculating seed flow timing, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path [0035-0036] although Ochampaugh2 does not explicitly teach using a timing mechanism, since the prior art teaches timing the seed flow, it would have been obvious to one of ordinary skill in the art to use a mechanism for recording timing the seed flow in order to calculate and time the seed flow precisely. It would have been obvious to one of ordinary skill in the art to time the seed flow as taught by Ochampaugh2 so that the applicator can determine the amount of treatment to be applied to reach a proper application rate of the seeds [0035].

Response to Arguments

Applicant's arguments with respect to claim(s) 1-27 have been considered but are moot because the new ground of rejection does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in the argument. The previous rejection was reconsidered due to applicants pointing out that the term "combination" is defined as including one or more types and/or one or more amounts of seed-applied substance that is applied to a seed (on page 12 of remarks). Hence, a new ground of rejection has been made above.

Conclusion

Claims 1-27 rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached on Monday to Friday 1:00PM to 4:00PM PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

Notice of References Cited	Application/Control No. 15/739,606		Applicant(s)/Patent Under Reexamination Smith et al.	
	Examiner MANDY C LOUIE		Art Unit 1715	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6148748-A	11-2000	Bardi; Danick J.	A01C7/081	111/174
*	B	US-20150223391-A1	08-2015	Wendte; Keith W.	A01C7/04	111/177
*	C	US-20130121101-A1	05-2013	Ochampaugh; Jeff	B01F15/0227	366/141
*	D	US-7869902-B2	01-2011	Hunter; James L.	A01C1/00	700/240
*	E	US-20150250091-A1	09-2015	AANESTAD; ROBERT D.	A01C1/06	111/200
*	F	US-20120183675-A1	07-2012	Reineccius; Greg A.	A01C1/00	427/4
*	G	US-6112679-A	09-2000	Borstmayer; Darren	A01C1/06	111/173
*	H	US-20120115911-A1	05-2012	Ochampaugh; Jeff	A01C1/08	514/341
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20210729

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of: Smith et al.	Confirmation No. 7148
Application No. 15/739,606	Group Art Unit: 1715
Filing Date: December 22, 2017	Examiner: Mandy C LOUIE
For: System and Method for Prescriptive Seed Treatment	

AMENDMENT

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

VIA EFS-WEB

Commissioner:

In reply to the Office Action mailed August 5, 2021, the shortened statutory period for response to which expires on November 5, 2021, and extends through February 5, 2022, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims in this paper.

Remarks follow the amendments section of this paper.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1 (Original): A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed, and a seed-applied substance;
calculating a location where the seed will be planted by the planter;
selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location;
generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and
planting the combination of the seed and seed-applied substance.

Claim 2 (Original): The method of Claim 1 wherein:
the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed;
the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
(a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator;
(b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator;

and

- (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path.

Claim 3 (Original): The method of Claim 1 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance;

generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles;

selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance; and

delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter.

Claim 4 (Original): The method of Claim 1 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance.

Claim 5 (Original): The method of Claim 2 wherein the step of selecting, based at

least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type.

Claim 6 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 7 (Original): The method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance.

Claim 8 (Original): The method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance.

Claim 9 (Original): The method of Claim 2 further comprising the steps of:
providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and
a seed drop tube;
storing the seed in the seed receptacle;

transferring the seed from the seed receptacles to the seed hopper via the seed
delivery tube;

transferring the seed from the seed hopper to the seed meter; and
delivering the seed from the seed meter to the seed drop tube.

Claim 10 (Original): The method of Claim 9 wherein the seed-applied substance is
applied to the seed proximate to the seed drop tube.

Claim 11 (Original): The method of Claim 9 wherein the seed-applied substance is
applied to the seed proximate to at least one of the following: the seed delivery tubes,
the seed receptacles, the seed hopper, and the seed meters.

Claim 12 (Original): The method of Claim 2 wherein the substance applicator
comprises a nozzle to spray the seed-applied substance onto the seed as the seed
passes through the seed flow path.

Claim 13 (Original): The method of Claim 3 wherein the step of selecting a seed
receptacle from the plurality of seed receptacles containing a selected combination of
seed and seed-applied substance further comprises:
inputting a list of the different combinations associated with the at least two of the
plurality of seed receptacles into a control system; and
wherein the control system identifies the seed receptacle having the selected
combination of seed and seed-applied substance.

Claim 14 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

- providing a metering device; and
- metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device.

Claim 15 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

- providing a timing mechanism; and
- calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path.

Claim 16 (Original): The method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following:

- providing a metering device and a timing mechanism;
- metering flow of the selected combination of seed and seed-applied substance from

the one of the plurality seed receptacles with the metering device; and
calculating, with the timing mechanism, a time for the selected combination of seed
and seed-applied substance to be delivered from the one of the plurality of
seed receptacles and planted by the planter.

Claim 17 (Previously presented): A method for seed treatment on a planter, the
method comprising the steps of:

providing the planter having a seed receptacle having a seed, a substance receptacle
having a seed-applied substance, a substance flow path, a seed flow path, and
a controller;

determining an amount of the seed-applied substance to be applied to the seed
during operation of the planter with the controller;

transferring the seed-applied substance from the substance receptacle into the
substance flow path;

transferring the seed from the seed receptacle into the seed flow path; and

applying the seed-applied substance to the seed within the seed flow path,

wherein the amount of the seed-applied substance is based, at least in part, on a
condition.

Claim 18 (Previously presented): The method of Claim 17 further comprising the steps
of:

providing a mixer in fluid communication with the substance receptacle and the
substance flow path; and

mixing the seed-applied substance prior to the seed-applied substance being applied to the seed.

Claim 19 (Original): The method of Claim 17 further comprising the steps of:
providing a seed hopper configured to receive the seed from the seed receptacle;
transferring the seed into the seed hopper; and
applying the seed-applied substance to the seed within the seed hopper.

Claim 20 (Original): The method of Claim 18 further comprising the steps of:
providing a seed meter configured to receive the seed from the seed hopper and
transfer the seed further through the seed flow path;
transferring the seed into the seed meter; and
applying the seed-applied substance to the seed within the seed meter.

Claim 21 (Original): The method of Claim 17 further comprising the step of:
adjusting a mixture ratio of the seed-applied substance during operation of the
planter.

Claim 22 (Original): The method of Claim 17 further comprising the step of:
providing a substance applicator in fluid connection with the substance receptacle, the
substance applicator adapted to prescriptively treat the seed.

Claim 23 (Original): The method of Claim 22 wherein the substance applicator is

associated with at least one of:

- a. a mixer in fluid communication with the substance receptacle and the substance flow path;
- b. a seed hopper configured to receive the seed from the seed receptacle;
- c. a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and
- d. the seed drop tube.

Claim 24 (Original): The method of Claim 18 further comprising the steps of:

providing a seed drop tube that is part of the seed flow path;

transferring the seed into the seed drop tube; and

applying the seed-applied substance to the seed proximate to or within the seed drop tube.

Claim 25 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 26 (Original): The method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either:

always the same amount of seed-applied substance; or

only either one specific amount of seed-applied substance or no amount of the seed-applied substance.

Claim 27 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed.

Claim 28 (New): A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed, and a seed-applied substance;
calculating a location where the seed will be planted by the planter;
selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location;
generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and
planting the combination of the seed and seed-applied substance;
wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field.

Claim 29 (New): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field by changing the type, number or amount of one or more seed-applied substances applied to the seed when generating the combination of the seed and seed-applied substance prior to the combination being planted at the location.

Claim 30 (New): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary based at least in part upon a seed-applied substance type, a number of seed-applied substances, or an amount of one or more seed-applied substances.

Claim 31 (New): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary based at least in part upon a seed type.

REMARKS

In the Office Action, the Examiner took the following actions:

- I. Rejected claim(s) 1 under 35 U.S.C. 103 as obvious over Bardi [US 6148748] in view of Wendte [US 20150223391];
- II. Rejected claims 2-8, 13-14, 17, 21, 25-27 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101];
- III. Rejected claims 9-11, 19, 22-24 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091];
- IV. Rejected claims 18-21 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675];
- V. Rejected claim 20 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679]; and
- VI. Rejected claims 15-16 under 35 U.S.C. 103 as being

unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911].

The Office Action may contain statements characterizing the related art and/or the claims. Regardless of whether any such statement is expressly identified and/or discussed herein, Applicant reserves the right to disagree with any such statement or characterization in the Office Action.

Claims 1-27 remain pending and under examination. Claims 28-31 are new. No new matter has been added. For at least the following reasons, Applicant respectfully requests reconsideration and withdrawal of the rejections.

CLAIM REJECTIONS – 35 USC §103

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Bardi [US 6148748] in view of Wendte [US 20150223391]. This rejection is respectfully traversed.

Independent claim 1 is directed to a prescriptive seed treatment method and recites the steps of, “providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance”. The Non-Final Office Action states that “the prior art does not appear to teach calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied

substance to plant at the location; and planting the combination of the seed and seed-applied substance”. Non-Final Office Action of 08/05/2021, p. 3, lines 18-21. To cure the deficient teachings of Bardi, the Non-Final Office Action argues that “[i]t would have been obvious to one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Bardi in order to optimize yield and planting throughput [0006-0008; abstract]” . Non-Final Office Action of 08/05/2021, p. 4, lines 1-6. Applicant respectfully traverses the argument that Wendte remedies the deficient teachings of Bardi and that the combination would obvious to one of ordinary skill in the art. Lastly, as to claim 1, the Non-Final Office Action argues “[a]nd although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt[e] using the seed treatment system of Bardi to improve seed planting throughput and reduce special handling”. Non-Final Office Action of 08/05/2021, p. 4, lines 6-8. Applicant respectfully traverses the argument that the combination of Wendte using the seed treatment of Bardi generates a prescription (combination) and would have been obvious to one of ordinary skill in the art.

The combination of Bardi and Wendte does not cure the deficient teachings of Bardi, is improper, and is inoperable for arriving at Applicant’s claimed prescriptive seed treatment method; and, therefore cannot be obvious. Bardi states, “[m]etering systems 30 below the tanks 12—14 direct particles from the tanks 12—14 into the manifold 18 below the tanks. An air supply system, in this case a fan 15, provides pressurized air to

the manifold 18. The pressurized air carries the particles through a distribution system 19 from the manifold 18 to ground engaging tools 5.” col. 5, lines 40-46. Bardi recognizes “[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added].” col. 6, lines 27-36. Therefore, Bardi admits that travel of a seed to the ground engaging tools cannot be a calculated planting of the generated combination since “treating of the small volume of seeds” (col. 3, lines 30-31) results in at least a portion of the air traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, “Which treated particle, with what treatment (combination) in Bardi is being planted where?”. Introducing “different types of varieties of seed based on seed type or variety zones agricultural field” (Wendte, Abstract) into the chamber of Bardi to be treated would not result in a calculated planting of the generated combination. In view of the foregoing, “the prescription (combination) of Wendte [cannot be generated] using the seed treatment system of Bardi [underline emphasis added]”. Non-Final Office Action of 08/05/2021, p. 4, lines 6-8.

Bardi teaches against the combination with Wendte. Wendte teaches “selectively plant[ing] different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map”. Wendte, Abstract. Whereas Bardi, “to accommodate different sized or

shaped seeds” (col. 6, lines 57-58), for “selectively planting[ing] different types of varieties of seed based on seed type” (Wendte, Abstract), requires “the farmer to change the cart after usage” col. 3, lines 19-21. The reason for changing the cart after usage for accommodating different seed is further explained in Bardi given that “[t]he pitch, width, and length of the spiral baffle 25 can be varied for different seed types. The baffle embodiment shown is similar to one used for treating peas. The overall length of the baffle 25 can be varied depending on the shape of the seed or particle being treated. Round seeds tend to roll readily and require fewer baffle rotations to encourage them to follow a spiral path with the treatment fluid. The baffle 25 can, therefore, be cut shorter with the round seeds, perhaps to even a half of a rotation of the baffle 25, which reduces the pressure drop across the module 22. Oblong seeds tend to require more baffle rotations to hold them in the spiral path sufficiently long to coat them with treatment fluid; thus the baffle 25 for oblong seeds must be either longer or have a shorter pitch to provide more rotations per length of the baffle 25 and, therefore, the seed treating module 22. Smaller seeds and particles can be induced into a rotary path with narrower baffle widths, enabling the opening in the center 26 to be larger, which reduces the pressure drop across the mixing module 22 [underline emphasis added].” col. 6, lines 38-55. Additionally, “[o]ther modifications of the apparatus 20 are also envisioned within the scope of the instant invention to accommodate different sized or shaped seeds. Canola seed, for example, is very small. It is believed that this in-line seed treating concept can be utilized with canola seed by keeping the baffle thickness the same as for other seeds, but reducing the inside diameter of the tube. This configuration would increase the velocity of the air/seed flow within the in-line seed treating unit 20 [underline emphasis added].” col. 6, lines 56-64. In

view of foregoing, it is clear that the combination of Bardi and Wendte provides a system that has to change out modules for different seed after each use to “selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map” (Wendte, Abstract) and does not teach a prescriptive seed treatment method providing a calculated planting of a generated combination of seed and seed treatment as provided in claim 1.

Bardi’s own words acknowledge that it does not disclose a prescriptive seed treatment method by stating, “[t]he only drawback to the use of a single module type would be relevant to the pressure drops”. col. 7, lines 2-3. Since use of a single module type would not allow for prescriptive seed treatment, Bardi would have clearly acknowledged more drawbacks than just pressure drop if Bardi intended to disclose a prescriptive seed treatment method that provides a calculated planting of a generated combination of seed and seed treatment as provided in claim 1.

Wendte cannot be combined with Bardi. In fact, any combination with Bardi to arrive at Applicant’s claimed prescriptive seed treatment method providing a calculated planting of a generated combination as set forth in claim 1 would necessarily require engineering “modifications of the apparatus 20” (col. 6, lines 56-58) or at minimum “chang[ing] the cart after usage” (col. 3, lines 19-21) as well as a rewriting of the disclosure in Bardi, changing how seed flow is controlled while passing through the in-line mixing unit module 22 to the ground engaging tools.

In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 1.

Claims 2-8, 13-14, 17, 21, 25-27 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101]. This rejection is respectfully traversed.

Ochampaugh fails to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi and Wendt as to independent claim 1, and further, in view of the preceding arguments. Therefore, claims 2-8, 13-14, and 25-27 should be allowable as depending from an allowable base claim.

Claim 2 further distinguishes over the cited references and draws attention to a significant deficiency in the combination of Ochampaugh with Bardi and Wendt. The Non-Final Office Action states, as pertaining to claim 2, "Ochampaugh teaches the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [0032]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path (hopper tank, hopper tank evacuation mechanism, [0034]), a seed flow path and a substance applicator (seed treating system of Bardi) [col 7, ln 17-25]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [0034]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path (seed treating system of Bardi)[underline emphasis added" [col 7, ln 17-25]. Non-Final Office Action of 08/05/2021, p. 4, lines 14-23. The combination of the teachings in Ochampaugh with the seed treating system of Bardi does not disclose

the limitations of claim 2 and does not arrive at Applicant's claimed prescriptive seed treatment method of applying a selected amount of seed-applied substance to a seed. Notably, Bardi discloses that "in-line mixing chamber 22 is provided with a spiral baffle 25 positioned along the interior wall 16a of a tube 16 that induces mixing with reduced pressure drops and reduced potential for damage to the carried seed particles. The central portion 26 of the spiral baffle 25 is open, allowing the central path of the chamber 22 to be clear. The spiral baffle 25 induces a rotational motion into the flow of the seed particles which pulls the air stream and the particles to the wall area 23 of the mixing chamber 22. The seed particles tend to roll along the wall 23 of the chamber 22 following the baffle 25 in a spiral trajectory. The treatment fluid is injected into the chamber at an injection point 24 such that it flows in a relatively wide stream along the wall 23 and follows the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underline emphasis added]". col. 5, lines 49-65. The "in-line mixing chamber 22" of Bardi is for mixing seed and treatment fluid, but not applying a selected amount of the seed-applied substance to a seed. Furthermore, Bardi admits that a selected amount of seed-applied substance cannot all be applied to a seed since "[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added]." col. 6, lines 27-36. Thus, "treating of the small

volume of seeds” (col. 3, lines 30-31) results in at least a portion of the air traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, “Which portion of the selected amount of seed-applied substance that is supposed to be applied to the seed, is stuck to a surface of the baffles and/or side wall of the tube or discharged through the open center?”. Further complicating the issue, Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected” (col. 6, lines 5-7), which is critical since, [t]he selected distance 27 has an impact on the width of the stream of fluid. If the injection point 24 is too close to the interior wall 23 of the chamber 22, the stream will be too narrow because the air does not interact sufficiently with the stream to force the treatment fluid to spread out” (col. 6, lines 19-24).

In view of the foregoing, it is abundantly clear that the teachings in Ochampaugh do not remedy Bardi and do not provide a combination of disclosure that makes obvious Applicant’s prescriptive seed treatment method of applying a selected amount of seed-applied substance to a seed as set forth in claim 2. Therefore, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of claim 2.

Independent claim 17 is directed to a method for seed treatment on a planter and recites the steps of “providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller; transferring the seed-applied substance from the substance receptacle into the substance flow path;

transferring the seed from the seed receptacle into the seed flow path; and applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on a condition". The Non-Final Office Action argues, as to independent claim 17, that "Ochampaugh discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller [0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from the substance receptacle into the substance flow path [0030]; Bardi teaches transferring the seed from the seed receptacle into the seed flow path [col 7, ln 15-30]; and applying the seed-applied substance to the seed within the seed flow path [col 7, ln 15-30], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract]." Applicant respectfully traverses the combination of Bardi, Wendte, and Ochampaugh and the argument that the combination using the seed treatment of Bardi) would have been obvious to one of ordinary skill in the art to arrive at a method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition.

The addition of Ochampaugh with Bardi and Wendte draws attention to a significant deficiency in the combination of the three cited references. The Non-Final Office Action states, as pertaining to claim 17, "Ochampaugh discloses...determining an amount of the seed-applied substance to be applied to the seed during operation of the

planter with the controller [0032, 0048]”. Non-Final Office Action of 08/05/2021, p. 4, lines 14-17. The Non-Final Office Action further argues that Bardi teaches applying the determined amount of seed-applied substance to the seed within the seed flow path. Non-Final Office Action of 08/05/2021, p. 4, lines 18-20. The combination of the teachings in Ochampaugh with the seed treating system of Bardi does not disclose the limitations of claim 17 and does not arrive at Applicant’s claimed prescriptive method of seed treatment where, during operation of a planter, a determined amount of seed-applied substance is applied to the seed within the seed flow path based on a condition. Notably, Bardi discloses that “in-line mixing chamber 22 is provided with a spiral baffle 25 positioned along the interior wall 16a of a tube 16 that induces mixing with reduced pressure drops and reduced potential for damage to the carried seed particles. The central portion 26 of the spiral baffle 25 is open, allowing the central path of the chamber 22 to be clear. The spiral baffle 25 induces a rotational motion into the flow of the seed particles which pulls the air stream and the particles to the wall area 23 of the mixing chamber 22. The seed particles tend to roll along the wall 23 of the chamber 22 following the baffle 25 in a spiral trajectory. The treatment fluid is injected into the chamber at an injection point 24 such that it flows in a relatively wide stream along the wall 23 and follows the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underline emphasis added]”. col. 5, lines 49-65. The “in-line mixing chamber 22” of Bardi is for mixing seed and treatment fluid, but not applying a determined amount of the seed-applied substance to a seed. Furthermore, Bardi admits that a determined amount of seed-applied substance cannot all be applied to a seed since “[d]ue to the centrifugal pull of the seed particle motion, the

portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added].” col. 6, lines 27-36. Thus, “treating of the small volume of seeds” (col. 3, lines 30-31) results in at least a portion of the air traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, “Which portion of the determined amount of seed-applied substance that is supposed to be applied to the seed, is stuck to a surface of the baffles and/or side wall of the tube or discharged through the open center?”. Further complicating the issue of applying a determined amount of seed-applied substance to a seed, Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected [underline emphasis added]” (col. 6, lines 5-7), which is critical since, [t]he selected distance 27 has an impact on the width of the stream of fluid. If the injection point 24 is too close to the interior wall 23 of the chamber 22, the stream will be too narrow because the air does not interact sufficiently with the stream to force the treatment fluid to spread out” (col. 6, lines 19-24).

Bardi also teaches against the combination as to the application of seed-applied substance to a seed during operation of the planter. Wendte teaches “selectively plant[ing] different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety

prescription map”. Wendte, Abstract. Whereas Bardi, “to accommodate different sized or shaped seeds” (col. 6, lines 57-58), for “selectively planting[ing] different types of varieties of seed based on seed type” (Wendte, Abstract), requires “the farmer to change the cart after usage” col. 3, lines 19-21. The reason for changing the cart after usage for accommodating different seed is further explained in Bardi given that “[t]he pitch, width, and length of the spiral baffle 25 can be varied for different seed types. The baffle embodiment shown is similar to one used for treating peas. The overall length of the baffle 25 can be varied depending on the shape of the seed or particle being treated. Round seeds tend to roll readily and require fewer baffle rotations to encourage them to follow a spiral path with the treatment fluid. The baffle 25 can, therefore, be cut shorter with the round seeds, perhaps to even a half of a rotation of the baffle 25, which reduces the pressure drop across the module 22. Oblong seeds tend to require more baffle rotations to hold them in the spiral path sufficiently long to coat them with treatment fluid; thus the baffle 25 for oblong seeds must be either longer or have a shorter pitch to provide more rotations per length of the baffle 25 and, therefore, the seed treating module 22. Smaller seeds and particles can be induced into a rotary path with narrower baffle widths, enabling the opening in the center 26 to be larger, which reduces the pressure drop across the mixing module 22 [underline emphasis added].” col. 6, lines 38-55. Additionally, “[o]ther modifications of the apparatus 20 are also envisioned within the scope of the instant invention to accommodate different sized or shaped seeds. Canola seed, for example, is very small. It is believed that this in-line seed treating concept can be utilized with canola seed by keeping the baffle thickness the same as for other seeds, but reducing the inside diameter of the tube. This configuration would increase the velocity of the air/seed flow

within the in-line seed treating unit 20 [underline emphasis added].” col. 6, lines 56-64. In view of foregoing, it is clear that the combination provides a system that has to change out modules for different seed after each use (i.e., taking the planter out of service; therefore, not occurring during operation of the planter) to “selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map” (Wendte, Abstract) and does not teach a method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition as provided in claim 17.

In view of the foregoing, it is abundantly clear that the teachings in Ochampaugh do not remedy the combination of Bardi and Wendte, and also do not provide a combination of disclosure that makes obvious Applicant’s prescriptive method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition as provided in claim 17. Therefore, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 17.

Ochampaugh fails to remedy all the deficiencies identified above in Bardi and Wendte as to independent claim 17, and further, in view of the preceding arguments. Therefore, claim 21 should be allowable as depending from an allowable base claim. **Claim 21** further distinguishes over the cited references and draws attention to a significant deficiency in the combination of Ochampaugh with Bardi and Wendte. The Non-Final Office Action states, as pertaining to claim 21, “Ochampaugh discloses the

method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [00.57]”. Non-Final Office Action of 08/05/2021, p. 6, lines 22-24. Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected [underline emphasis added]” (col. 6, lines 5-7), and module type based a variety of planting situations requires “the farmer to change the cart after usage” (col. 3, lines 19-21). In view of the foregoing, the combination fails to teach the step of adjusting a mixture ratio of the seed-applied substance during operation of the planter as claim 21 recites. Therefore, Applicant respectfully requests that the 35 U.S.C. § 103 rejection of claim 21 be withdrawn and claim 21 allowed.

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 9-11 depend from independent claim 1 via intervening claim 2. Hunter and Aanestad fail to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 1 and dependent claims 2-3, and further, in view of the preceding arguments. Therefore, claims 9-11 should be allowable as depending from an allowable base claim.

Claims 9-11 further distinguishes over the cited references and draws attention to a significant deficiency in the combination of Ochampaugh with Bardi and Wendte. The Non-Final Office Action states, as pertaining to claim 9, “Hunter discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle (117); a seed delivery tube (114); a seed hopper (146); a seed meter (117); storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube; transferring the seed from the seed hopper to the seed meter [col 6, ln 18 to col 7, ln 67]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]. However, Hunter does not appear to teach further providing a seed drop tube and delivering the seed from the seed meter to the seed drop tube. Aanestad is provided. Aanestad teaches a seed treater that delivers treated seeds from a seed hopper to the ground via a flexible conduit (seed drop tube) [Fig. 2; 0013]. It would have been obvious to one of ordinary skill in the art to further provide a seed drop tube to a seed treater so as to precisely guide the treated seed to a specific location on the agricultural ground”. Non-Final Office Action of 08/05/2021, p. 7, lines 15-25. Hunter is directed to a commercial (off-planter) seed treater. Noticeably absent from Hunter is any reference to or the actual use of the word “planter” because Hunter is directed to “[p]lant breeding, plant product development, plant product characterization, and plant product commercialization processes [requiring], for each genotype or breeding line, the creation of a large number of seed samples from a bulk or composite seed sample”. col. 1, lines 15-21. One skilled in the art would not look to Hunter

for a prescriptive seed treatment method of calculated planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter. Therefore, contrary to the contention in the Non-Final Office Action, “[i]t would [not] have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]”. Non-Final Office Action of 08/05/2021, p. 7, lines 15-25.

One skilled in the art would not look to Aanestad for a prescriptive seed treatment method of calculated planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter. Aanestad discloses a Seed Treatment Device “wherein the treatment of the seed takes place within the seedbox itself under pressure thereby enabling uniform treatment of the seed [underline emphasis added]”. [Title; Abstract] Moreover, the bulk Seed Treatment Device of Aanestad that “govern[s] the rate, in ounces, of treatment per acre. A formula including these variables is provided the grain drill operator for his particular configuration. These variables include (1) drill width, (2) number of openings in drill box, (3) pounds of seed planted per acre, (4) ounces of treatment material per 100 pounds of seed, (5) travel speed, and (6) grain box capacity in pounds [underline emphasis added]” (p.1, para. 0014) would not be looked to, contrary to the contention in the Non-Final Office Action (p. 7, lines 24-25), for Applicant’s prescriptive seed treatment method of calculating planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter.

Claims 9-11 further distinguish over the cited references. The Non-Final Office Action contends that “Hunter discloses the method of Claim 9 wherein the seed-applied

substance is applied to the seed proximate to the seed drop tube [Fig. 2; 0013] (where one could modify the flexible tubing 132 as similarly with the flexible seed drop conduit of Aanestad to deliver seeds to the ground)” and “Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper; and the seed meters [Fig. 2; col 6, ln 18 to col 7, ln 67].” Non-Final Office Action of 08/05/2021, p. 8, lines 1-6. However, Aanestad teaches that seed is treated “within the seed box itself under pressure [underline emphasis added]” (p. 1, para. 0001) before passing into the receiving cup 12 and the flexible conduit 16 (p.1, para. 0004; p. 1, para. 0006; p. 1, para. 0013; p. 1, para. 0015).

In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of claims 9-11.

Claims 19 and 22-24 depend from independent claim 17, which is allowable over the Bardi, Wendte, and Ochampaugh for at least the reasons set forth above as to claim 17. Therefore, claims 19 and 22-24 should be allowable by dependency upon an allowable base claim.

Moreover, Hunter is directed to a commercial (off-planter) seed treater. Noticeably absent from Hunter is any reference to or the actual use of the word “planter” because Hunter is directed to “[p]lant breeding, plant product development, plant product characterization, and plant product commercialization processes [requiring], for each genotype or breeding line, the creation of a large number of seed samples from a bulk or composite seed sample”. col. 1, lines 15-21. One skilled in the art would not look to Hunter for a prescriptive method for seed treatment that, during operation of a planter, applies a

determined amount of seed-applied substance to the seed within the seed flow path based on a condition. Therefore, contrary to the contention in the Non-Final Office Action, “[i]t would [not] have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]”. Non-Final Office Action of 08/05/2021, p. 7, lines 15-25.

One skilled in the art would not look to Aanestad for a prescriptive method for seed treatment that, during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition. Aanestad discloses a Seed Treatment Device “wherein the treatment of the seed takes place within the seedbox itself under pressure thereby enabling uniform treatment of the seed [underline emphasis added]”. [Title; Abstract] Moreover, the bulk Seed Treatment Device of Aanestad that “govern[s] the rate, in ounces, of treatment per acre. A formula including these variables is provided the grain drill operator for his particular configuration. These variables include (1) drill width, (2) number of openings in drill box, (3) pounds of seed planted per acre, (4) ounces of treatment material per 100 pounds of seed, (5) travel speed, and (6) grain box capacity in pounds [underline emphasis added]” (p.1, para. 0014) would not be looked to, contrary to the contention in the Non-Final Office Action (p. 7, lines 24-25), for Applicant’s prescriptive method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition.

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 18-21 depend from independent claim 17, an allowable base claim that distinguishes over Bardi, Wendte, and Ochampaugh for the above-provided reasons. Reineccius fails to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 17, and further, in view of the preceding arguments. Therefore, claims 18-21 should be allowable as depending from an allowable base claim.

The Non-Final Office Action argues that “Reineccius discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0023-0024], wherein Reineccius allows to reduce the delay between seed treatment and planting [0024]”. Non-Final Office Action of 08/05/2021, p. 9, lines 6-9. Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected [underline emphasis added]” (col. 6, lines 5-7), and module type based a variety of planting situations requires “the farmer to change the cart after usage” (col. 3, lines 19-21). In view of the foregoing, the combination fails to teach the step of adjusting a mixture ratio of the seed-applied substance during operation of the planter as claim 21 recites. Therefore, Applicant respectfully requests that the 35 U.S.C. § 103 rejection of claim 21 be withdrawn and claim 21 allowed.

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claim 20 depends from independent claim 17, an allowable base claim that distinguishes over Bardi, Wendte, and Ochampaugh for the above-provided reasons. Borstmayer does not remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 17. Therefore, claim 20 should be allowable as depending from an allowable base claim.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 15-16 depend from independent claim 1 via intervening claims 15 and 16, respectively. Ochampaugh2 fails to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 1 and dependent claims 2-3, and further, in view of the preceding arguments. Therefore, claims 15-16 should be allowable as depending from an allowable base claim.

Claims 15-16 further distinguish over the cited references and draws attention to

a significant deficiency in the combination of Ochampaugh with Bardi and Wendte. The Non-Final Office Action states, as pertaining to claims 15-16, “Ochampaugh2 discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: calculating seed flow timing; both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path [0035-0036] although Ochampaugh2 does not explicitly teach using a timing mechanism, since the prior art teaches timing the seed flow, it would have been obvious to one of ordinary skill to use a mechanism for recording timing the seed flow in order to calculate and time the seed flow precisely. It would have been obvious to one of ordinary skill in the art to time the seed flow as taught by Ochampaugh2 so that the applicator can determine the amount of treatment to be applied to reach a proper application rate of the seeds [0035]”. Non-Final Office Action of 08/05/2021, p. 10, lines 3-12.

Bardi discloses that “in-line mixing chamber 22 is provided with a spiral baffle 25 positioned along the interior wall 16a of a tube 16 that induces mixing with reduced pressure drops and reduced potential for damage to the carried seed particles. The central portion 26 of the spiral baffle 25 is open, allowing the central path of the chamber 22 to be clear. The spiral baffle 25 induces a rotational motion into the flow of the seed particles which pulls the air stream and the particles to the wall area 23 of the mixing chamber 22. The seed particles tend to roll along the wall 23 of the chamber 22 following the baffle 25 in a spiral trajectory. The treatment fluid is injected into the chamber at an injection point 24 such that it flows in a relatively wide stream along the wall 23 and follows

the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underline emphasis added]”. col. 5, lines 49-65. The “in-line mixing chamber 22” of Bardi is for mixing seed and treatment fluid, but not applying a selected amount of the seed-applied substance to a seed. Furthermore, Bardi admits that a selected amount of seed-applied substance cannot all be applied to a seed since “[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added].” col. 6, lines 27-36. Thus, “treating of the small volume of seeds” (col. 3, lines 30-31) results in at least a portion of the air traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, “Which portion of the selected amount of seed-applied substance that is supposed to be applied to the seed, is stuck to a surface of the baffles and/or side wall of the tube or discharged through the open center?”. Further complicating the issue, Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected” (col. 6, lines 5-7), which is critical since, [t]he selected distance 27 has an impact on the width of the stream of fluid. If the injection point 24 is too close to the interior wall 23 of the chamber 22, the stream will be too narrow because the air does not interact sufficiently with the

stream to force the treatment fluid to spread out” (col. 6, lines 19-24). Therefore, calculating the timing of the seed treatment and seed flow as taught by the combination of references does not teach that timing results in a determined amount of seed-applied substance being applied to a seed.

In view of the foregoing, it is abundantly clear that the teachings in Ochampaugh² do not remedy Bardi and do not provide a combination of disclosure that makes obvious Applicant’s prescriptive seed treatment method of claims 15-16. Therefore, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of claims 15-16.

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims. Additional claim fees for new claims 28-31 are being submitted herewith.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: November 4, 2021

By: /KYLE S. COLEMAN/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	1715
	Examiner Name	Mandy C LOUIE
	Attorney Docket Number	P11431US00_NP

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S. PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							
If you wish to add additional Foreign Patent Document citation information please click the Add button.								Add
NON-PATENT LITERATURE DOCUMENTS								Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		15739606
	Filing Date		2017-12-22
	First Named Inventor	Steven P. Smith	
	Art Unit	1715	
	Examiner Name	Mandy C LOUIE	
	Attorney Docket Number	P11431US00_NP	

	1	CANADA INTELLECTUAL PATENT OFFICE; "Examination Report", 3,028,351, 10 August 2021, 5 pages.	×
--	---	--	---

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	1715
	Examiner Name	Mandy C LOUIE
	Attorney Docket Number	P11431US00_NP

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/KYLE S. COLEMAN/	Date (YYYY-MM-DD)	2022-01-04
Name/Print	Kyle S. Coleman	Registration Number	66257

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	02/16/2022		
Goodhue, Coleman & Owens, P.C. 12951 University Ave Suite 201 Clive, IA 50325			EXAMINER LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			02/16/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

3DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 28-31 rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention. It is unclear where the support for the new limitations particularly the combination of the seed and seed-applied substance can vary as the planter changes location within the field can be found in the original disclosure.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Bardi [US 6148748] in view of Wendte [US 20150223391].

Claim 1: Bardi teaches a seed treatment method comprising the steps of providing a planter (air seeding implement) [abstract], a seed, and a seed-applied substance (seed treatment material) [abstract]. Although Bardi teaches the system can be a modular design to enable different modules for

different seed types and give the farmer a number of seeding and fertilizing alternatives [col 3, ln 30-42] as also shown in Fig. 4 (where the different seeds and different treatment fluids can be used) [col 7, ln 32-44]; the prior art does not appear to teach calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance. Wendte is provided. Wendte teaches an automatic planting system which include a seed metering system that can be controlled at each row units to selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map [abstract]. Wendt further teaches seed location is managed based upon characteristic(s) of the zone in the agricultural field [0011]. It would have been obvious to one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Bardi in order to optimize yield and planting throughput [0006-0008; abstract]. And although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt using the seed treatment system of Bardi to improve seed planting throughput and reduce special handling.

Claims 2-8, 13-14, 17, 21, 25-27 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101].

Teaching of the prior art is aforementioned, but does not appear to teach every specific detail of producing the seed prescription. Ochampaugh is provided.

Claim 2: Ochampaugh teaches the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [0032]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path (hopper tank, hopper tank evacuation mechanism, [0034]), a seed flow path and a substance applicator (seed treating system of Bardi) [col 7, ln 17-25]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [0034]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path (seed treating system of Bardi) [col 7, ln 17-25].

Claim 3: Wendt teaches wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance [0043]; generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles [Ochampaugh 0032]; selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance [Wendt, 0009]; and delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter [Wendt, 0009, 0011].

Claim 4: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type of type of seed-applied substance [0011; 0051].

Claim 5: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type [0051].

Claim 6: Wendt teaches wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substance in the at least two of the plurality of seed receptacles [0051].

Claim 7: wherein the combination of seed and seed applied substance varies based at least in part on one of the following: a type of seed, a type of the seed-applied substance, and an application rate of the seed-applied substance [Wendt, 0051; Ochampaugh, 0048].

Claim 8: wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location [Wendt 0006; Ochampaugh, 0032, 0048], generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance [Wendt, 0006; Ochampaugh, 0032, 0048].

Claim 13: Wendt discloses the method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises: inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance [0046].

Claim 14: Ochampaugh discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a metering device; and metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device [0031-0034].

Claim 17: **Ochampaugh** discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller [0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from the substance receptacle into the substance flow path [0030]; Bardi teaches transferring the seed from the seed receptacle into the seed flow path [col 7, ln 15-30]; and applying the seed-applied substance to the seed within the seed flow path [col 7, ln 15-30], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract].

Claim 21: **Ochampaugh** discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0057].

Claim 25: **Ochampaugh** discloses the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles [0010].

Claim 26: Wendt discloses the method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either: always the same amount of seed-applied substance; or only either one specific amount of seed-applied substance or no amount of the seed-applied substance [0043].

Claim 27: **Ochampaugh** discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed [0023].

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 9. Hunter and Aanestad are provided.

Claim 9: Hunter discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle (112), a seed delivery tube (114), a seed hopper (146), a seed meter (117); storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube; transferring the seed from the seed hopper to the seed meter [col 6, ln 18 to col 7, ln 67]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]. However, Hunter does not appear to teach further providing a seed drop tube and delivering the seed from the seed meter to the seed drop tube. Aanestad is provided. Aanestad teaches a seed treater that delivers treated seeds from a seed hopper to the ground via a flexible conduit (seed drop tube) [Fig. 2; 0013]. It would have been obvious to one of ordinary skill in the art to further provide a seed drop tube to a seed treater so as to precisely guide the treated seed to a specific location on the agricultural ground.

Claim 10: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube [Fig. 2; 0013] (where one could modify the flexible tubing 132 as similarly with the flexible seed drop conduit of Aanestad to deliver seeds to the ground).

Claim 11: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters [Fig. 2; col 6, ln 18 to col 7, ln 67].

Claim 19: Hunter and Aanestad teaches further comprising the steps of: providing a seed hopper configured to receive the seed from the seed receptacle; transferring the seed into the seed hopper; and applying the seed-applied substance to the seed within the seed hopper [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 22: Hunter and Aanestad discloses the method of Claim 17 further comprising the step of: providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 23: Hunter and Aanestad discloses the method of Claim 22 wherein the substance applicator is associated with at least one of: a) a mixer in fluid communication with the substance receptacle and the substance flow path; b) a seed hopper configured to receive the seed from the seed receptacle; c) a seed meter configured to

receive the seed from the seed hopper and further transfer it through the seed flow path; and d) the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 24: Hunter and Aanestad discloses the method of Claim 18 further comprising the steps of: providing a seed drop tube that is part of the seed flow path; transferring the seed into the seed drop tube; and applying the seed-applied substance to the seed proximate to or within the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 18.

Claim 18: Reineccius discloses the method of Claim 2 further comprising the steps of: providing a mixer (agitator) in fluid communication with the substance receptacle and the substance flow path; and mixing the seed-applied substance prior to the seed-applied substance being applied to the seed [Fig. 1; 0041]. It would have been obvious to one of ordinary skill in the art to further provide a mixer in fluid communication with the substance receptacle and substance flow path, so as to further hold and thoroughly mix the chemical formulations [0073].

Claim 21: Reineccius discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0023-0024], wherein Reineccius allows to reduce the delay between seed treatment and planting [0024].

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 20.

Borstmayer is provided.

Claim 20: Borstmayer discloses the method of Claim 18 further comprising the steps of: providing a seed meter configured to receive the seed from the seed hopper and transfer the seed further through the seed flow path; transferring the seed into the seed meter; and applying the seed-applied substance to the seed within the seed meter (two diameter metering screw is effective way to accurately meter, mix seed and liquid treatment and to discharge material to seeder) [col 1, ln 30-45]. It would have been obvious to one of ordinary skill in the art to mix the seed applied substance to the seed in the seed meter as suggested Borstmayer, so as to provide an effective way to accurately meter, mix seed and liquid treatment together to be delivered to the seeder.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 15-16. Ochampaugh2 is provided.

Claims 15 and 16: Ochampaugh2 discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: calculating seed flow timing, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path [0035-0036] although Ochampaugh2 does not explicitly teach using a timing mechanism, since the prior art teaches timing the seed flow, it would have been obvious to one of ordinary skill in the art to use a mechanism for recording timing the seed flow in order to calculate and time the seed flow precisely. It would have been obvious to one of ordinary skill in the art to time the seed flow as taught by Ochampaugh2 so that the applicator can determine the amount of treatment to be applied to reach a proper application rate of the seeds [0035].

Claim Rejections - 35 USC § 102/103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory

basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention.

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim(s) 28-31 is/are rejected under 35 U.S.C. 102(a1) as anticipated by or, in the alternative, under 35 U.S.C. 103 as obvious over Kinzenbaw [US 20150059629].

Claim 28: Kinzenbaw teaches a method for planting a plurality of seed types which comprises a planter [abstract], a seed and seed-applied substance [0182-0183]. The method comprises calculating a location where the seed will be planted by the planter (planting at locations based upon known field characteristics) [0006; 0008]; selecting based on a condition [0014-0015; 0018], a combination of seed and seed-applied substance to plant at the location [0014; 0016; 0103-0104; 0129; 0183] generating the combination of the seed and seed-applied substance prior to the combination being planted at the location (treatment added to the seed either on the go or pre-made manner and adjusted according the conditions) [0183]; planting the combination of the seed and the seed-applied substance [0194-0195];

wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field [0167; 0183-0184].

Claims 29-30: although Kinzenbaw does not explicitly teach changing the type, number, or amount of one or more seed applied substances applied to the seed when generating the combination, Kinzenbaw does teaches the additions (of treatment) can be dynamically adjusted according to the ever-changing soil, seed and/or climate conditions; where it would have been obvious to one of ordinary skill in the art the addition or changing of treatment would read at least on changing the type or number of the seed applied substances.

Claim 31: Kinzenbaw teaches the combination of seed and seed-applied substance can vary based upon a seed type [0180].

Response to Arguments

Applicant's arguments filed 11/04/21 have been fully considered but they are not persuasive. Regarding applicant's arguments that it is improper to combine Bardi with Wendte since it would require Bardi to change out the modules for different seed after use to selectively plant different types of varieties of seed based on seed type of variety, it is argued that the claim simply requires generating a combination from seed and seed-applied substance, wherein Bardi teaches the different treatment fluids can be added to the particles in each mixing unit, wherein the particles from each stream are placed into the ground in different portions [col 7, 30-44], which would suggest that Bardi is capable of forming a combination of seed and seed-applied substance based upon location. Furthermore, the claims do not preclude switching out modules for different types of seeds. Regarding applicant's argument that Bardi teaches away from using up the select amount of treatment fluid because only a partial of the treatment fluid is coated on the seeds, it is argued that the claims do not require the treatment fluid to be completely utilized and coated on the seed. Regarding applicant's argument of the Bardi failing to teach step of adjusting a mixture ratio of seed-applied substance during operations, it is

argued that Wendte teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract]. Regarding applicant's argument that Aanestad teaches relies a prescription for treatment - based upon other variables such as pound of seed planted per acre, ounces of treatment material per 100 pounds of seed and so forth, it is argued that the claims do not preclude other conditions or variables in calculating the prescription treatment.

Conclusion

Claims 1-31 rejected.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached on Monday to Friday 1:00PM to 4:00PM PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

<i>Notice of References Cited</i>	Application/Control No. 15/739,606		Applicant(s)/Patent Under Reexamination Smith et al.	
	Examiner MANDY C LOUIE		Art Unit 1715	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20150059629-A1	03-2015	Kinzenbaw; Jon	A01C7/044	111/200
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20220208

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	1715
	Examiner Name	Mandy C LOUIE
	Attorney Docket Number	P11431US00_NP

U.S. PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S. PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1							
If you wish to add additional Foreign Patent Document citation information please click the Add button.								Add
NON-PATENT LITERATURE DOCUMENTS								Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.						T ⁵

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		15739606
	Filing Date		2017-12-22
	First Named Inventor	Steven P. Smith	
	Art Unit	1715	
	Examiner Name	Mandy C LOUIE	
	Attorney Docket Number	P11431US00_NP	

1	EUROPE PATENT OFFICE, EXTENDED SEARCH REPORT, EP 21204703.9, 26 JANUARY 2022, 14 PAGES.	×
If you wish to add additional non-patent literature document citation information please click the Add button <input type="button" value="Add"/>		
EXAMINER SIGNATURE		
Examiner Signature		Date Considered
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.		
<small> ¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached. </small>		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15739606
	Filing Date	2017-12-22
	First Named Inventor	Steven P. Smith
	Art Unit	1715
	Examiner Name	Mandy C LOUIE
	Attorney Docket Number	P11431US00_NP

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/KYLE S. COLEMAN/	Date (YYYY-MM-DD)	2022-03-08
Name/Print	Kyle S. Coleman	Registration Number	66257

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	04/26/2022	EXAMINER	
Goodhue, Coleman & Owens, P.C. 12951 University Ave Suite 201 Clive, IA 50325			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			04/26/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@apcoll.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 15/739,606	Applicant(s) Smith et al.		
	Examiner MANDY C LOUIE	Art Unit 1715	AIA (First Inventor to File) Status Yes	Page 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
MANDY C LOUIE	Primary Examiner	Telephonic
Kyle Coleman	Attorney	

Date of Interview: 28 March 2022

Issues Discussed:

35 U.S.C. 103

Applicant's representative discussed how the applicant's invention distinguishes over the prior art of record, particularly, the prior art of record are mainly directed to macro seed application, whereas the applicant's invention is directed to micro seed application. It was discussed that macro seed applications includes treating an entire environment such as spraying or whole field such as in-furrow treatment. Applicant's representative indicated that previous prescription applications did not present a micro seed application as a solution. The primary difference between macro and micro appears to be the amount of seed treatment used for seed application. The applicant's application would appear to be spritzing individual seeds with "micro" or smaller amounts of seed treatment, which would reduce runoff from excess seed treatment typically found in macro applications. Applicant's representative also pointed out that the prior art Bardi is not on the fly prescription system, whereas applicant's invention can be adjusted in real time. It was also disclosed that the applicant's portable nozzle is located near the seed drop chute, where the seed is place right before the nozzle before dropping to the soil. Such arrangement would prevent seed tubes or chutes from being excessively coated and reduce post-treatment handling. Clean up of the apparatus after a micro application is reduced. Applicant's representative also indicated that despite the small amount used in a micro application, the percentage of coating on the seed is relatively high, which makes the applicant's invention an effective and sustainable means for treatment seeds. Applicant's representative noted that claim 10 describes the location where the micro seed treatment application occurs. It was indicated that Applicant's invention uses a micro nozzle that deposits pico scale amounts to the seed. Examiner indicated that such features are not claimed and if these limitations (prescription process, micro application, specific location for the treatment of seed to reduce post handling) would require further consideration of the current prior art of record and potential new search. It was also indicated that the nozzle used by applicant had a special design for dispensing the treatment to the seed.

/MANDY C LOUIE/ Primary Examiner, Art Unit 1715	
<p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

<i>Applicant-Initiated Interview Summary</i>	Application No. 15/739,606	Applicant(s) Smith et al.		
	Examiner MANDY C LOUIE	Art Unit 1715	AIA (First Inventor to File) Status Yes	Page 2 of 2

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Doc code: RCEX

PTO/SB/30EFS (01-22)

Doc description: Request for Continued Examination (RCE)

Approved for use through 05/31/2024. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	15/739,606	Filing Date	2017-12-22	Docket Number (if applicable)	P11431US00_NP	Art Unit	1715
First Named Inventor	Steven P. Smith			Examiner Name	Mandy C LOUIE		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to
Deposit Account No 506801

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (01-22)

Approved for use through 05/31/2024. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	KYLE S. COLEMAN/	Date (YYYY-MM-DD)	2022-08-16
Name	Kyle S. Coleman	Registration Number	66257

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1 (Original): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed, and a seed-applied substance;

calculating a location where the seed will be planted by the planter;

selecting, based at least in part on a condition, a combination of seed and seed-

applied substance to plant at the location;

generating the combination of the seed and seed-applied substance prior to the

combination being planted at the location; and

planting the combination of the seed and seed-applied substance.

Claim 2 (Original): The method of Claim 1 wherein:

the step of selecting, based at least in part on the condition, the combination of seed

and seed-applied substance to plant at the location further comprises selecting

an amount of the seed-applied substance to be applied to the seed;

the step of generating the combination of the seed and seed-applied substance prior

to the combination being planted at the location further comprises:

(a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator;

(b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator;

and

- (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path.

Claim 3 (Original): The method of Claim 1 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance;

generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles;

selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance; and

delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter.

Claim 4 (Original): The method of Claim 1 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance.

Claim 5 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to

plant at the location further comprises selecting a seed type.

Claim 6 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 7 (Original): The method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance.

Claim 8 (Original): The method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance.

Claim 9 (Original): The method of Claim 2 further comprising the steps of:
providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and
a seed drop tube;
storing the seed in the seed receptacle;
transferring the seed from the seed receptacles to the seed hopper via the seed

delivery tube;
transferring the seed from the seed hopper to the seed meter; and
delivering the seed from the seed meter to the seed drop tube.

Claim 10 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube.

Claim 11 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters.

Claim 12 (Original): The method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path.

Claim 13 (Original): The method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises:
inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and
wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance.

Claim 14 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a metering device; and
metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device.

Claim 15 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
providing a timing mechanism; and
calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path.

Claim 16 (Original): The method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following:
providing a metering device and a timing mechanism;
metering flow of the selected combination of seed and seed-applied substance from the one of the plurality seed receptacles with the metering device; and

calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter.

Claim 17 (Previously presented): A method for seed treatment on a planter, the method comprising the steps of:

providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller;

determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller;

transferring the seed-applied substance from the substance receptacle into the substance flow path;

transferring the seed from the seed receptacle into the seed flow path; and

applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on a condition.

Claim 18 (Previously presented): The method of Claim 17 further comprising the steps of:

providing a mixer in fluid communication with the substance receptacle and the substance flow path; and

mixing the seed-applied substance prior to the seed-applied substance being applied

to the seed.

Claim 19 (Original): The method of Claim 17 further comprising the steps of:
providing a seed hopper configured to receive the seed from the seed receptacle;
transferring the seed into the seed hopper; and
applying the seed-applied substance to the seed within the seed hopper.

Claim 20 (Original): The method of Claim 18 further comprising the steps of:
providing a seed meter configured to receive the seed from the seed hopper and
transfer the seed further through the seed flow path;
transferring the seed into the seed meter; and
applying the seed-applied substance to the seed within the seed meter.

Claim 21 (Original): The method of Claim 17 further comprising the step of:
adjusting a mixture ratio of the seed-applied substance during operation of the
planter.

Claim 22 (Original): The method of Claim 17 further comprising the step of:
providing a substance applicator in fluid connection with the substance receptacle, the
substance applicator adapted to prescriptively treat the seed.

Claim 23 (Original): The method of Claim 22 wherein the substance applicator is
associated with at least one of:

- a. a mixer in fluid communication with the substance receptacle and the substance flow path;
- b. a seed hopper configured to receive the seed from the seed receptacle;
- c. a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and
- d. the seed drop tube.

Claim 24 (Original): The method of Claim 18 further comprising the steps of:
providing a seed drop tube that is part of the seed flow path;
transferring the seed into the seed drop tube; and
applying the seed-applied substance to the seed proximate to or within the seed drop tube.

Claim 25 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 26 (Original): The method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either:
always the same amount of seed-applied substance; or
only either one specific amount of seed-applied substance or no amount of the seed-applied substance.

Claim 27 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed.

Claim 28 (Previously presented): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed, and a seed-applied substance;
calculating a location where the seed will be planted by the planter;
selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location;
generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and
planting the combination of the seed and seed-applied substance;
wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field.

Claim 29 (Previously presented): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field by changing the type, number or amount of one or more seed-applied substances applied to the seed when generating the combination of the seed and seed-applied substance prior to the combination being planted at the location.

Claim 30 (Previously presented): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary based at least in part upon a seed-applied substance type, a number of seed-applied substances, or an amount of one or more seed-applied substances.

Claim 31 (Previously presented): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary based at least in part upon a seed type.

Claim 32 (New): A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed drop tube, a substance receptacle, a substance applicator,
a seed, and a seed-applied substance;
calculating a location where the seed will be planted by the planter;
selecting, based at least in part on a condition, a combination of seed and seed-
applied substance to plant at the location at least in part by selecting a type of
seed-applied substance and selecting an amount of the selected seed-applied
substance to be applied to the seed;
generating the combination of the seed and seed-applied substance prior to the
combination being planted at the location at least in part by:
delivering an amount of the selected seed-applied substance from the
substance receptacle to the substance applicator, wherein the delivered
amount is calculated to enable the substance applicator to apply the

selected amount of the selected seed-applied substance to the seed;
and
the substance applicator providing the delivered amount for applying the
selected amount of the selected seed-applied substance to the seed at
the seed drop tube; and
planting the combination of the seed and seed-applied substance;
wherein the combination of seed and seed-applied substance can vary as the planter
changes locations within the field.

Claim 33 (New): The prescriptive seed treatment method of claim 32, wherein:
the step of selecting a type of seed-applied substance and selecting an amount of the
selected seed-applied substance to be applied to the seed further comprises selecting
one or more types of seed-applied substances and selecting an amount for each of
the selected one or more types of seed-applied substances to be applied to the seed;
wherein the step of delivering an amount of the selected seed-applied substance from
the substance receptacle to the substance applicator, wherein the delivered
amount is calculated to enable the substance applicator to apply the selected
amount of the selected seed-applied substance to the seed further comprises
delivering the amounts of the selected seed-applied substances from one or
more substance receptacles to one or more substance applicators, wherein the
delivered amounts are calculated to enable the one or more substance
applicators to apply the selected amounts of the selected seed-applied
substances to the seed; and

wherein the step of the substance applicator providing the delivered amount for applying the selected amount of the selected seed-applied substance to the seed at the seed drop tube further comprises the one or more substance applicators providing the delivered amounts for applying the selected amounts of the selected seed-applied substances to the seed at the seed drop tube.

Claim 34 (New): A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed, and a seed-applied substance;
calculating a location where the seed will be planted by the planter;
prescriptively selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location;
generating the combination of the seed and seed-applied substance prior to the combination being planted at the location at least in part by applying a microscale amount of the seed-applied substance to the seed; and
planting the combination of the seed and seed-applied substance within a field;
wherein generating the combination is both generated immediate to planting to minimize handling of the combination and can vary as the planter changes locations within the field.

REMARKS

In the Final Office Action, the Examiner took the following actions:

- I. Rejected claims 28-31 under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement;
- II. Rejected claim(s) 1 under 35 U.S.C. 103 as obvious over Bardi [US 6148748] in view of Wendte [US 20150223391];
- III. Rejected claims 2-8, 13-14, 17, 21, 25-27 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101];
- IV. Rejected claims 9-11, 19, 22-24 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091];
- V. Rejected claims 18-21 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675];
- VI. Rejected claim 20 under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and

Ochampaugh as applied to claim 2 or 3 above, and
further in view of Borstmayer [US 6112679];

VII. Rejected claims 15-16 under 35 U.S.C. 103 as being
unpatentable over Bardi in view of Wendt and
Ochampaugh as applied to claim 2 or 3 above, and
further in view of Ochampaugh2 [US 20120115911];
and

VIII. Rejected claim(s) 28-31 under 35 U.S.C. 102(a1) as
anticipated by or, in the alternative, under 35 U.S.C.
103 as obvious over Kinzenbaw [US 20150059629].

The Final Office Action may contain statements characterizing the related art and/or the claims. Regardless of whether any such statement is expressly identified and/or discussed herein, Applicant reserves the right to disagree with any such statement or characterization in the Final Office Action.

Claims 1-31 remain pending and under examination. Claims 32-34 are new. No new matter has been added. For at least the following reasons, Applicant respectfully requests reconsideration and withdrawal of the rejections.

SUMMARY OF THE EXAMINER'S INTERVIEW

The undersigned attorney thanks the Examiner for the courtesy extended during the interview of March 28, 2022. The Examiner's summary sets forth an accurate and complete summary of the substance of the interview.

CLAIM REJECTIONS – 35 USC § 112

The Final Office Action rejected claims 28-31 under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The Final Office Action argues "the claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention. It is unclear where the support for the new limitations particularly the combination of the seed and seed-applied substance can vary as the planter changes location within the field can be found in the original disclosure."

However, support for the limitations in claims 28-31, particularly the limitation that the combination of the seed and seed-applied substance can vary as the planter changes location within the field, is included throughout Applicant's specification. For example, page 5, lines 4-5, states "[m]oreover, the optimal type and amount of seed treatment substances often varies from field to field, row to row, and even seed planting location to seed planting location [underline emphasis added]." Further, on page 18, lines 20-24, it states "[a]s will be discussed in detail below, the system provides for numerous configurations whereby the combination of seed and type and/or amount of

seed-applied substance can be prescriptively selected based, at least in part, on the field, region, batch, row, and/or seed position [underline emphasis added].” Additionally, page 39, lines 14-18, recite “selecting which combination of seed and seed-applied substances (e.g., type and/or amount) to plant in a particular location, and such determination typically can be at the individual location, zone, region, field and/or across multiple fields and/or farming operation level. The selected combination can vary on a field-by-field, region-by-region, row-by-row, column-by-column, zone-by-zone, batch-by-batch, and/or seed-by-seed basis [underline emphasis added].” Further still, page 50, lines 13-17, state “[f]urthermore, the applicable controller(s) 54 can use seed singulation, GPS 80 and/or other means to determine the prescribed combination of seed and seed-applied substance(s) on a seed--by--seed, row--by--row, column--by--column, zone-by-zone, region-by-region, field-by-field and/or across multiple fields and/or farming operations [underline emphasis added].”

In view of the foregoing, Applicant respectfully requests withdraw of the 35 U.S.C. § 112(a) rejection of claims 28-31.

35 USC § 103

As part of Examiner’s summary of the March 28th interview, Examiner noted that if Applicant’s claims included “prescription process, micro application, specific location for the treatment of seed to reduce post handling [limitations], . . . [such] would require further consideration of the current prior art of record and [a] potential new search.”

Applicant respectfully argues it’s claims satisfy Examiner’s requirements and are otherwise novel and non-obvious. Indeed, Applicant’s prescriptive seed treatment

claims include a seed, a seed-applied substance, a selected amount of seed-applied substance, and a combination of the seed and seed-applied substance. Applicant's specification defines the term "seed" to include "seeds of any type of plants", the term "seed-applied substance" to "include any composition applied to seeds", and the term "combination" to include "one or more types and/or one or more amounts of seed-applied substances that are applied to a seed [underline emphasis added]." p. 10, line 21, p. 10, lines 24-25, p. 11, lines 19-20. The definition of "applied" is to "put or spread (something) on a surface." Oxford English Dictionary. Conversely, the definition of "mixed", which is used by Bardi, is to "make or prepare by combining ingredients." Oxford English Dictionary. Applicant's seed-applied substance "applied to a seed" in a selected amount is a prescriptive application that is optimally both a microscale application and applied in a manner that avoids unnecessary post-application handling of treated seed. The cited art does not disclose a prescriptive application to a seed, let alone one that is a microscale application or avoids unnecessary post-application handling of treated seed.

The primary reference Bardi is a good example of this. In Bardi, "[t]he in-line seed treating unit includes a cylindrical housing having input and outlet ends located at opposing axial ends of the cylindrical housing to provide a generally linear overall flow path for the seed entrained air flow through the product distribution line. A baffle formed as a spiral fighting with an open center portion is disposed within the cylindrical housing to induce the air flow and entrained seeds in a spiral flow path along the housing axis and, thereby pushing the entrained seeds outwardly toward the inner wall of the housing [underline emphasis added]." col. 4, lines 6-21. "[t]he treatment fluid is injected into the

chamber at an injection point 24 such that it flows in a relatively wide stream [underline emphasis added]” and is “dispersed into a fan-shaped pattern on the side wall of the tube” and “follows the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underling emphasis added].” col. 5, lines 60-62; col. 6, lines 13-14; col. 5, lines 62-65]. FIG. 8 from Bardi, which is shown below, pictorially illustrates the above-described features of the cylindrical housing.

It is important to note that Bardi floods the cylindrical housing with treatment fluid at the input in “a fan-shaped pattern”, “[t]he treatment fluid then travels in a relatively broad stream along the same path as the seed particles...”, “is dispersed within the air flow”, “enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material” by the time it reaches the output. col. 7, lines 13; col. 6, lines 15-17; col. 4, lines 22-23; col. 5, lines 63-65. The spread of treatment fluid in the cylindrical housing, well beyond the size of a single seed particle, for coating to occur is also required given Bardi clarifies that “[i]f the injection point 24 is too close to the interior wall 23 of the chamber 22, the stream will be too narrow because the air does not interact sufficiently with the stream to force the treatment fluid to spread out.” col. 6, lines 17-20. Seed particle type and shape in Bardi also change the overall length of the baffle (i.e., distance between the input and output) and hence the length of travel of the treatment fluid for seed coating to occur before the output. Bardi states, “[t]he overall length of the baffle 25 can be varied depending on the shape of the seed or particle being treated. Round seeds tend to roll readily and require fewer baffle rotations to encourage them to follow a spiral path with the treatment fluid.” col. 6, lines 39-43.

Further, “[o]blong seeds tend to require more baffle rotations to hold them in the spiral path sufficiently long to coat them with treatment fluid [underling emphasis added];” col. 6, lines 46-48. In this manner, “[t]he spiral trajectory increases the mixing path length within a straight unit length of pipe or tube, thus mixing time is increased [underling emphasis added].” col. 3, lines 56-58.

Bardi also relies on the effective distribution of large amount of treatment fluid (i.e., as comparing the amount of treatment fluid to the surface area of a seed) within and along the entire length of the cylindrical housing, from input to output, to hold seed particles “sufficiently long” enough, while rolling in the stream of treatment fluid, to become coated by the treatment material by the time the seed particles reach the output.

Bardi floods the cylindrical housing with treatment fluid at the input in “a fan-shaped pattern”, “[t]he treatment fluid then travels in a relatively broad stream along the same path as the seed particles...”, “is dispersed within the air flow”, “enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material” by the time it reaches the output. col. 7, lines 13; col. 6, lines 15-17; col. 4, lines 22-23; col. 5, lines 63-65. The spread of treatment fluid in the cylindrical housing, must necessarily be beyond the size of a single seed particle, for coating to occur, especially given that Bardi identifies it being a problem when “the stream will be too narrow because the air does not interact sufficiently with the stream to force the treatment fluid to spread out.” col. 6, lines 18-20. Further, “[o]blong seeds tend to require more baffle rotations to hold them in the spiral path sufficiently long to coat them with treatment fluid [underling emphasis added];” col. 6, lines 46-48. In this manner,

“[t]he spiral trajectory increases the mixing path length within a straight unit length of pipe or tube, thus mixing time is increased [underling emphasis added].” col. 3, lines 56-58.

Bardi teaches that both treatment fluid and seed particles are pushed “outwardly toward the inner wall of the housing” and “[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles.” col. 4, lines 18-20; col. 6, lines 27-30. In this manner, “substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream 35 towards the wall 23; thus most of the air travels along the baffle 25 with the particles.” col. 6, lines 31-35. Additionally, “[t]he spiral trajectory increases the mixing path length within a straight unit length of pipe or tube, thus mixing time is increased [underling emphasis added].” col. 3, lines 56-58. As such, Bardi cannot produce prescriptive seed treatments that would not be affected by residual treatment fluid within and on internal surfaces of the cylindrical housing and baffle given that “[t]he in-line mixer of the invention induces the particles to travel along a spiral path on the internal wall of the mixing chamber [underline emphasis added]” and “[t]he treatment fluid is injected into the chamber at an injection point 24 such that it flows in a relatively wide stream [underline emphasis added]” and is “dispersed into a fan-shaped pattern on the side wall of the tube” and “follows the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underling emphasis added].” col. 3, lines 54-56; col. 5, lines 60-62; col. 6, lines 13-14; col. 5, lines 62-65]. Moreover, because Bardi relies on passing seed

particles and treatment fluid through a specific size and length of cylindrical housing with specific size and length baffles for coating seed particles before reaching the output, Bardi must modify or change out of the field “[t]he overall length of the baffle 25...depending on the shape of the seed or particle being treated. Round seeds tend to roll readily and require fewer baffle rotations to encourage them to follow a spiral path with the treatment fluid.” col. 6, lines 39-43. Further modifications for “[o]blong seeds tend to require more baffle rotations to hold them in the spiral path sufficiently long to coat them with treatment fluid;” col. 6, lines 46-48.

For these and other reasons, Bardi does not disclose Applicant’s claimed inventions.

Prescriptive Treatment – As a result, one benefit of Applicant’s claimed invention being able to provide a “selected amount” of a seed-applied substance is to apply such seed-applied substance in a manner that a seed or batch of seeds receives an amount within a desired range consistently enough to satisfy industry standards. Different seed-applied substances usually have different desired ranges of active ingredient(s) or colonizable units.

Applicant originally presented independent claims include prescriptive process limitations. By way of example, independent claim 1 is a “prescriptive seed treatment method” that comprises the steps of “selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location,” and “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location.”

Similarly, independent claim 17 is a method for seed treatment on a planter

comprising “determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller,” and “applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on a condition.”

Additionally, independent claim 28 is a “prescriptive seed treatment” method comprising the steps of “selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location,” “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location,” “planting the combination of the seed and seed-applied substance, wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field.”

Applicant’s originally presented independent claims also include a condition based at least in part on which a combination of a seed and seed-applied substance selected, generated and/or planted.

Bardi does not disclose a solution that can select, generate or plant any particular combination of seed and seed-applied substance, let alone one that can adjust the combination of seed and seed-applied substance, based at least in part on a condition. For example, seeds in Bardi go through cylindrical housing randomly. Seeds on the outer edge of the cylindrical housing receive significantly more treatment fluid than seeds passing through the center. Depending on what part of the cylindrical housing unit the seed in Bardi travels, the amount of treatment fluid that is on the seed after the seed exits the cylindrical housing can vary significantly. Bardi is not mechanically capable of causing any particular amount of seed-applied substance to be

applied to a seed to generate a combination of seed and seed-applied substance based at least in part on any condition. In addition, Bardi is not capable of changing between substances while going through the field. To change substances before all the flood of treatment fluid was used up in Bardi would require removing significant amounts of such treatment fluid from the cylindrical housing unit, which would result in significant waste. Up and above the waste of changing treatment fluids that would be necessary by Bardi, the amount of time necessary to switch between treatment fluids would prevent prescriptive application while going through the field. Bardi also does not disclose any mechanism to remove the pool of treatment fluid. Residue of one treatment fluid would thus remain in the cylindrical housing unit for a long period of time, such that the residue of the prior substance could continually result in a combination of seed by seed-applied substance that included the prior treatment fluid rather than the desired combination of seed and seed-applied substance for an unacceptably large number of combinations of seed and seed-applied substances.

Similarly, the seed coated in Bardi randomly can touch many different portions of the mechanism after being coated, such that inconsistent amounts of treatment fluid rub off the seed and onto the mechanism. Not providing any mechanism to minimize post-treatment handling or rub off further confirms Bardi does not disclose and is not capable of generating a selected combination of seed and seed-applied substance, let alone has the capacity to vary between different selected combinations, based on at least one condition as it goes through the field.

Not surprisingly then, Bardi does not disclose and is not capable of prescriptively applying (e.g., varying as the planter goes through the field based on a condition the

amount or type of) seed-applied substances to seed in the field.

In fact, Bardi even teaches away from in-field prescriptive changes of substances. Bardi focuses on out-of-the-field changes for different substances. Indeed, Bardi highlights the needed changes and modifications performed out of the field for addressing different seed and treatment fluids (i.e., “a variety of planting situations”) by stating that the “modular system enables the farmer to change the cart after usage, permitting the same air cart to be used for a variety of planting situations [underline emphases added]” and “[f]or best efficiency, different modules can be provided for different seed types, such that the internals of the mixing unit are varied depending on the seed size and shape [underline emphasis added].” col. 3, lines 19-21; col. 3, lines 37-39.

In view of the foregoing, Bardi cannot prescriptively coat different seed particles with different treatment fluids while in the field.

In addition to the prescriptive process elements in Applicant’s independent claims, Applicant’s dependent claims also include many limitations relating to prescriptive process, microscale application and treatment locations designed to reduce post-treatment handling.

Prescriptive Process – Applicant’s dependent claims include numerous prescriptive process limitations that are simply not feasible with Bardi. The following are just a few examples:

Claim 2: “selecting an amount of the seed-applied substance to be applied to the seed;”

Claim 4: “selecting at least one of a seed type or type of seed-applied

substance;”

Claim 5: “selecting a seed type;”

Claim 7: “the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance;”

Claim 21: “adjusting a mixture ratio of the seed-applied substance during operation of the planter;”

Claim 22: “providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed;”

Claim 26: “wherein the amount of the type of the seed-applied substance to be applied to the seed is... only either one specific amount of seed-applied substance.”

Claim 27: “selecting a type of the seed-applied substance to be applied to the seed;”

Claim 29: “the combination of seed and seed-applied substance can vary as the planter changes location within the field by changing the type, number or amount of one or more seed-applied substances applied to the seed when generating the combination of the seed and seed-applied substance prior to the combination being planted at the location;”

Claim 30: “the combination of seed and seed-applied substance can vary based at least in part upon a seed-applied substance type, a number of seed-applied substances, or an amount of one or more seed-applied substance;” and

Claim 31: “the combination of seed and seed-applied substance can vary based at least in part upon a seed type.”

In view of the foregoing, it is abundantly clear that Bardi does not disclose a microscale application of a seed-applied substance to a seed given that Bardi relies on the effective distribution of large amount of treatment fluid (i.e., as comparing the amount of treatment fluid to the surface area of a seed) within and along the entire length of the cylindrical housing, from input to output, to hold seed particles “sufficiently long” enough, while rolling in the stream of treatment fluid, to become coated by the treatment material by the time the seed particles reach the output.

Post Handling/Touching – Applicant’s claims 10 and 24 are directed at generating the combination of seed and seed-applied substance at locations intended to minimize or eliminate post treatment handling.

Conversely, Bardi teaches that “[t]he treatment fluid is preferably injected in the form of a drop or spray at a point sufficiently below the interior wall of the chamber such that it is caught by the rotating air stream and dispersed into a fan-shaped pattern on the side wall of the tube [underline emphasis added]” and the in-line mixer “encourages particles, usually seeds, to roll along the same path as the coating material with which it is to be mixed. [underline emphasis added]” col. 3, lines 50-51. And, further, “[t]he in-line mixer of the invention induces the particles to travel along a spiral path on the internal wall of the mixing chamber.” col. 3, lines 54-56. And further “[t]he mixing unit 20 is located in the middle manifold line 18d so that stream 48 carries coated particles, typically seed, through a distribution system 19 to specific furrows formed in the ground.” col. 7, lines 63-66.

Bardi also teaches that “[t]he mixing unit 20 is located in the middle manifold line 18d so that stream 48 carries coated particles, typically seed, through a distribution

system 19 to specific furrows formed in the ground [underline emphasis added].” col. 7, lines 63-66. And, in another instance, Bardi states “[a]n air supply system, in this case a fan 15, provides pressurized air to the manifold 18. The pressurized air carries the particles through a distribution system 19 from the manifold 18 to ground engaging tools 5 [underline emphasis added].” col. 5, lines 43-46.

In view of the foregoing, it is clear that Bardi does not disclose applying seed-applied substances to seed in a manner that minimizes or eliminates any post-application handling or touching by the planting system during planting. Rather, Bardi requires coated seed particles to be carried through a significant portion of the mechanism prior to being planted.

Many seed-applied substances can be sticky, such that handling of the seed after a substance is delivered to a seed can cause a substance to stick to any part of the seed flow path the seed would touch thereafter. This can result in build up, clogging of the seed or substance flow paths and even disrupt or prevent continuous planting.

New Claims 32-34 – Applicant also respectfully submits new claims 32-34 in an effort to better highlight the prescriptive process, microscale application and limited post-treatment handling application location aspects of its invention.

For the reasons stated above, the new claims’ prescriptive process and limited post-treatment handling application location aspects are not met by Bardi.

Additionally, Bardi does not disclose and is not capable of applying a microscale amount of a seed-applied substance to a seed. For example, Bardi relies on the effective distribution of large amount of treatment fluid (i.e., as comparing the amount of treatment fluid to the surface area of a seed) within and along the entire length of the

cylindrical housing, from input to output, to hold seed particles “sufficiently long” enough, while rolling in the stream of treatment fluid, to become coated by the treatment material by the time the seed particles reach the output. By flooding the cylindrical housing with treatment fluid, it is difficult to see how the ratio of treatment fluid to seed in the cylindrical housing of Bardi could be microscale without additional disclosure. In view of the foregoing, it is abundantly clear that Bardi does not disclose a microscale application of a seed-applied substance to a seed.

Applicant respectfully requests allowance of new claims 32-34.

Claim Rejections - 35 USC § 103

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Bardi [US 6148748] in view of Wendte [US 20150223391]. This rejection is respectfully traversed.

Independent claim 1 is directed to a prescriptive seed treatment method and recites the steps of, “providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance”. The Final Office Action states that “the prior art does not appear to teach calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance”. Final Office Action of 02/16/2022, p. 4, lines 3-6. To cure the

deficient teachings of Bardi, the Final Office Action argues that “[i]t would have been obvious to one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Bardi in order to optimize yield and planting throughput [0006-0008; abstract]” . Final Office Action of 02/16/2022, p. 4, lines 10-15.

Applicant respectfully traverses the argument that Wendte remedies the deficient teachings of Bardi and that the combination would be obvious to one of ordinary skill in the art. Lastly, as to claim 1, the Final Office Action argues “[a]nd although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt[e] using the seed treatment system of Bardi to improve seed planting throughput and reduce special handling”. Final Office Action of 02/16/2022, p. 4, lines 16-18. Applicant respectfully traverses the argument that the combination of Wendte using the seed treatment of Bardi generates a prescription (combination) and would have been obvious to one of ordinary skill in the art. The combination of Bardi and Wendte does not cure the deficient teachings of Bardi, is improper, and is inoperable for arriving at Applicant’s claimed prescriptive seed treatment method; and, therefore cannot be obvious for the following reasons and those further provided under the 35 U.S.C. § 103 heading above.

Moreover, Wendte describes a field map as being a tool that agricultural technology solutions can use to set targets for agricultural technology solutions. The teachings in Wendte do not change the mechanical function of the underlying solution.

Here too, even if adding a field map as described by Wendte enabled Bardi to set targets (e.g., know what amounts or substances to apply in particular zones of a field), such would not change Bardi's mechanical limitations and operations as set forth above. Bardi still would not have the mechanical functionality to generate the selected combination of seed and seed-applied substance based at least in part on a condition when combined with the teachings of Wendte.

Additionally, Bardi cannot control when a selected seed and treatment fluid going through the cylindrical housing would be planted, such that it could not calculate where a combination of seed and seed-applied substance would be planted by a planter.

Notably, Bardi states, "[m]etering systems 30 below the tanks 12—14 direct particles from the tanks 12—14 into the manifold 18 below the tanks. An air supply system, in this case a fan 15, provides pressurized air to the manifold 18. The pressurized air carries the particles through a distribution system 19 from the manifold 18 to ground engaging tools 5." col. 5, lines 40-46. Bardi recognizes "[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added]." col. 6, lines 27-36. Therefore, Bardi admits that travel of a seed to the ground engaging tools cannot be a calculated planting of the generated combination since "treating of the small volume of seeds" (col. 3, lines 30-31) results in at least a portion of the air

traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, “Which treated particle, with what treatment (combination) in Bardi is being planted where?”. Introducing “different types of varieties of seed based on seed type or variety zones agricultural field” (Wendte, Abstract) into the chamber of Bardi to be treated would not result in a calculated planting of the generated combination. In view of the foregoing, “the prescription (combination) of Wendte cannot be generated using the seed treatment system of Bardi [underline emphasis added]”. Final Office Action of 02/16/2022, p. 4, lines 16-18.

Bardi teaches against the combination with Wendte. Wendte teaches “selectively plant[ing] different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map”. Wendte, Abstract. Whereas Bardi, “to accommodate different sized or shaped seeds” (col. 6, lines 57-58), for “selectively planting[ing] different types of varieties of seed based on seed type” (Wendte, Abstract), requires “the farmer to change the cart after usage” col. 3, lines 19-21. The reason for changing the cart after usage for accommodating different seed is further explained in Bardi given that “[t]he pitch, width, and length of the spiral baffle 25 can be varied for different seed types. The baffle embodiment shown is similar to one used for treating peas. The overall length of the baffle 25 can be varied depending on the shape of the seed or particle being treated. Round seeds tend to roll readily and require fewer baffle rotations to encourage them to follow a spiral path with the treatment fluid. The baffle 25 can, therefore, be cut shorter with the round seeds, perhaps to even a half of a rotation of the baffle 25, which

reduces the pressure drop across the module 22. Oblong seeds tend to require more baffle rotations to hold them in the spiral path sufficiently long to coat them with treatment fluid; thus the baffle 25 for oblong seeds must be either longer or have a shorter pitch to provide more rotations per length of the baffle 25 and, therefore, the seed treating module 22. Smaller seeds and particles can be induced into a rotary path with narrower baffle widths, enabling the opening in the center 26 to be larger, which reduces the pressure drop across the mixing module 22 [underline emphasis added].” col. 6, lines 38-55. Additionally, “[o]ther modifications of the apparatus 20 are also envisioned within the scope of the instant invention to accommodate different sized or shaped seeds. Canola seed, for example, is very small. It is believed that this in-line seed treating concept can be utilized with canola seed by keeping the baffle thickness the same as for other seeds, but reducing the inside diameter of the tube. This configuration would increase the velocity of the air/seed flow within the in-line seed treating unit 20 [underline emphasis added].” col. 6, lines 56-64. In view of foregoing, it is clear that the combination of Bardi and Wendte provides a system that has to change out modules for different seed after each use to “selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map” (Wendte, Abstract) and does not teach a prescriptive seed treatment method providing a calculated planting of a generated combination of seed and seed treatment as provided in claim 1.

Bardi’s own words acknowledge that it does not disclose a prescriptive seed treatment method by stating, “[t]he only drawback to the use of a single module type would be relevant to the pressure drops”. col. 7, lines 2-3. Since use of a single module

type would not allow for prescriptive seed treatment, Bardi would have clearly acknowledged more drawbacks than just pressure drop if Bardi intended to disclose a prescriptive seed treatment method that provides a calculated planting of a generated combination of seed and seed treatment as provided in claim 1.

Wendte cannot be combined with Bardi. In fact, any combination with Bardi to arrive at Applicant's claimed prescriptive seed treatment method providing a calculated planting of a generated combination as set forth in claim 1 would necessarily require engineering "modifications of the apparatus 20" (col. 6, lines 56-58) or at minimum "chang[ing] the cart after usage" (col. 3, lines 19-21) as well as a rewriting of the disclosure in Bardi, changing how seed flow is controlled while passing through the in-line mixing unit module 22 to the ground engaging tools.

In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 1.

Claims 2-8, 13-14, 17, 21, 25-27 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101]. This rejection is respectfully traversed.

Ochampaugh fails to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi and Wendte as to independent claim 1, and further, in view of the preceding arguments. Therefore, claims 2-8, 13-14, and 25-27 should be allowable as depending from an allowable base claim.

Claim 2 further distinguishes over the cited references and draws attention to a significant deficiency in the combination of Ochampaugh with Bardi and Wendte. The

Final Office Action states, as pertaining to claim 2, “Ochampaugh teaches the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [0032]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path (hopper tank, hopper tank evacuation mechanism, [0034]), a seed flow path and a substance applicator (seed treating system of Bardi) [col 7, In 17-25]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [0034]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path (seed treating system of Bardi)[underline emphasis added” [col 7, In 17-25]. Final Office Action of 02/16/2022, p. 5, lines 1-10. The combination of the teachings in Ochampaugh with the seed treating system of Bardi does not disclose the limitations of claim 2 and does not arrive at Applicant’s claimed prescriptive seed treatment method of applying a selected amount of seed-applied substance to a seed. Notably, Bardi discloses that “in-line mixing chamber 22 is provided with a spiral baffle 25 positioned along the interior wall 16a of a tube 16 that induces mixing with reduced pressure drops and reduced potential for damage to the carried seed particles. The central portion 26 of the spiral baffle 25 is open, allowing the central path of the chamber 22 to be clear. The spiral baffle 25 induces a rotational motion into the flow of the seed particles which pulls the air stream and the particles to the wall area 23 of the mixing chamber 22. The seed particles tend to roll along the wall 23 of the chamber 22

following the baffle 25 in a spiral trajectory. The treatment fluid is injected into the chamber at an injection point 24 such that it flows in a relatively wide stream along the wall 23 and follows the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underline emphasis added]”. col. 5, lines 49-65. The “in-line mixing chamber 22” of Bardi is for mixing seed and treatment fluid, but not applying a selected amount of the seed-applied substance to a seed. Furthermore, Bardi admits that a selected amount of seed-applied substance cannot all be applied to a seed since “[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added].” col. 6, lines 27-36. Thus, “treating of the small volume of seeds” (col. 3, lines 30-31) results in at least a portion of the air traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, “Which portion of the selected amount of seed-applied substance that is supposed to be applied to the seed, is stuck to a surface of the baffles and/or side wall of the tube or discharged through the open center?”. Further complicating the issue, Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected” (col. 6, lines 5-7), which is

critical since, [t]he selected distance 27 has an impact on the width of the stream of fluid. If the injection point 24 is too close to the interior wall 23 of the chamber 22, the stream will be too narrow because the air does not interact sufficiently with the stream to force the treatment fluid to spread out” (col. 6, lines 19-24).

In view of the foregoing and in further view of the reasons set forth under the 35 U.S.C. § 103 heading above, it is abundantly clear that the teachings in Ochampaugh do not remedy Bardi and do not provide a combination of disclosure that makes obvious Applicant’s prescriptive seed treatment method of applying a selected amount of seed-applied substance to a seed as set forth in claim 2. Therefore, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of claim 2.

Independent claim 17 is directed to a method for seed treatment on a planter and recites the steps of “providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller; transferring the seed-applied substance from the substance receptacle into the substance flow path; transferring the seed from the seed receptacle into the seed flow path; and applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on a condition”. The Non-Final Office Action argues, as to independent claim 17, that “Ochampaugh discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller

[0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from the substance receptacle into the substance flow path [0030]; Bardi teaches transferring the seed from the seed receptacle into the seed flow path [col 7, ln 15-30]; and applying the seed-applied substance to the seed within the seed flow path [col 7, ln 15-30], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract].” Applicant respectfully traverses the combination of Bardi, Wendte, and Ochampaugh and the argument that the combination using the seed treatment of Bardi) would have been obvious to one of ordinary skill in the art to arrive at a method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition.

The addition of Ochampaugh with Bardi and Wendte draws attention to a significant deficiency in the combination of the three cited references. The Non-Final Office Action states, as pertaining to claim 17, “Ochampaugh discloses...determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]”. Final Office Action of 02/16/2022, p. 7, lines 1-4. The Final Office Action further argues that Bardi teaches applying the determined amount of seed-applied substance to the seed within the seed flow path. Final Office Action of 02/16/2022, p. 7, lines 5-7. The combination of the teachings in Ochampaugh with the seed treating system of Bardi does not disclose the limitations of claim 17 and does not arrive at Applicant’s claimed prescriptive method of seed treatment where, during operation of a planter, a determined amount of seed-applied substance is applied

to the seed within the seed flow path based on a condition. Notably, Bardi discloses that “in-line mixing chamber 22 is provided with a spiral baffle 25 positioned along the interior wall 16a of a tube 16 that induces mixing with reduced pressure drops and reduced potential for damage to the carried seed particles. The central portion 26 of the spiral baffle 25 is open, allowing the central path of the chamber 22 to be clear. The spiral baffle 25 induces a rotational motion into the flow of the seed particles which pulls the air stream and the particles to the wall area 23 of the mixing chamber 22. The seed particles tend to roll along the wall 23 of the chamber 22 following the baffle 25 in a spiral trajectory. The treatment fluid is injected into the chamber at an injection point 24 such that it flows in a relatively wide stream along the wall 23 and follows the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underline emphasis added]”. col. 5, lines 49-65. The “in-line mixing chamber 22” of Bardi is for mixing seed and treatment fluid, but not applying a determined amount of the seed-applied substance to a seed. Furthermore, Bardi admits that a determined amount of seed-applied substance cannot all be applied to a seed since “[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added].” col. 6, lines 27-36. Thus, “treating of the small volume of seeds” (col. 3, lines 30-31) results in at least a portion of

the air traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, “Which portion of the determined amount of seed-applied substance that is supposed to be applied to the seed, is stuck to a surface of the baffles and/or side wall of the tube or discharged through the open center?”. Further complicating the issue of applying a determined amount of seed-applied substance to a seed, Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected [underline emphasis added]” (col. 6, lines 5-7), which is critical since, [t]he selected distance 27 has an impact on the width of the stream of fluid. If the injection point 24 is too close to the interior wall 23 of the chamber 22, the stream will be too narrow because the air does not interact sufficiently with the stream to force the treatment fluid to spread out” (col. 6, lines 19-24).

Bardi also teaches against the combination as to the application of seed-applied substance to a seed during operation of the planter. Wendte teaches “selectively plant[ing] different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map”. Wendte, Abstract. Whereas Bardi, “to accommodate different sized or shaped seeds” (col. 6, lines 57-58), for “selectively planting[ing] different types of varieties of seed based on seed type” (Wendte, Abstract), requires “the farmer to change the cart after usage” col. 3, lines 19-21. The reason for changing the cart after usage for accommodating different seed is further explained in Bardi given that “[t]he pitch, width, and length of the spiral baffle 25 can be varied for different seed types. The

baffle embodiment shown is similar to one used for treating peas. The overall length of the baffle 25 can be varied depending on the shape of the seed or particle being treated. Round seeds tend to roll readily and require fewer baffle rotations to encourage them to follow a spiral path with the treatment fluid. The baffle 25 can, therefore, be cut shorter with the round seeds, perhaps to even a half of a rotation of the baffle 25, which reduces the pressure drop across the module 22. Oblong seeds tend to require more baffle rotations to hold them in the spiral path sufficiently long to coat them with treatment fluid; thus the baffle 25 for oblong seeds must be either longer or have a shorter pitch to provide more rotations per length of the baffle 25 and, therefore, the seed treating module 22. Smaller seeds and particles can be induced into a rotary path with narrower baffle widths, enabling the opening in the center 26 to be larger, which reduces the pressure drop across the mixing module 22 [underline emphasis added].” col. 6, lines 38-55. Additionally, “[o]ther modifications of the apparatus 20 are also envisioned within the scope of the instant invention to accommodate different sized or shaped seeds. Canola seed, for example, is very small. It is believed that this in-line seed treating concept can be utilized with canola seed by keeping the baffle thickness the same as for other seeds, but reducing the inside diameter of the tube. This configuration would increase the velocity of the air/seed flow within the in-line seed treating unit 20 [underline emphasis added].” col. 6, lines 56-64. In view of foregoing, it is clear that the combination provides a system that has to change out modules for different seed after each use (i.e., taking the planter out of service; therefore, not occurring during operation of the planter) to “selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field

characteristics defined in a seed variety prescription map” (Wendte, Abstract) and does not teach a method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition as provided in claim 17.

In view of the foregoing and further for the reasons set forth under the 35 U.S.C. § 103 heading above, it is abundantly clear that the teachings in Ochampaugh do not remedy the combination of Bardi and Wendte, and also do not provide a combination of disclosure that makes obvious Applicant’s prescriptive method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition as provided in claim 17. Therefore, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 17.

Ochampaugh fails to remedy all the deficiencies identified above in Bardi and Wendte as to independent claim 17, and further, in view of the preceding arguments. Therefore, claim 21 should be allowable as depending from an allowable base claim. **Claim 21** further distinguishes over the cited references and draws attention to a significant deficiency in the combination of Ochampaugh with Bardi and Wendte. The Final Office Action states, as pertaining to claim 21, “Ochampaugh discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [00.57]”. Final Office Action of 02/16/2022, p. 7, lines 9-11. Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type

and the treatment fluid to be injected [underline emphasis added]" (col. 6, lines 5-7), and module type based a variety of planting situations requires "the farmer to change the cart after usage" (col. 3, lines 19-21). In view of the foregoing and further for the reasons set forth under the 35 U.S.C. § 103 heading above, the combination fails to teach the step of adjusting a mixture ratio of the seed-applied substance during operation of the planter as claim 21 recites. Therefore, Applicant respectfully requests that the 35 U.S.C. § 103 rejection of claim 21 be withdrawn and claim 21 allowed.

Claim 26 depends from independent claim 1 and should be allowed by dependency upon an allowable base claim. Claim 26 further distinguishes over the cited references, particularly given that Wendte fails to remedy all the deficiencies in Bardi in view of the preceding arguments. Claim 26 recites "wherein the amount of the type of the seed-applied substance to be applied to the seed is... only either one specific amount of seed-applied substance or no amount of the seed-applied substance." Bardi is incapable of applying treatment fluid to seed particles in "only either one specific amount" for at least the reasons set forth under the 35 U.S.C. § 103 heading above. The teachings in Wendte cannot remedy the deficiency in Bardi. Therefore, Applicant respectfully requests that the 35 U.S.C. § 103 rejection of claim 26 be withdrawn and claim 26 allowed.

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 9-11 depend from independent claim 1 via intervening claim 2. Hunter and Aanestad fail to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 1 and dependent claims 2-3, and further, in view of the preceding arguments. Therefore, claims 9-11 should be allowable as depending from an allowable base claim.

Claims 9-11 further distinguishes over the cited references and draws attention to a significant deficiency in the combination of Ochampaugh with Bardi and Wendte. The Final Office Action states, as pertaining to claim 9, "Hunter discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle (117); a seed delivery tube (114); a seed hopper (146); a seed meter (117); storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube; transferring the seed from the seed hopper to the seed meter [col 6, ln 18 to col 7, ln 67]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]. However, Hunter does not appear to teach further providing a seed drop tube and delivering the seed from the seed meter to the seed drop tube. Aanestad is provided. Aanestad teaches a seed treater that delivers treated seeds from a seed hopper to the ground via a flexible conduit (seed drop tube) [Fig. 2; 0013]. It would have been obvious to one of ordinary skill in the art to further provide a seed drop tube to a seed treater so as to precisely guide the treated seed to a

specific location on the agricultural ground”. Final Office Action of 02/16/2022, p. 8, lines 1-11. Hunter is directed to a commercial (off-planter) seed treater. Noticeably absent from Hunter is any reference to or the actual use of the word “planter” because Hunter is directed to “[p]lant breeding, plant product development, plant product characterization, and plant product commercialization processes [requiring], for each genotype or breeding line, the creation of a large number of seed samples from a bulk or composite seed sample”. col. 1, lines 15-21. One skilled in the art would not look to Hunter for a prescriptive seed treatment method of calculated planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter. Therefore, contrary to the contention in the Final Office Action, “[i]t would [not] have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]”. Final Office Action of 02/16/2022, p. 7, lines 4-7.

One skilled in the art would not look to Aanestad for a prescriptive seed treatment method of calculated planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter. Aanestad discloses a Seed Treatment Device “wherein the treatment of the seed takes place within the seedbox itself under pressure thereby enabling uniform treatment of the seed [underline emphasis added]”. [Title; Abstract]. Moreover, the bulk Seed Treatment Device of Aanestad would not be looked to, contrary to the contention in the Final Office Action (p. 8, lines 8-11), for Applicant’s prescriptive seed treatment method of calculating planting of a generated combination by applying a selected amount of seed-

applied substance to a seed with a planter.

Claims 9-11 further distinguish over the cited references. The Final Office Action contends that “Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube [Fig. 2; 0013] (where one could modify the flexible tubing 132 as similarly with the flexible seed drop conduit of Aanestad to deliver seeds to the ground)” and “Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper; and the seed meters [Fig. 2; col 6, ln 18 to col 7, ln 67].” Final Office Action of 02/16/2022, p. 8, lines 12-17. However, Aanestad teaches that seed is treated “within the seed box itself under pressure [underline emphasis added]” (p. 1, para. 0001) before passing into the receiving cup 12 and the flexible conduit 16 (p.1, para. 0004; p. 1, para. 0006; p. 1, para. 0013; p. 1, para. 0015).

In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of claims 9-11.

Claims 19 and 22-24 depend from independent claim 17, which is allowable over the Bardi, Wendte, and Ochampaugh for at least the reasons set forth above as to claim 17 and further under the 35 U.S.C. § 103 heading. Therefore, claims 19 and 22-24 should be allowable by dependency upon an allowable base claim.

Moreover, Hunter is directed to a commercial (off-planter) seed treater. Noticeably absent from Hunter is any reference to or the actual use of the word “planter” because Hunter is directed to “[p]lant breeding, plant product development, plant product characterization, and plant product commercialization processes [requiring], for

each genotype or breeding line, the creation of a large number of seed samples from a bulk or composite seed sample”. col. 1, lines 15-21. One skilled in the art would not look to Hunter for a prescriptive method for seed treatment that, during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition. Therefore, contrary to the contention in the Final Office Action, “[i]t would [not] have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]”. Final Office Action of 02/16/2022, p. 8, lines 4-7.

One skilled in the art would not look to Aanestad for a prescriptive method for seed treatment that, during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition. Aanestad discloses a Seed Treatment Device “wherein the treatment of the seed takes place within the seedbox itself under pressure thereby enabling uniform treatment of the seed [underline emphasis added]”. [Title; Abstract] Moreover, the bulk Seed Treatment Device of Aanestad would not be looked to, contrary to the contention in the Final Office Action, for Applicant’s prescriptive method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition.

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further

in view of Reineccius [US 20120183675]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 18-21 depend from independent claim 17, an allowable base claim that distinguishes over Bardi, Wendte, and Ochampaugh for the above-provided reasons. Reineccius fails to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 17, and further, in view of the preceding arguments. Therefore, claims 18-21 should be allowable as depending from an allowable base claim.

The Final Office Action argues that “Reineccius discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0023-0024], wherein Reineccius allows to reduce the delay between seed treatment and planting [0024]”. Final Office Action of 02/16/2022, p. 9, lines 17-20. Bardi discloses that, “[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected [underline emphasis added]” (col. 6, lines 5-7), and module type based a variety of planting situations requires “the farmer to change the cart after usage” (col. 3, lines 19-21). In view of the foregoing, the combination fails to teach the step of adjusting a mixture ratio of the seed-applied substance during operation of the planter as claim 21 recites. Therefore, Applicant respectfully requests that the 35 U.S.C. § 103 rejection of claim 21 be withdrawn and claim 21 allowed.

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 20 depends from independent claim 17, an allowable base claim that distinguishes over Bardi, Wendte, and Ochampaugh for the above-provided reasons. Borstmayer does not remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 17. Therefore, claim 20 should be allowable as depending from an allowable base claim.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911]. This rejection is respectfully traversed.

Bardi in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 15-16 depend from independent claim 1 via intervening claims 15 and 16, respectively. Ochampaugh2 fails to remedy all the deficiencies identified above in Bardi and identified in the combination of Bardi, Wendte, and Ochampaugh as to independent claim 1 and dependent claims 2-3, and further, in view of the preceding arguments. Therefore, claims 15-16 should be allowable as depending from an allowable base claim.

Claims 15-16 further distinguish over the cited references and draws attention to

a significant deficiency in the combination of Ochampaugh with Bardi and Wendte. The Final Office Action states, as pertaining to claims 15-16, “Ochampaugh2 discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: calculating seed flow timing; both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path [0035-0036] although Ochampaugh2 does not explicitly teach using a timing mechanism, since the prior art teaches timing the seed flow, it would have been obvious to one of ordinary skill to use a mechanism for recording timing the seed flow in order to calculate and time the seed flow precisely. It would have been obvious to one of ordinary skill in the art to time the seed flow as taught by Ochampaugh2 so that the applicator can determine the amount of treatment to be applied to reach a proper application rate of the seeds [0035]”. Final Office Action of 02/16/2022, p. 10, lines 14-23.

Bardi discloses that “in-line mixing chamber 22 is provided with a spiral baffle 25 positioned along the interior wall 16a of a tube 16 that induces mixing with reduced pressure drops and reduced potential for damage to the carried seed particles. The central portion 26 of the spiral baffle 25 is open, allowing the central path of the chamber 22 to be clear. The spiral baffle 25 induces a rotational motion into the flow of the seed particles which pulls the air stream and the particles to the wall area 23 of the mixing chamber 22. The seed particles tend to roll along the wall 23 of the chamber 22 following the baffle 25 in a spiral trajectory. The treatment fluid is injected into the chamber at an injection point 24 such that it flows in a relatively wide stream along the

wall 23 and follows the same path as the rolling particles, enabling the seed particles to roll in the stream of treatment fluid and, thereby, become coated by the treatment material [underline emphasis added]". col. 5, lines 49-65. The "in-line mixing chamber 22" of Bardi is for mixing seed and treatment fluid, but not applying a selected amount of the seed-applied substance to a seed. Furthermore, Bardi admits that a selected amount of seed-applied substance cannot all be applied to a seed since "[d]ue to the centrifugal pull of the seed particle motion, the portion of the air passing straight through the open center of the chamber 22 does not carry a significant number of particles. In testing, the particles have been found to be treated with good uniformity, thus substantially all of the particles are carried along the wall 23 of the chamber 22. The rotary motion of the particles tends to pull the air stream towards the wall 23; thus most of the air travels along the baffle 25 with the particles [underline emphasis added]." col. 6, lines 27-36. Thus, "treating of the small volume of seeds" (col. 3, lines 30-31) results in at least a portion of the air traveling through the open center of the chamber carrying particles whereas the other particles are being carried along the wall of the chamber, which begs the question, "Which portion of the selected amount of seed-applied substance that is supposed to be applied to the seed, is stuck to a surface of the baffles and/or side wall of the tube or discharged through the open center?". Further complicating the issue, Bardi discloses that, "[t]he injection point 24 is located in the top of the module 22; however, the exact location of the injection point 24 will vary with mixing module type and the treatment fluid to be injected" (col. 6, lines 5-7), which is critical since, [t]he selected distance 27 has an impact on the width of the stream of fluid. If the injection point 24 is too close to the interior wall 23 of the chamber 22, the

stream will be too narrow because the air does not interact sufficiently with the stream to force the treatment fluid to spread out” (col. 6, lines 19-24). Therefore, calculating the timing of the seed treatment and seed flow as taught by the combination of references does not teach that timing results in a determined amount of seed-applied substance being applied to a seed.

In view of the foregoing, it is abundantly clear that the teachings in Ochampaugh² do not remedy Bardi and do not provide a combination of disclosure that makes obvious Applicant’s prescriptive seed treatment method of claims 15-16. Therefore, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of claims 15-16.

Claim Rejections - 35 USC § 102/103

Claim(s) 28-31 is/are rejected under 35 U.S.C. 102(a1) as anticipated by or, in the alternative, under 35 U.S.C. 103 as obvious over Kinzenbaw [US 20150059629]. This rejection is respectfully traversed.

Kinzenbaw discloses a seed tape planter where the seed is carried and enclosed within the tape which is planted in soil. Kinzenbaw states “that insecticide, fertil-izer, and/or other seed treatments or refuge could be added to the seed tape.” ¶ 0183. Applicant’s term “combination” includes “one or more types and/or one or more amounts of seed-applied substances that are applied to a seed.” p. 11, lines 19-20. Kinzenbaw teaches “seed treatments...added to the seed tape’ whereas Applicant claims “seed-applied substances” that are applied to the seed. In view of the foregoing, Applicant respectfully requests the 35 U.S.C. § 102/103 rejection be withdrawn and claims 28-31

be allowed.

New Claims

Claims 32-34 are new. No new matter has been added.

Independent claim 32 is directed to a prescriptive seed treatment method with steps directed, in part, to “selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location at least in part by selecting a type of seed-applied substance and selecting an amount of the selected seed-applied substance to be applied to the seed; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location at least in part by: delivering an amount of the selected seed-applied substance from the substance receptacle to the substance applicator, wherein the delivered amount is calculated to enable the substance applicator to apply the selected amount of the selected seed-applied substance to the seed; and the substance applicator providing the delivered amount for applying the selected amount of the selected seed-applied substance to the seed at the seed drop tube; and planting the combination of the seed and seed-applied substance; wherein the combination of seed and seed-applied substance can vary as the planter changes locations within the field.”

Claim 33 depends from claim 32 and recites, in part, “the step of selecting a type of seed-applied substance and selecting an amount of the selected seed-applied substance to be applied to the seed further comprises selecting one or more types of seed-applied substances and selecting an amount for each of the selected one or more types of seed-applied substances to be applied to the seed; wherein the step of

delivering an amount of the selected seed-applied substance from the substance receptacle to the substance applicator, wherein the delivered amount is calculated to enable the substance applicator to apply the selected amount of the selected seed-applied substance to the seed further comprises delivering the amounts of the selected seed-applied substances from one or more substance receptacles to one or more substance applicators, wherein the delivered amounts are calculated to enable the one or more substance applicators to apply the selected amounts of the selected seed-applied substances to the seed; and wherein the step of the substance applicator providing the delivered amount for applying the selected amount of the selected seed-applied substance to the seed at the seed drop tube further comprises the one or more substance applicators providing the delivered amounts for applying the selected amounts of the selected seed-applied substances to the seed at the seed drop tube.”

Independent claim 34 is directed to a prescriptive seed treatment method with steps directed, in part, to “prescriptively selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location at least in part by applying a microscale amount of the seed-applied substance to the seed; and planting the combination of the seed and seed-applied substance within a field; wherein generating the combination is both generated immediate to planting to minimize handling of the combination and can vary as the planter changes locations within the field.”

The cited reference do not teach or make obvious new claims 32-34.

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

This amendment accompanies the filing of a subsequent Request for Continued Examination (RCE). Please charge Deposit Account No. 506801 the amount of \$1,000 (small) for the RCE per the attached transmittal. This is a request for a three month extension of time, the small entity fee of \$740 for which is being paid at the time of filing this response. Please charge Deposit Account 506801 the amount of \$480 for the two additional independent claims and \$150 for the one additional dependent claim. Please grant any extensions of time required to enter this response. No additional fees are believed due; however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to fees to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: August 16, 2022

By: /KYLE S. COLEMAN/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	10/06/2022	EXAMINER	
Goodhue, Coleman & Owens, P.C. 12951 University Ave Suite 201 Clive, IA 50325			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			10/06/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

Continuation of Disposition of Claims* 7) Claim(s) is/are rejected: 1-34

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/16/22 has been entered.

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 102/103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim(s) 1 is/are rejected under 35 U.S.C. 102(a1) as anticipated by or, in the alternative, under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398].

Claim 1: Wilkerson teaches a seed treatment method [abstract] comprising the steps of providing a planter [0023], a seed and a seed-applied substance (fluid dispensing) [0022-0023]; calculating a location where the seed will be planted by the planter (target location) [0031]; selecting based at least in part on a condition (e.g. seed release rate or travel time) a combination of seed and applied substance to plant at the location [0029-0030; 0033, 0036]; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location (before seed reaches target location) [0031] planting the combination of the seed and seed-applied substance [0031-0032]. It would have been inherent or obvious to one of ordinary skill in the art that the seed will at least be partially coated or treated with the liquid prior to falling in the furrow.

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398] in view of Wendte [US 20150223391].

Claim 1: Wilkerson teaches a seed treatment method [abstract] comprising the steps of providing a planter [0023], a seed and a seed-applied substance (fluid dispensing) [0022-0023]; calculating a location where the seed will be planted by the planter (target location) [0031]; selecting based at least in part on a condition (e.g. seed release rate or travel time) a combination of seed and applied substance to plant at the location [0029-0030; 0033, 0036]; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location (before seed reaches target location) [0031] planting the combination of the seed and seed-applied substance [0031-0032]. However Wilkerson does not appear to teach calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied

substance. Wendte is provided. Wendte teaches an automatic planting system which include a seed metering system that can be controlled at each row units to selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map [abstract]. Wendt further teaches seed location is managed based upon characteristic(s) of the zone in the agricultural field [0011]. It would have been obvious to one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Wilkerson in order to optimize yield and planting throughput [0006-0008; abstract]. And although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt using the seed treatment system of Wilkerson to improve seed planting throughput and reduce special handling.

Claim(s) 2-8, 13-14, 17, 21, 25-31 and 34 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101].

Teaching of the prior art is aforementioned, but does not appear to teach every specific detail of producing the seed prescription or varying the seed applied substance. Ochampaugh is provided.

Claims 2 and 28: Ochampaugh teaches the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [0032]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path (hopper tank, hopper tank evacuation mechanism, [0034]), a seed flow path and a substance applicator

(seed treating system of Wilkerson) [0029-0033]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [0034]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path (seed treating system of Wilkerson) [0029-0033].

Claims 3 and 29: Wendt teaches wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance [0043]; generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles [Ochampaugh 0032]; selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance [Wendt, 0009]; and delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter [Wendt, 0009, 0011].

Claims 4 and 30: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type of type of seed-applied substance [0011; 0051].

Claims 5 and 31: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type [0051].

Claim 6: Wendt teaches wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substance in the at least two of the plurality of seed receptacles [0051].

Claim 7: wherein the combination of seed and seed applied substance varies based at least in part on one of the following: a type of seed, a type of the seed-applied substance, and an application rate of the seed-applied substance [Wendt, 0051; Ochampaugh, 0048].

Claim 8: wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location [Wendt 0006; Ochampaugh, 0032, 0048], generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance [Wendt, 0006; Ochampaugh, 0032, 0048].

Claim 13: Wendt discloses the method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises: inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance [0046].

Claim 14: Ochampaugh discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a metering device; and metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device [0031-0034].

Claim 17: Ochampaugh discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller [0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from

the substance receptacle into the substance flow path [0030]; Wilkerson teaches transferring the seed from the seed receptacle into the seed flow path [0029-0033]; and applying the seed-applied substance to the seed within the seed flow path [0029-0033], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract].

Claim 21: Ochampaugh discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0057].

Claim 25: Ochampaugh discloses the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles [0010].

Claim 26: Wendt discloses the method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either: always the same amount of seed-applied substance; or only either one specific amount of seed-applied substance or no amount of the seed-applied substance [0043].

Claim 27: Ochampaugh discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed [0023].

Claim 34: Wilkerson teaches minimizing the amount of material applied between seeds [0006]; where it would have been obvious to one of ordinary skill in the art to optimize the amount to be in the microscale so as to reduce the amount of waste as suggested by Wilkerson [0025].

Claim(s) 32-33 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claims 2 and 28 above, and further in view of Knake [US 4356934].

Teaching of the prior art is aforementioned, but does not appear to teach the substance applicator providing the delivered amount for applying the selected amount of selected seed-applied substance to the seed at the seed drop tube. Knake is provided.

Claim 32: Knake teaches spraying treatment onto the seed at the seed drop tube [Fig. 6]. It would have been obvious to one of ordinary skill in the art to modify the treatment applicator to apply the treatment at the seed drop tube so as to better control the coating of the seeds for planting [col 3, ln 25-51].

Claim 33: Ochampaugh discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller [0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from the substance receptacle into the substance flow path [0030]; Wilkerson teaches transferring the seed from the seed receptacle into the seed flow path [0029-0033]; and applying the seed-applied substance to the seed within the seed flow path [0029-0033], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract].

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 9. Hunter and Aanestad are provided.

Claim 9: Hunter discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle (112), a seed delivery tube (114), a seed hopper (146), a seed meter (117); storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via a seed delivery tube; transferring the seed from the seed hopper to the seed meter [col 6, ln 18 to col 7, ln 67]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]. However, Hunter does not appear to teach further providing a seed drop tube and delivering the seed from the seed meter to the seed drop tube. Aanestad is provided. Aanestad teaches a seed treater that delivers treated seeds from a seed hopper to the ground via a flexible conduit (seed drop tube) [Fig. 2; 0013]. It would have been obvious to one of ordinary skill in the art to further provide a seed drop tube to a seed treater so as to precisely guide the treated seed to a specific location on the agricultural ground.

Claim 10: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube [Fig. 2; 0013] (where one could modify the flexible tubing 132 as similarly with the flexible seed drop conduit of Aanestad to deliver seeds to the ground).

Claim 11: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters [Fig. 2; col 6, ln 18 to col 7, ln 67].

Claim 19: Hunter and Aanestad teaches further comprising the steps of: providing a seed hopper configured to receive the seed from the seed receptacle; transferring the seed into the seed hopper; and applying the seed-applied substance to the seed within the seed hopper [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 22: Hunter and Aanestad discloses the method of Claim 17 further comprising the step of: providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 23: Hunter and Aanestad discloses the method of Claim 22 wherein the substance applicator is associated with at least one of: a) a mixer in fluid communication with the substance receptacle and the substance flow path; b) a seed hopper configured to receive the seed from the seed receptacle; c) a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and d) the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 24: Hunter and Aanestad discloses the method of Claim 18 further comprising the steps of: providing a seed drop tube that is part of the seed flow path; transferring the seed into the seed drop tube; and applying the seed-applied substance to the seed proximate to or within the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 18.

Claim 18: Reineccius discloses the method of Claim 2 further comprising the steps of: providing a mixer (agitator) in fluid communication with the substance receptacle and the substance flow path; and mixing the seed-applied substance prior to the seed-applied substance being applied to the seed [Fig. 1; 0041]. It would have been obvious to one of ordinary skill in the art to further provide a mixer in

fluid communication with the substance receptacle and substance flow path, so as to further hold and thoroughly mix the chemical formulations [0073].

Claim 21: Reineccius discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0023-0024], wherein Reineccius allows to reduce the delay between seed treatment and planting [0024].

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 20. Borstmayer is provided.

Claim 20: Borstmayer discloses the method of Claim 18 further comprising the steps of: providing a seed meter configured to receive the seed from the seed hopper and transfer the seed further through the seed flow path; transferring the seed into the seed meter; and applying the seed-applied substance to the seed within the seed meter (two diameter metering screw is effective way to accurately meter, mix seed and liquid treatment and to discharge material to seeder) [col 1, ln 30-45]. It would have been obvious to one of ordinary skill in the art to mix the seed applied substance to the seed in the seed meter as suggested Borstmayer, so as to provide an effective way to accurately meter, mix seed and liquid treatment together to be delivered to the seeder.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 15-16. Ochampaugh2 is provided.

Claims 15 and 16: Ochampaugh2 discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: calculating seed flow timing, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path [0035-0036] although Ochampaugh2 does not explicitly teach using a timing mechanism, since the prior art teaches timing the seed flow, it would have been obvious to one of ordinary skill in the art to use a mechanism for recording timing the seed flow in order to calculate and time the seed flow precisely. It would have been obvious to one of ordinary skill in the art to time the seed flow as taught by Ochampaugh2 so that the applicator can determine the amount of treatment to be applied to reach a proper application rate of the seeds [0035].

Response to Arguments

Applicant's arguments with respect to claim(s) 1-34 have been considered but are moot because the new ground of rejection does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in the argument.

Conclusion

Claims 1-34 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached Monday to Friday 1:00PM to 4:00PM PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

<i>Notice of References Cited</i>	Application/Control No. 15/739,606		Applicant(s)/Patent Under Reexamination Smith et al.	
	Examiner MANDY C LOUIE		Art Unit 1715	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20080202398-A1	08-2008	Wilkerson; John B.	A01C7/06	111/118
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20220930



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	02/07/2023		
Goodhue, Coleman & Owens, P.C. 12951 University Ave Suite 201 Clive, IA 50325			EXAMINER LOUIE, MANDY C	
			ART UNIT 1715	PAPER NUMBER
			NOTIFICATION DATE 02/07/2023	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@apcoll.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 15/739,606	Applicant(s) Smith et al.		
	Examiner MANDY C LOUIE	Art Unit 1715	AIA (First Inventor to File) Status Yes	Page 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
MANDY C LOUIE	Primary Examiner	Telephonic
Kyle Coleman	Attorney of Record	

Date of Interview: 20 December 2022

Issues Discussed:

35 U.S.C. 103

12/20/22 First interview was conducted regarding how applicant's invention distinguishes over the prior art of record. Particularly, applicant's representative argued how Wilkerson does not teach generating the combination of seed and seed-applied substance prior to combination being planted, and argues Wilkerson teaches treating the seed after being dropped in the soil. It was argued by the examiner that teachings of Wilkerson suggests the possibility of treatment being sprayed prior to the seed being dropped to the ground when seed and treatment are directed to targeted location. No agreement was reached at 12/20/22 interview; hence, it was suggested by the examiner to seek at least a third consultation on the discussion. The findings from the third consultation was discussed with the applicant's representative in a follow up interview on 1/31/23, where the examiner reaffirmed that the scope of the present claim would still be read by Wilkerson. However, it was suggested by the examiner to distinguish over Wikerson (and other furrow applications) a limitation of not applying substance to the soil during the seed applying step would be helpful. Applicant's representative indicated amendments might be possible to include such language to specify the seed flow path (and removing the terms "approximately"). Another suggestion by the examiner was to include more structure of when or where the seed is treated in the system, and that the seeds are treated in a singular or singulated manner. It was also indicated that the term "planting" has a broad scope, where one of ordinary skill in the art can interpret topping the seeds with soil is considered "planting" rather than a simple drop to the soil from the planter. Other suggestions to further distinguish the applicant's claims over other potential prior art (such as air seeders) includes describing the micro amount of substance being applied to the seed and/or nozzle or application structure being used to coat the seeds. Examiner also provided relevant references US 20200323126 and US 20160374260. It was noted that these suggestions by the examiner would require further search and consideration. There was no agreement reached in the follow-up interview.

/MANDY C LOUIE/ Primary Examiner, Art Unit 1715	
<p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

<i>Applicant-Initiated Interview Summary</i>	Application No. 15/739,606	Applicant(s) Smith et al.		
	Examiner MANDY C LOUIE	Art Unit 1715	AIA (First Inventor to File) Status Yes	Page 2 of 2

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of: Smith et al.	Confirmation No. 7148
Application No. 15/739,606	Group Art Unit: 1715
Filing Date: December 22, 2017	Examiner: Mandy C LOUIE
For: System and Method for Prescriptive Seed Treatment	

AMENDMENT

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

VIA EFS-WEB

Commissioner:

In reply to the Office Action mailed October 6, 2022, the shortened statutory period for response to which expires on January 6, 2023 and extends through April 6, 2023, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims in this paper.

Remarks follow the amendments section of this paper.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Claim 1 (Original): A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed, and a seed-applied substance;
calculating a location where the seed will be planted by the planter;
selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location;
generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and
planting the combination of the seed and seed-applied substance.

Claim 2 (Original): The method of Claim 1 wherein:
the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed;
the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:
(a) providing a substance receptacle, a substance flow path, a seed flow path and a substance applicator;
(b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator;
and

- (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path.

Claim 3 (Original): The method of Claim 1 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance;

generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles;

selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance; and

delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter.

Claim 4 (Original): The method of Claim 1 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type or type of seed-applied substance.

Claim 5 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to

plant at the location further comprises selecting a seed type.

Claim 6 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 7 (Original): The method of Claim 1 wherein the combination of seed and seed-applied substance varies based at least in part on one of the following: a type of the seed, a type of the seed-applied substance, and an application rate of the seed-applied substance.

Claim 8 (Original): The method of Claim 1 wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance.

Claim 9 (Original): The method of Claim 2 further comprising the steps of:
providing a seed receptacle, a seed delivery tube, a seed hopper, a seed meter, and
a seed drop tube;
storing the seed in the seed receptacle;
transferring the seed from the seed receptacles to the seed hopper via the seed

delivery tube;
transferring the seed from the seed hopper to the seed meter; and
delivering the seed from the seed meter to the seed drop tube.

Claim 10 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube.

Claim 11 (Original): The method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters.

Claim 12 (Original): The method of Claim 2 wherein the substance applicator comprises a nozzle to spray the seed-applied substance onto the seed as the seed passes through the seed flow path.

Claim 13 (Original): The method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises:

inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and
wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance.

Claim 14 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

providing a metering device; and

metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device.

Claim 15 (Original): The method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises:

providing a timing mechanism; and

calculating, with the timing mechanism, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path.

Claim 16 (Original): The method of Claim 3 wherein the step of delivering the selected combination of seed and seed-applied substance from the selected seed receptacle further comprises at least two of the following:

providing a metering device and a timing mechanism;

metering flow of the selected combination of seed and seed-applied substance from the one of the plurality seed receptacles with the metering device; and

calculating, with the timing mechanism, a time for the selected combination of seed and seed-applied substance to be delivered from the one of the plurality of seed receptacles and planted by the planter.

Claim 17 (Previously presented): A method for seed treatment on a planter, the method comprising the steps of:

providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller;

determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller;

transferring the seed-applied substance from the substance receptacle into the substance flow path;

transferring the seed from the seed receptacle into the seed flow path; and

applying the seed-applied substance to the seed within the seed flow path,

wherein the amount of the seed-applied substance is based, at least in part, on a condition.

Claim 18 (Previously presented): The method of Claim 17 further comprising the steps of:

providing a mixer in fluid communication with the substance receptacle and the substance flow path; and

mixing the seed-applied substance prior to the seed-applied substance being applied

to the seed.

Claim 19 (Original): The method of Claim 17 further comprising the steps of:
providing a seed hopper configured to receive the seed from the seed receptacle;
transferring the seed into the seed hopper; and
applying the seed-applied substance to the seed within the seed hopper.

Claim 20 (Original): The method of Claim 18 further comprising the steps of:
providing a seed meter configured to receive the seed from the seed hopper and
transfer the seed further through the seed flow path;
transferring the seed into the seed meter; and
applying the seed-applied substance to the seed within the seed meter.

Claim 21 (Original): The method of Claim 17 further comprising the step of:
adjusting a mixture ratio of the seed-applied substance during operation of the
planter.

Claim 22 (Original): The method of Claim 17 further comprising the step of:
providing a substance applicator in fluid connection with the substance receptacle, the
substance applicator adapted to prescriptively treat the seed.

Claim 23 (Original): The method of Claim 22 wherein the substance applicator is
associated with at least one of:

- a. a mixer in fluid communication with the substance receptacle and the substance flow path;
- b. a seed hopper configured to receive the seed from the seed receptacle;
- c. a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and
- d. the seed drop tube.

Claim 24 (Original): The method of Claim 18 further comprising the steps of:
providing a seed drop tube that is part of the seed flow path;
transferring the seed into the seed drop tube; and
applying the seed-applied substance to the seed proximate to or within the seed drop tube.

Claim 25 (Original): The method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles.

Claim 26 (Original): The method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either:
always the same amount of seed-applied substance; or
only either one specific amount of seed-applied substance or no amount of the seed-applied substance.

Claim 27 (Original): The method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed.

Claim 28 (Currently amended): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed, and a seed-applied substance;

calculating a location where the seed will be delivered to the soil~~planted~~ by the planter;

selecting, based at least in part on a condition, a combination of seed and seed-applied substance to be delivered to the soil~~plant~~ at the location;

generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil~~planted~~ at the location;

delivering the combination of the seed and seed-applied substance to the soil at the location; and

~~planting the combination of the seed and seed-applied substance;~~

wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field.

Claim 29 (Previously presented): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field by changing the type, number or amount of one or more seed-applied substances applied to the seed when generating the combination of

the seed and seed-applied substance prior to the combination being planted at the location.

Claim 30 (Previously presented): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary based at least in part upon a seed-applied substance type, a number of seed-applied substances, or an amount of one or more seed-applied substances.

Claim 31 (Previously presented): The prescriptive seed treatment method of claim 28, wherein the combination of seed and seed-applied substance can vary based at least in part upon a seed type.

Claim 32 (Currently amended): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed drop tube, a substance receptacle, a substance applicator, a seed, and a seed-applied substance;

calculating a location where the seed will be delivered to the soil~~planted~~ by the planter;

selecting, based at least in part on a condition, a combination of seed and seed-applied substance to be delivered to the soil~~plant~~ at the location at least in part by selecting a type of seed-applied substance and selecting an amount of the selected seed-applied substance to be applied to the seed;

generating the combination of the seed and seed-applied substance prior to the

combination being planted at the location at least in part by:

delivering an amount of the selected seed-applied substance from the substance receptacle to the substance applicator, wherein the delivered amount is calculated to enable the substance applicator to apply the selected amount of the selected seed-applied substance to the seed; and

the substance applicator providing the delivered amount for applying the selected amount of the selected seed-applied substance to the seed for creating the combination of the seed and seed-applied substance between a discharge of at the seed drop tube and the soil; and

planting-delivering the combination of the seed and seed-applied substance to the soil;

wherein the combination of seed and seed-applied substance can vary as the planter changes locations within the field.

Claim 33 (Previously presented): The prescriptive seed treatment method of claim 32, wherein:

the step of selecting a type of seed-applied substance and selecting an amount of the selected seed-applied substance to be applied to the seed further comprises selecting one or more types of seed-applied substances and selecting an amount for each of the selected one or more types of seed-applied substances to be applied to the seed;

wherein the step of delivering an amount of the selected seed-applied substance from

the substance receptacle to the substance applicator, wherein the delivered amount is calculated to enable the substance applicator to apply the selected amount of the selected seed-applied substance to the seed further comprises delivering the amounts of the selected seed-applied substances from one or more substance receptacles to one or more substance applicators, wherein the delivered amounts are calculated to enable the one or more substance applicators to apply the selected amounts of the selected seed-applied substances to the seed; and

wherein the step of the substance applicator providing the delivered amount for applying the selected amount of the selected seed-applied substance to the seed at the seed drop tube further comprises the one or more substance applicators providing the delivered amounts for applying the selected amounts of the selected seed-applied substances to the seed at the seed drop tube.

Claim 34 (Currently amended): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed, and a seed-applied substance;

calculating a location where the seed will be delivered to the soil~~planted~~ by the planter;

prescriptively selecting, based at least in part on a condition, a combination of seed and seed-applied substance for delivering to the soil to plant at the location;

generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil~~planted~~ at the location at least in part by

applying a microscale amount of the seed-applied substance to the seed; and
~~planting~~ delivering the combination of the seed and seed-applied substance to the soil
within a field at the location;
wherein generating the combination is both generated immediate to being delivered to
the soil~~planting~~ to minimize handling of the combination and can vary as the
planter changes locations within the field.

Claim 35 (New): A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed drop tube, a substance receptacle, a substance applicator, a
seed, and a seed-applied substance;
calculating a location where the seed will be delivered to the soil by the planter;
selecting, based at least in part on a condition, a combination of seed and seed-applied
substance to deliver to the soil at the location at least in part by selecting a type of
seed-applied substance and selecting an amount of the selected seed-applied
substance to be applied to the seed;
discharging the selected seed-applied substance from the substance applicator;
discharging the seed from the seed drop tube;
applying the selected seed-applied substance to the seed for generating the combination of
the seed and seed-applied substance prior to the combination being delivered to the
soil for planting; and
delivering the combination of the seed and seed-applied substance to the soil;
wherein the combination of seed and seed-applied substance can vary as the planter
changes locations within the field.

REMARKS

In the Office Action, the Examiner took the following actions:

- I. Claim(s) 1 is/are rejected under 35 U.S.C. 102(a1) as anticipated by or, in the alternative, under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398];
- II. Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398] in view of Wendte [US 20150223391];
- III. Claim(s) 2-8, 13-14, 17, 21, 25-31 and 34 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101];
- IV. Claim(s) 32-33 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claims 2 and 28 above, and further in view of Knake [US 4356934];
- V. Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091];
- VI. Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and

Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675];

VII. Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679]; and

VIII. Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911].

The Office Action may contain statements characterizing the related art and/or the claims. Regardless of whether any such statement is expressly identified and/or discussed herein, Applicant reserves the right to disagree with any such statement or characterization in the Office Action.

Applicant amends claims 28, 32, 34 without prejudice or disclaimer of its subject matter. Specifically, independent claims 28, 32, and 34 are amended to further distinguish the cited art. Claim 35 is new. No new matter has been added. Claims 1-35 remain pending and under examination. For at least the following reasons, Applicant respectfully requests reconsideration and withdrawal of the rejections.

SUMMARY OF THE EXAMINER'S INTERVIEW

The undersigned attorney thanks the Examiner for the courtesy extended during

the interview of December 20, 2022. The Examiner's summary sets forth a summary of the interview along with further commentary by the Examiner. Although it can reasonably be read as such, Applicant seeks to clarify that the following statement in the interview summary "It was also indicated that the term 'planting' has a broad scope, where one of ordinary skill in the art can interpret topping the seeds with soil is considered 'planting' rather than a simple drop to the soil from the planter" was posited to Applicant's representative by the Examiner.

Claim Rejections - 35 USC § 102/103

Claim(s) 1 is/are rejected under 35 U.S.C. 102(a1) as anticipated by or, in the alternative, under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398]. This rejection is respectfully traversed.

Independent claim 1 is directed to a prescriptive seed treatment method and recites the steps of, "providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance". The Non-Final Office Action states that "generating the combination of the seed and seed-applied substance prior to the combination being planted at the location (before seed reaches target location) [0031] planting the combination of the seed and seed-applied substance [0031-0032]. It would have been inherent or obvious to one of ordinary skill in the art that the seed will at least

be partially coated or treated with the liquid prior to falling in the furrow.”. Non-Final Office Action of 10/6/2022, p. 3, lines 7-11. Wilkerson does not support the Office Action’s interpretation and application of Wilkerson against the cited claim language. In fact, Wilkerson teaches against the arguments made in the Office Action. For example, Wilkerson teaches that the “target location TL where fluid F contacts soil” [0069] is located in the furrow as shown in Figs 2 and 10. Regarding FIG. 2, Wilkerson states that “[s]ystem 200 can be attached to mobile farm equipment. System 200 can position and space one or more seeds 202 at predetermined distances apart along the length of a furrow 204 as the farm equipment moves in the direction of direction arrow x. System 200 can also dispense a discrete volume of fluid F onto and/or near each seed 202 positioned in furrow 204 [underline emphasis added.” para. 0027. Further explaining paragraph 0027 and FIG. 2, Wilkerson continues, “[a]s stated above, system 200 can dispense a discrete volume of fluid F onto or near each seed 202. System 200 can time the release of fluid F from fluid dispenser FD such that fluid F is released on and/or near each seed 202 in furrow 204. Fluid dispenser FD is shown in FIG. 2 spraying fluid F onto furrow 204 just after application of fluid F to seeds 202 in furrow 204 [underline emphasis added].” para. 0030. Regarding FIG. 2, Wilkerson states, “[i]n addition, control system CONT can communicate with fluid dispenser FD for providing control signals to dispense fluid F on and/or near each seed 202 placed in furrow 204 [underline emphasis added].” para. 0031. Continuing in paragraph 0031, Wilkerson states, “[t]he predetermined time can be set such that fluid dispenser FD deposits fluid F on and/or near each seed S as it reaches a target location, generally designated TL”, which Wilkerson teaches that the “target location TL where fluid F contacts soil” [0069]

is located in the furrow as shown in FIG. 2. Wilkerson summarizes the teachings in paragraphs 0031-0032 stating, “[t]he result is that fluid F is deposited directly on one or more seeds 202 positioned in the furrow 204 [underline emphasis added].” para 0032. In view of the foregoing, Wilkerson fails to disclose the recited limitations in claim 1. Moreover, Wilkerson teaches against the Non-Final Office Action’s interpretation and application of the teachings in Wilkerson, as applied to claim 1. In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 102 rejection and allowance of independent claim 1.

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398] in view of Wendte [US 20150223391]. This rejection is respectfully traversed.

Independent claim 1 is directed to a prescriptive seed treatment method and recites the steps of, “providing a planter, a seed, and a seed-applied substance; calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location; and planting the combination of the seed and seed-applied substance”. The Final Office Action states that “Wilkerson does not appear to teach calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance”. Non-Final Office Action of 10/6/2022, p. 3, lines

21-23. To cure the deficient teachings of Wilkerson, the Non-Final Office Action argues that “Wendte teaches an automatic planting system which include a seed metering system that can be controlled at each row units to selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map [abstract]. Wendt further teaches seed location is managed based upon characteristic(s) of the zone in the agricultural field [0011]. It would have been obvious to one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Wilkerson in order to optimize yield and planting throughput [0006-0008; abstract]. And although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt using the seed treatment system of Wilkerson to improve seed planting throughput and reduce special handling.” Non-Final Office Action of 10/6/2022, p. 4, lines 1-12. Applicant respectfully traverses the argument that Wendte remedies the deficient teachings of Wilkerson and that the combination would be obvious to one or ordinary skill in the art. Lastly, as to claim 1, the Non-Final Office Action argues “[a]nd although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt[e] using the seed treatment system of Wilkerson to improve seed planting throughput and reduce special handling”. Non-Final Office Action of 10/6/2022, p. 4, lines 10-12. Applicant

respectfully traverses the argument that the combination of Wendte using the seed treatment of Wilkerson generates a prescription (combination) and would have been obvious to one of ordinary skill in the art. The combination of Wilkerson and Wendte does not cure the deficient teachings of Wilkerson; and, therefore cannot be obvious for the following reasons and those further provided under the 35 U.S.C. § 102 heading above.

Moreover, Wendte describes a field map as being a tool that agricultural technology solutions can use to set targets for agricultural technology solutions. The teachings in Wendte do not change the in-furrow chemicals application of Wilkerson. Here too, even if adding a field map as described by Wendte enabled Wilkerson to set targets (e.g., know what amounts or substances to apply in particular zones of a field), such would not change Wilkerson's in-furrow chemicals application and operations as set forth above. Wilkerson still would not teach or generate the selected combination of seed and seed-applied substance prior to the combination being planted at the location based at least in part on a condition when combined with the teachings of Wendte. In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 1.

Claim(s) 2-8, 13-14, 17, 21, 25-31 and 34 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101]. This rejection is respectfully traversed.

Ochampaugh fails to remedy all the deficiencies identified above in Wilkerson

and identified in the combination of Wikerson and Wendte as to independent claim 1, and further, in view of the preceding arguments. Therefore, claims 2-8, 13-14, and 25-27 should be allowable as depending from an allowable base claim.

Independent claim 17 is directed to a method for seed treatment on a planter and recites the steps of “providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller; transferring the seed-applied substance from the substance receptacle into the substance flow path; transferring the seed from the seed receptacle into the seed flow path; and applying the seed-applied substance to the seed within the seed flow path, wherein the amount of the seed-applied substance is based, at least in part, on a condition”. The Non-Final Office Action argues, as to independent claim 17, that “Ochampaugh discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller [0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from the substance receptacle into the substance flow path [0030]; Wikerson teaches transferring the seed from the seed receptacle into the seed flow path [0029-0033]; and applying the seed-applied substance to the seed within the seed flow path [0029-0033], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract].” Applicant respectfully

traverses the combination of Wilkerson, Wendte, and Ochampaugh and the argument that the combination using the seed treatment of Wilkerson would have been obvious to one of ordinary skill in the art to arrive at a method for seed treatment, that during operation of a planter, applies a determined amount of seed-applied substance to the seed within the seed flow path based on a condition. Such obviousness cannot stand given that Wilkerson discloses “systems and methods for in-furrow application chemicals for improving in-furrow chemical application” and can be summarized from the arguments presented above in Wilkerson own words, “[t]he result is that fluid F is deposited directly on one or more seeds 202 positioned in the furrow 204 [underline emphasis added].” para 0032. In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 17.

Claim 21 depends from independent claim 17 and should be allowable by dependency from an allowable base claim.

Independent claim 28 has been amended to recite, in part, “calculating a location where the seed will be delivered to the soil by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to be delivered to the soil at the location; generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil at the location; delivering the combination of the seed and seed-applied substance to the soil at the location; and wherein the combination of seed and seed-applied substance can vary as the planter changes location within the field.” The teachings in Wilkerson describing “systems and methods for in-furrow application chemicals for improving in-furrow chemical application” can be summarized from the arguments presented above in

Wilkerson own words, “[t]he result is that fluid F is deposited directly on one or more seeds 202 positioned in the furrow 204 [underline emphasis added].” para 0032. Therefore, Wilkerson does not teach or make obvious claim 28 describing a combination of seed and seed-applied substance being generated before being delivered to the soil. Ochampaugh fails to remedy all the deficiencies identified above in Wilkerson and identified in the combination of Wilkerson and Wendte. In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 28.

Independent claim 34 has been amended to recite, in part, “calculating a location where the seed will be delivered to the soil by the planter; prescriptively selecting, based at least in part on a condition, a combination of seed and seed-applied substance for delivering to the soil to plant at the location; generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil at the location at least in part by applying a microscale amount of the seed-applied substance to the seed; and delivering the combination of the seed and seed-applied substance to the soil within a field at the location; wherein generating the combination is both generated immediate to being delivered to the soil to minimize handling of the combination and can vary as the planter changes locations within the field.” The teachings in Wilkerson describing “systems and methods for in-furrow application chemicals for improving in-furrow chemical application” can be summarized from the arguments presented above in Wilkerson own words, “[t]he result is that fluid F is deposited directly on one or more seeds 202 positioned in the furrow 204 [underline

emphasis added].” para 0032. Therefore, Wilkerson does not teach or make obvious claim 34 describing a combination of seed and seed-applied substance being generated before being delivered to the soil. Ochampaugh fails to remedy all the deficiencies identified above in Wilkerson and identified in the combination of Wilkerson and Wendte. In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 34.

Claim(s) 32-33 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claims 2 and 28 above, and further in view of Knake [US 4356934]. This rejection is respectfully traversed.

Independent claim 32 has been amended to recite, in part, “calculating a location where the seed will be delivered to the soil by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to be delivered to the soil at the location at least in part by selecting a type of seed-applied substance and selecting an amount of the selected seed-applied substance to be applied to the seed; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location at least in part by: delivering an amount of the selected seed-applied substance from the substance receptacle to the substance applicator, wherein the delivered amount is calculated to enable the substance applicator to apply the selected amount of the selected seed-applied substance to the seed; and the substance applicator providing the delivered amount for applying the selected amount of the selected seed-applied substance to the seed for creating the combination of the seed and seed-applied substance between a

discharge of the seed drop tube and the soil; and delivering the combination of the seed and seed-applied substance to the soil; wherein the combination of seed and seed-applied substance can vary as the planter changes locations within the field.” The teachings in Wilkerson describing “systems and methods for in-furrow application chemicals for improving in-furrow chemical application” can be summarized from the arguments presented above in Wilkerson own words, “[t]he result is that fluid F is deposited directly on one or more seeds 202 positioned in the furrow 204 [underline emphasis added].” para 0032. Therefore, Wilkerson does not teach or make obvious claim 33 describing a combination of seed and seed-applied substance being generated between a discharge of the seed drop tube and the soil and the generated combination being delivered to the soil. The combination of Wendte, Ochampaugh, and Knake fails to remedy all the deficiencies identified above in Wilkerson and identified in the combination of Wikerson and Wendte. In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of independent claim 32.

Claim 33 depends from independent claim 32 and should be allowable as depending from an allowable base claim.

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091]. This rejection is respectfully traversed.

Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for

the reasons set forth above and must be withdrawn. Claims 9-11 depend from independent claim 1 via intervening claim 2. Claims 19 and 22-24 depend from independent claim 17. Hunter and Aanestad fail to remedy all the deficiencies identified above in Wilkerson and identified in the combination of Wilkerson, Wendte and Ochampaugh as to independent claim 1 and independent claim 17, and further, in view of the preceding arguments. Therefore, claims 9-11, 19, and 22-24 should be allowable as depending from an allowable base claim.

Claim 9 further distinguishes over the cited references and draws attention to a significant deficiency in the combination of Wilkerson with Wendte, Ochampaugh, and in further view of Hunter and Aanestad. The Non-Final Office Action states, as pertaining to claim 9, "Hunter discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle (117); a seed delivery tube (114); a seed hopper (146); a seed meter (117); storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via the a seed delivery tube; transferring the seed from the seed hopper to the seed meter [col 6, ln 18 to col 7, ln 67]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]. However, Hunter does not appear to teach further providing a seed drop tube and delivering the seed from the seed meter to the seed drop tube. Aanestad is provided. Aanestad teaches a seed treater that delivers treated seeds from a seed hopper to the ground via a flexible conduit (seed drop tube) [Fig. 2; 0013]. It would have been obvious

to one of ordinary skill in the art to further provide a seed drop tube to a seed treater so as to precisely guide the treated seed to a specific location on the agricultural ground”. Non-Final Office Action of 10/6/2022, p. 8, lines 1-14. Hunter is directed to a commercial (off-planter) seed treater. Noticeably absent from Hunter is any reference to or the actual use of the word “planter” because Hunter is directed to “[p]lant breeding, plant product development, plant product characterization, and plant product commercialization processes [requiring], for each genotype or breeding line, the creation of a large number of seed samples from a bulk or composite seed sample”. col. 1, lines 15-21. One skilled in the art would not look to Hunter for a prescriptive seed treatment method of calculated planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter. Therefore, contrary to the contention in the Non-Final Office Action, “[i]t would [not] have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]”. Non-Final Office Action of 10/6/2022, p. 7, lines 7-9.

One skilled in the art would not look to Aanestad for a prescriptive seed treatment method of calculated planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter. Aanestad discloses a Seed Treatment Device “wherein the treatment of the seed takes place within the seedbox itself under pressure thereby enabling uniform treatment of the seed [underline emphasis added]”. [Title; Abstract]. Moreover, the bulk Seed Treatment Device of Aanestad would not be looked to, contrary to the contention in the Non-Final

Office Action (p. 9, lines 8-11), for Applicant's prescriptive seed treatment method of calculating planting of a generated combination by applying a selected amount of seed-applied substance to a seed with a planter.

Claims 10-11 further distinguish over the cited references. The Final Office Action contends that "Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube [Fig. 2; 0013] (where one could modify the flexible tubing 132 as similarly with the flexible seed drop conduit of Aanestad to deliver seeds to the ground)" and "Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper; and the seed meters [Fig. 2; col 6, ln 18 to col 7, ln 67]." Non-Final Office Action of 10/6/2022, p. 9, lines 15-17. However, Aanestad teaches that seed is treated "within the seed box itself under pressure [underline emphasis added]" (p. 1, para. 0001) before passing into the receiving cup 12 and the flexible conduit 16 (p.1, para. 0004; p. 1, para. 0006; p. 1, para. 0013; p. 1, para. 0015).

In view of the foregoing, Applicant respectfully requests withdrawal of the 35 U.S.C. § 103 rejection and allowance of claims 9-11.

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675]. This rejection is respectfully traversed.

Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for

the reasons set forth above and must be withdrawn. Claims 18-21 depend from independent claim 17, an allowable base claim that distinguishes over Wilkerson, Wendte, and Ochampaugh for the above-provided reasons. Reineccius fails to remedy all the deficiencies identified above in Wilkerson and identified in the combination of Wilkerson, Wendte, and Ochampaugh as to independent claim 17, and further, in view of the preceding arguments. Therefore, claims 18-21 should be allowable as depending from an allowable base claim.

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679]. This rejection is respectfully traversed.

Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claim 20 depends from independent claim 17, an allowable base claim that distinguishes over Wilkerson, Wendte, and Ochampaugh for the above-provided reasons. Borstmayer does not remedy all the deficiencies identified above in Wilkerson and identified in the combination of Wilkerson, Wendte, and Ochampaugh as to independent claim 17. Therefore, claim 20 should be allowable as depending from an allowable base claim.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911]. This rejection is respectfully traversed.

Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 fails for the reasons set forth above and must be withdrawn. Claims 15-16 depend from independent claim 1 via intervening claims 15 and 16, respectively. Ochampaugh2 fails to remedy all the deficiencies identified above in Wilkerson and identified in the combination of Wilkerson, Wendte, and Ochampaugh as to independent claim 1 and dependent claims 2-3, and further, in view of the preceding arguments. Therefore, claims 15-16 should be allowable as depending from an allowable base claim.

New Claims

Claim 35 is new. No new matter has been added.

Independent claim 35 is directed to a prescriptive seed treatment method with steps directed, in part, to “selecting, based at least in part on a condition, a combination of seed and seed-applied substance to deliver to the soil at the location at least in part by selecting a type of seed-applied substance and selecting an amount of the selected seed-applied substance to be applied to the seed; discharging the selected seed-applied substance from the substance applicator; discharging the seed from the seed drop tube; applying the selected seed-applied substance to the seed for generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil for planting; and delivering the combination of the seed and seed-applied substance to the soil; wherein the combination of seed and seed-applied substance can vary as the planter changes locations within the field.”

The cited reference do not teach or make obvious new claim 35. For example, the teachings in Wilkerson describing “systems and methods for in-furrow application

chemicals for improving in-furrow chemical application” can be summarized from the arguments presented above in Wilkerson own words, “[t]he result is that fluid F is deposited directly on one or more seeds 202 positioned in the furrow 204 [underline emphasis added].” para 0032. Therefore, Wilkerson does not teach or make obvious “generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil for planting and delivering the combination of the seed and seed-applied substance to the soil”. No combination of the cited references cures the deficiency in the teachings in Wilkerson. In view of the foregoing, Applicant respectfully requests allowance of independent claim 35.

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

This is a request for a three month extension of time, the small entity fee of \$592 for which is being paid at the time of filing this response. Please charge Deposit Account 506801 the amount of \$192 for the one additional independent claim and \$40 for the additional claim. Please grant any extensions of time required to enter this response. No additional fees are believed due; however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to fees to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: April 6, 2023

By: /Kyle S. Coleman/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888

Notice of References Cited	Application/Control No. 15/739,606		Applicant(s)/Patent Under Reexamination Smith et al.	
	Examiner MANDY C LOUIE		Art Unit 1715	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-5931882-A	08-1999	Fick; Douglas L.	A01C23/007	172/4
*	B	US-4356934-A	11-1982	Knake; Raymond P.	A01C1/06	47/DIG.9
*	C	US-20020104262-A1	08-2002	Muhr, Blaine	A01C1/06	47/57.6
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20230822



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	08/29/2023	EXAMINER	
Goodhue, Coleman & Owens, P.C. 12951 University Ave Suite 201 Clive, IA 50325			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			08/29/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim(s) 1 is/are rejected under 35 U.S.C. 102(a1) under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398].

Claim 1: Wilkerson teaches a seed treatment method [abstract] comprising the steps of providing a planter [0023], a seed and a seed-applied substance (fluid dispensing) [0022-0023]; calculating a location where the seed will be planted by the planter (target location) [0031]; selecting based at least in part on a condition (e.g. seed release rate or travel time) a combination of seed and applied substance to plant at the location [0029-0030; 0033, 0036]; generating the combination of the

seed and seed-applied substance prior to the combination being planted at the location (before seed reaches target location) [0031; 0032] planting the combination of the seed and seed-applied substance [0031-0032]. It would have been obvious to one of ordinary skill in the art in light of Wilkerson teaching the predetermined time can be selected to be greater than or less than time for the seed to reach target location, that in one option the seed will at least be partially coated or treated with the liquid prior to falling in the furrow as it is traveling to the target location.

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398] in view of Wendte [US 20150223391].

Claim 1: Wilkerson teaches a seed treatment method [abstract] comprising the steps of providing a planter [0023], a seed and a seed-applied substance (fluid dispensing) [0022-0023]; calculating a location where the seed will be planted by the planter (target location) [0031]; selecting based at least in part on a condition (e.g. seed release rate or travel time) a combination of seed and applied substance to plant at the location [0029-0030; 0033, 0036]; generating the combination of the seed and seed-applied substance prior to the combination being planted at the location (before seed reaches target location) [0031] planting the combination of the seed and seed-applied substance [0031-0032]. However Wilkerson does not appear to teach calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance. Wendte is provided. Wendte teaches an automatic planting system which include a seed metering system that can be controlled at each row units to selectively plant different types of varieties of seed based on seed type or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map [abstract]. Wendt further teaches seed location is managed based upon characteristic(s) of the zone in the agricultural field [0011]. It would have been obvious to

one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Wilkerson in order to optimize yield and planting throughput [0006-0008; abstract]. And although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt using the seed treatment system of Wilkerson to improve seed planting throughput and reduce special handling.

Claim(s) 2-8, 13-14, 17, 21, 25-27 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101].

Teaching of the prior art is aforementioned, but does not appear to teach every specific detail of producing the seed prescription or varying the seed applied substance. Ochampaugh is provided.

Claims 2: Ochampaugh teaches the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting an amount of the seed-applied substance to be applied to the seed [0032]; the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: (a) providing a substance receptacle, a substance flow path (hopper tank, hopper tank evacuation mechanism, [0034]), a seed flow path and a substance applicator (seed treating system of Wilkerson) [0029-0033]; (b) delivering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator [0034]; and (c) using the substance applicator to apply the amount of the seed-applied substance to the seed within the seed flow path (seed treating system of Wilkerson) [0029-0033].

Claim 3: Wendt teaches wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a plurality of seed receptacles, wherein at least two of the plurality of seed receptacles contains a different combination of seed and seed-applied substance [0043]; generating the different combination of seed and seed-applied substance prior to placement into the at least two of the plurality of seed receptacles [Ochampaugh 0032]; selecting a seed receptacle from the plurality of seed receptacles containing the selected combination of seed and seed-applied substance [Wendt, 0009]; and delivering the selected combination of seed and seed-applied substance from the selected seed receptacle to be planted by the planter [Wendt, 0009, 0011].

Claim 4: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting at least one of a seed type of type of seed-applied substance [0011; 0051].

Claim 5: Wendt teaches wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a seed type [0051].

Claim 6: Wendt teaches wherein the different combination of seed and seed-applied substance comprises different seed types and different types of seed-applied substance in the at least two of the plurality of seed receptacles [0051].

Claim 7: wherein the combination of seed and seed applied substance varies based at least in part on one of the following: a type of seed, a type of the seed-applied substance, and an application rate of the seed-applied substance [Wendt, 0051; Ochampaugh, 0048].

Claim 8: wherein a controller can be used to calculate the location where the seed will be planted by the planter, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location [Wendt 0006; Ochampaugh, 0032, 0048], generate the

combination of the seed and seed-applied substance prior to the combination being planted at the location, or plant the combination of seed and seed-applied substance [Wendt, 0006; Ochampaugh, 0032, 0048].

Claim 13: Wendt discloses the method of Claim 3 wherein the step of selecting a seed receptacle from the plurality of seed receptacles containing a selected combination of seed and seed-applied substance further comprises: inputting a list of the different combinations associated with the at least two of the plurality of seed receptacles into a control system; and wherein the control system identifies the seed receptacle having the selected combination of seed and seed-applied substance [0046].

Claim 14: Ochampaugh discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: providing a metering device; and metering the amount of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator with the metering device [0031-0034].

Claim 17: Ochampaugh discloses a method for seed treatment on a planter, the method comprising the steps of: providing the planter having a seed receptacle having a seed, a substance receptacle having a seed-applied substance, a substance flow path, a seed flow path, and a controller [0032]; determining an amount of the seed-applied substance to be applied to the seed during operation of the planter with the controller [0032, 0048]; transferring the seed-applied substance from the substance receptacle into the substance flow path [0030]; Wilkerson teaches transferring the seed from the seed receptacle into the seed flow path [0029-0033]; and applying the seed-applied substance to the seed within the seed flow path [0029-0033], wherein Wendt teaches the amount of the seed-applied substance is based, at least in part, on the condition [abstract].

Claim 21: Ochampaugh discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0057].

Claim 25: Ochampaugh discloses the method of Claim 3 wherein the different combination of seed and seed-applied substance comprises different types of seed-applied substances in the at least two of the plurality of seed receptacles [0010].

Claim 26: Wendt discloses the method of Claim 2 wherein the amount of the type of the seed-applied substance to be applied to the seed is either: always the same amount of seed-applied substance; or only either one specific amount of seed-applied substance or no amount of the seed-applied substance [0043].

Claim 27: Ochampaugh discloses the method of Claim 2 wherein the step of selecting, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location further comprises selecting a type of the seed-applied substance to be applied to the seed [0023].

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 9. Hunter and Aanestad are provided.

Claim 9: Hunter discloses the method of Claim 2 further comprising the steps of: providing a seed receptacle (112), a seed delivery tube (114), a seed hopper (146), a seed meter (117); storing the seed in the seed receptacle; transferring the seed from the seed receptacles to the seed hopper via a seed delivery tube; transferring the seed from the seed hopper to the seed meter [col 6, ln 18 to col 7, ln

67]. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the seed treatment system of Hunter for an improved method treating portions of an initial seed sample and allow for flexibility to make treatment adjustments [col 2, ln 4-12]. However, Hunter does not appear to teach further providing a seed drop tube and delivering the seed from the seed meter to the seed drop tube. Aanestad is provided. Aanestad teaches a seed treater that delivers treated seeds from a seed hopper to the ground via a flexible conduit (seed drop tube) [Fig. 2; 0013]. It would have been obvious to one of ordinary skill in the art to further provide a seed drop tube to a seed treater so as to precisely guide the treated seed to a specific location on the agricultural ground.

Claim 10: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to the seed drop tube [Fig. 2; 0013] (where one could modify the flexible tubing 132 as similarly with the flexible seed drop conduit of Aanestad to deliver seeds to the ground).

Claim 11: Hunter discloses the method of Claim 9 wherein the seed-applied substance is applied to the seed proximate to at least one of the following: the seed delivery tubes, the seed receptacles, the seed hopper, and the seed meters [Fig. 2; col 6, ln 18 to col 7, ln 67].

Claim 19: Hunter and Aanestad teaches further comprising the steps of: providing a seed hopper configured to receive the seed from the seed receptacle; transferring the seed into the seed hopper; and applying the seed-applied substance to the seed within the seed hopper [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 22: Hunter and Aanestad discloses the method of Claim 17 further comprising the step of: providing a substance applicator in fluid connection with the substance receptacle, the substance applicator adapted to prescriptively treat the seed [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 23: Hunter and Aanestad discloses the method of Claim 22 wherein the substance applicator is associated with at least one of: a) a mixer in fluid communication with the substance receptacle and the substance flow path; b) a seed hopper configured to receive the seed from the seed

receptacle; c) a seed meter configured to receive the seed from the seed hopper and further transfer it through the seed flow path; and d) the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claim 24: Hunter and Aanestad discloses the method of Claim 18 further comprising the steps of: providing a seed drop tube that is part of the seed flow path; transferring the seed into the seed drop tube; and applying the seed-applied substance to the seed proximate to or within the seed drop tube [Fig. 2; col 6, ln 18 to col 7, ln 67 and Fig. 2; 0013].

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 18.

Claim 18: Reineccius discloses the method of Claim 2 further comprising the steps of: providing a mixer (agitator) in fluid communication with the substance receptacle and the substance flow path; and mixing the seed-applied substance prior to the seed-applied substance being applied to the seed [Fig. 1; 0041]. It would have been obvious to one of ordinary skill in the art to further provide a mixer in fluid communication with the substance receptacle and substance flow path, so as to further hold and thoroughly mix the chemical formulations [0073].

Claim 21: Reineccius discloses the method of Claim 17 further comprising the step of: adjusting a mixture ratio of the seed-applied substance during operation of the planter (configuring recipes and batches for seed treatment during real time) [0023-0024], wherein Reineccius allows to reduce the delay between seed treatment and planting [0024].

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 20. Borstmayer is provided.

Claim 20: Borstmayer discloses the method of Claim 18 further comprising the steps of: providing a seed meter configured to receive the seed from the seed hopper and transfer the seed further through the seed flow path; transferring the seed into the seed meter; and applying the seed-applied substance to the seed within the seed meter (two diameter metering screw is effective way to accurately meter, mix seed and liquid treatment and to discharge material to seeder) [col 1, ln 30-45]. It would have been obvious to one of ordinary skill in the art to mix the seed applied substance to the seed in the seed meter as suggested Borstmayer, so as to provide an effective way to accurately meter, mix seed and liquid treatment together to be delivered to the seeder.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911].

Teaching of the prior art is aforementioned, but does not appear to teach all the limitations of claim 15-16. Ochampaugh2 is provided.

Claims 15 and 16: Ochampaugh2 discloses the method of Claim 2 wherein the step of generating the combination of the seed and seed-applied substance prior to the combination being planted at the location further comprises: calculating seed flow timing, both delivery time of the seed-applied substance from the substance receptacle through the substance flow path to the substance applicator and the travel time of the seed through the seed flow path [0035-0036] although Ochampaugh2 does

not explicitly teach using a timing mechanism, since the prior art teaches timing the seed flow, it would have been obvious to one of ordinary skill in the art to use a mechanism for recording timing the seed flow in order to calculate and time the seed flow precisely. It would have been obvious to one of ordinary skill in the art to time the seed flow as taught by Ochampaugh² so that the applicator can determine the amount of treatment to be applied to reach a proper application rate of the seeds [0035].

Claim(s) 28-32, 34-35 is/are rejected under 35 U.S.C. 103 as being unpatentable over Knake [US 4356934] in view of Wilkerson and Wendt, and further in view of Fink [US 5931882].

Claim 28: Knake teaches an apparatus for spraying treating seeds during planting [abstract], wherein the method includes providing a planter, a seed and a seed applied substance [col 1, ln 65 to col 2, ln 45], and spraying the seed prior to being distributed to the soil (generating combination of seed and seed applied substance prior being delivered to the soil and delivering the combination of the seed and seed applied substance to the soil) [col 3, ln 25-50]. However, Knake does not appear to teach calculating a location where the seed will be delivered to the soil by the planter, selecting in part of a condition, a combination of seed and seed applied substance to be delivered to the soil location. Wilkerson and Wendt are provided.

Wilkerson teaches an on-board seed treatment planter system [abstract], also with the intent of reducing seed coating waste [0003-0004], where the system is managed by a control unit with the planter [abstract]. It would have been obvious to one of ordinary skill in the art to automate the method of Knake for depositing fluid onto the seed and delivering the treated seed to the soil with a control system as taught by Wilkerson so as to more efficiently and precisely treat the seed with seed applied substance since both prior art are directed to reducing waste [Knake, col 2, ln 60-65; Wilkerson, 0003-0004]. Wendt teaches an automatic planting system which include a seed metering system that can be controlled at each row units to selectively plant different types of varieties of seed based on seed type

or variety zones agricultural field, corresponding to field characteristics defined in a seed variety prescription map [abstract]. Wendt further teaches seed location is managed based upon characteristic(s) of the zone in the agricultural field [0011]. It would have been obvious to one of ordinary skill in the art to use an automatic planting system for calculating a location where the seed will be planted by the planter; selecting, based at least in part on a condition, a combination of seed and seed-applied substance to plant at the location; and planting the combination of the seed and seed-applied substance with the system of Wilkerson in order to optimize yield and planting throughput [0006-0008; abstract]. And although not explicit, it would have been obvious to one of ordinary skill in the art in light of the prior art to generate the prescription (combination) of Wendt using the seed treatment system of Knake and Wilkerson to improve seed planting throughput and reduce special or excessive handling. As for

However, the prior art does not appear to teach varying the seed applied substance for example as the planter changes locations. Fink is provided.

Fink teaches a multi-product application system, seed planting system and control are provided for dispensing of liquid or granular product in pre-select amounts [abstract]. Fink further teaches a grid recipe system for creating a recipe which defines amounts of each type of product to be applied to specific areas of the field and/or which defines a seed planting depths and frequencies for specific areas of the field [abstract]. It would have been obvious to one of ordinary skill in the art to vary the seed applied substance as the planter changes location using an automated system since Fink teaches each area can be designated with different recipe according to a grid recipe system due to different conditions of the area allowing for the best outcomes [col 1, ln 37-50].

Claims 29-31: Fink teaches changing the combination of the seed and seed applied substance as the planter changes location by changing the type, number or amount of one or more seed applied substances [col 2, ln 30-47; col 10, ln 35-65].

Claim 32: teaching of the prior art is aforementioned, wherein Knake further teaches providing a planter [abstract], seed drop tube (chute), a substance receptacle (storage container or tank 67), a substance applicator (nozzle 55) [col 5, ln 50-65], seed [col 3, ln 24-50] and seed applied substance (treating fluid) [col 3, ln 60-67], wherein Fink teaches changing the combination of the seed and seed applied substance as the planter changes location by changing the type, number or amount of one or more seed applied substances based upon the targeted area conditions [col 2, ln 30-47; col 10, ln 35-65].

Claim 34: Knake teaches applying an amount of seed applied substance to the seed is at low spray rates and reduce excessive amounts of relatively expensive treating material [col 2, ln 38-65]. Therefore, it would have been obvious to one of ordinary skill in the art to optimize the amount to be in the microscale so as to reduce the amount of waste as suggested by Knake.

Claim 35: teaching of the prior art is aforementioned, wherein Knake further teaches providing a planter [abstract], seed drop tube (chute), a substance receptacle (storage container or tank 67), a substance applicator (nozzle 55) [col 5, ln 50-65], seed [col 3, ln 24-50] and seed applied substance (treating fluid) [col 3, ln 60-67], wherein Fink teaches changing the combination of the seed and seed applied substance as the planter changes location by changing the type, number or amount of one or more seed applied substances based upon the targeted area conditions [col 2, ln 30-47; col 10, ln 35-65]. Knake further teaches discharging the selected seed applied substance from the substance applicator (nozzle) and discharging the seed from the seed drop tube (chute) [col 3; ln 25-67].

Claim 33 is/are rejected under 35 U.S.C. 103 as being unpatentable over Knake in view of Wilkerson and Wendt and Fink as applied to claim 32 above, and further in view of Muhr [US 20020104262].

Teaching of the prior art is aforementioned, but does not appear to teach calculating the amount of substance to be applied to the seed. Muhr is provided.

Claim 33: Muhr teaches controlling the amount and rate the liquid inoculant is supplied [0066].

It would have been obvious to one of ordinary skill in the art to control the amount of substance as suggested by Muhr so as to match the quantity required [0077].

Response to Arguments

Applicant's arguments filed 04/06/23 have been fully considered but they are not persuasive.

Regarding applicant's argument of Wilkerson teaching the opposite of the claimed language (pg 17-19 of filed remarks), particularly that Wilkerson teaches first depositing the fluid directly on one or more seeds positioned in the furrow, it is argued by the examiner that although Wilkerson teaches an example where the fluid is applied to the seed positioned in the furrow, Wilkerson also teaches the following alternative of predetermined time can be selected to be greater or less than the time for the seed to move from the sensed location to target location such that the fluid dispenser release fluid at a desired location near seed [0032]. As previously mentioned that Wilkerson teaches the fluid can be deposited and/or near each seed as it reaches a target location [0031], it would appear to the examiner that Wilkerson suggests by adjusting the predetermined time one of ordinary skill in the art could deposit the fluid with the seed in a number of ways, for example, depositing fluid onto the soil prior the seed reaching target location, depositing fluid onto the seed as the seed reaches the target location, depositing the fluid onto the seed simultaneously reaching the target location, and depositing fluid onto the seed after the seed reaches the target location. Hence, it would have been obvious to one of ordinary skill in the art to select depositing the fluid onto the seed simultaneously reaching the target location through routine experimentation and optimize the predetermined time so as to deposit at least a part of the fluid directly onto the seed for treatment. Therefore, rather than Wilkerson being limited to the specific examples such as depositing fluid when the seed is in the furrow as argued by applicant, it

would appear that the disclosed teachings of Wilkerson is open to other ways of depositing fluid with the seed as it is traveling to the target location.

Conclusion

Claims 1-35 are rejected.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached Monday to Friday 1:00PM to 4:00PM PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of: Smith et al.	Confirmation No.: 7148
Application No.: 15/739,606	Group Art Unit: 1715
Filing Date: December 22, 2017	Examiner: Mandy C LOUIE
For: System and Method for Prescriptive Seed Treatment	

PRE-APPEAL BRIEF REQUEST FOR REVIEW

In the Final Office Action, the Examiner rejected claim 1 under 35 U.S.C. 103 as being unpatentable over Wilkerson (US 2008/0202398), and further in view of Wendte (US 2015/0223391); the claims 2-11 and 13-27 rejected based on a combination of Wilkerson, Wendte, Ochampaugh (US 2013/0121101), and one of Hunter (US 7869902); Reineccius (US 2012/0183675); Borstmayer (US 6112679); and Ochampaugh2 (US 2012/0115911). Claim(s) 28-35 are rejected under 35 U.S.C. 103 as being unpatentable based on the combination of Knake (US 4356934), Wilkerson, Wendt, and (US 5931882). Applicant respectfully disagrees. Claim 1 recites “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location”; the Examiner’s reliance on Wilkerson for teaching this limitation is misplaced because the combination of the seed and seed-applied substance is not created prior to planting, and ignores the essential location of sprayed areas that are only in furrow, which is to say applied to the ground where the seed is resting, without distinction.

I. Wilkerson is non-analogous art for disclosing “generating the combination of the seed and seed-applied substance prior to the combination being planted.”

Wilkerson addresses inefficiencies in conventional in-furrow applications, where “protectant is sprayed in areas between the seeds 112” in a furrow, by developing systems and methods for in-furrow application chemicals for improving in-furrow

chemical application [underline emphasis added].” [0010]. To improve in-furrow applications, Wilkerson discloses “[s]ystem 202 [shown in FIG. 2] can dispense a discrete volume of fluid F onto and/or near each seed 202 positioned in furrow 204 [underline emphasis added].” [0027]. “System 200 can time the release of fluid F from fluid dispenser FD such that fluid F is released on and/or near each seed 202 in furrow 204. Fluid dispenser FD is shown in FIG. 2 spraying fluid F onto furrow 204 just after application of fluid F to seeds 202 in furrow 204 [underline emphasis added]. [0030] “In addition, control system CONT [shown in FIG. 2] can communicate with fluid dispenser FD for providing control signals to dispense fluid F on and/or near each seed 202 placed in furrow 204 [underline emphasis added].” [0031]. “During operation seed 202 can arrive at target location TL at the predetermined time after passing sensed location SL and receive fluid F. The result is that fluid F is deposited directly on one or more seeds positioned in furrow 204 [shown in FIG. 2; underline emphasis added].” [0032]. As for the other fluid dispensing system 300, shown in FIG. 3, Wilkerson discloses, “[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S (or fluid) by fluid dispenser FD [underline emphasis added].” [0041]. Because Wilkerson is non-analogous art for disclosing “generating a combination of seed and seed-applied substance prior to the combination being planted” as stated in Applicant’s Claim 1, the rejections are improper and should be withdrawn.

II. Wilkerson teaches directly away from “generating the combination of the seed and seed-applied substance prior to the combination being planted at the location”.

In applying Wilkerson, the Examiner argues the opposite and suggests “generating the combination of seed and seed-applied substance prior to the combination being planted

at the location (before seed reaches target location) [0031;0032]...would be obvious to one of ordinary skill in the art in light of Wilkerson teaching the predetermined time can be selected to be greater than or less than time for the seed to reach target location, that in one option the seed will at least be partially coated or treated with the liquid prior to falling in the furrow as it is traveling to the target location.” Office Action, p. 3. Wilkerson teaches directly away from the Examiner’s interpretation and application of Wilkerson against claim 1. Wilkerson discloses “fluid F is deposited directly on one or more seeds 202 positioned in furrow 204 [underline emphasis added].” [0032]. Wilkerson also discloses, describing FIG. 2, “spraying fluid F onto furrow 204 just after application of fluid F to seeds 202 in furrow 204 [underline emphasis added].” [0030]. Wilkerson further discloses, “[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S [underline emphasis added].” [0041]. Depositing fluid directly on a seed positioned in a furrow, spraying fluid onto the furrow just after application of fluid to a seed in the furrow and covering a seed in a furrow with spray, as disclosed in Wilkerson, teaches directly away from “generating the combination of seed and seed-applied substance prior to the combination being planted.”

The Examiner improperly reads out the furrow location of the seed when considering Wilkerson’s flexible time discussion. For example, Wilkerson also discloses controlling “[t]he pulse-width of the actuation signal...to produce a desired spray band length along the furrow 204.” [0035; FIG. 2 shows spray band length along the furrow.]. “[T]o dispense fluid F on and/or near each seed 202 placed in furrow 204 [0031]”, a “predetermined time can be selected to be greater than or less than the time for seed 202 to move from the sensed location SL to target location TL such that fluid dispenser FD releases fluid F at a desired location near seed [underline emphasis added].” [0032].

Depositing fluid F near the seed teaches directly away from Applicant's claimed "seed-applied substance" requiring fluid being applied directly on the seed and the step of "generating the combination of seed and seed-applied substance prior to the combination being planted" recited in claim 1. Because, contrary to the Examiner's contentions, Wilkerson teaches directly away from generating a combination of seed and seed-applied substance, the rejections are improper and should be withdrawn.

III. Examiner's suggestion or motivation for modifying the in-furrow disclosure of Wilkerson is based on impermissible hindsight reconstruction and is improper.

Wilkerson discloses depositing a seed in a furrow and treating the seed and area near the seed with fluid. Wilkerson does not disclose generating a combination of seed and seed-applied substance prior to the combination being planted. The Examiner's suggestion that the predetermined time in Wilkerson can be selected to partially coat or treat seed with liquid prior to falling in the furrow is unsupported. That the written description in Wilkerson discloses only in-furrow applications, as argued in Sections I and II above, is irrefutable. That FIG. 2 in Wilkerson discloses an in-furrow application, as argued in Sections I and II above, is also irrefutable. The Examiner cannot add to or modify the disclosure in Wilkerson to read on the claim limitations. The Examiner's argument is based on an improper understanding and application of FIG. 2 [see also FIG. 8 showing a perspective view of the system] in Wilkerson. Wilkerson discloses nozzle 214 trails behind the open bottom end 208 of the seed tube ST, and seed tube ST, nozzle 214 and seed 202 move in the direction of arrow x. [0027; 0029; 0067-0069]. Thus, "the horizontal component of seed velocity can be used with planter velocity (v_p) to calculate lateral displacement between the seed landing location and the reference [underline emphasis added]." [0068]. Because seed 202 is moving in the direction of

arrow x, seed 202 does not fall straight down or rearward into fluid F, but moves forward through a lateral displacement into furrow 204 [0069]. No modification of the predetermined time will change the fact that nozzle 214 always trails the open bottom end 208 of the seed tube ST, and seed 202 moving in the direction of arrow x has forward lateral displacement. Further, no modification of the predetermined time can change Wilkerson teaching that “fluid F is deposited directly on one or more seeds 202 positioned in furrow 204 [0032; underline emphasis added]” and “in FIG. 2 spray[s] fluid F onto furrow 204 just after application of fluid F to seeds 202 in furrow 204 [0030; underline emphasis added]”. Because the Examiner’s attempt to modify and read Wilkerson on the claim limitations as being obvious are unsupported, and because no modification of the predetermined time in Wilkerson can ever generate a combination of seed and seed-applied substance prior to the combination being planted, and notwithstanding the extent undertaken by the Examiner to exercise impermissible hindsight reconstruction of the reference, the rejections are improper and should be withdrawn.

In view of the foregoing, Applicant respectfully requests reconsideration of this application, withdrawal of all current rejections, and the timely allowance of the pending claims. Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: November 15, 2023
By: /Kyle S. Coleman/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	12/18/2023	EXAMINER	
Goodhue, Coleman & Owens, P.C.			LOUIE, MANDY C	
12951 University Ave			ART UNIT	PAPER NUMBER
Suite 201			1715	
Clive, IA 50325			NOTIFICATION DATE	DELIVERY MODE
			12/18/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@apcoll.com

Notice of Panel Decision from Pre-Appeal Brief Review	Application No. 15/739,606		Applicant(s) Smith et al.	
	Examiner MANDY C LOUIE		Art Unit 1715	AIA (FITF) Status Yes
	<p>This is in response to the Pre-Appeal Brief Request for Review filed <u>15 November 2023</u> .</p> <p>1. ☐ Improper Request - The Request is improper and a conference will not be held for the following reason(s):</p> <div style="margin-left: 20px;"> ☐ The Notice of Appeal has not been filed concurrent with the Pre-Appeal Brief Request. ☐ The request does not include reasons why a review is appropriate. ☐ A proposed amendment is included with the Pre-Appeal Brief request. ☐ Other: _____. </div> <p>The time period for filing a response continues to run from the receipt date of the Notice of Appeal or from the mail date of the last Office communication, if no Notice of Appeal has been received.</p> <p>2. ☒ Proceed to Patent Trial and Appeal Board - A Pre-Appeal Brief conference has been held. The application remains under appeal because there is at least one actual issue for appeal. Applicant is required to submit an appeal brief in accordance with 37 CFR 41.37. The time period for filing an appeal brief will be reset to be one month from mailing this decision, or the balance of the two-month time period running from the receipt of the notice of appeal, whichever is greater. Further, the time period for filing of the appeal brief is extendible under 37 CFR 1.136 based upon the mail date of this decision or the receipt date of the notice of appeal, as applicable.</p> <div style="margin-left: 20px;"> ☒ The panel has determined the status of the claim(s) is as follows: Claim(s) allowed: _____. Claim(s) objected to: _____. Claim(s) rejected: <u>1-35</u> . Claim(s) withdrawn from consideration: _____. </div> <p>3. ☐ Allowable application - A conference has been held. The rejection is withdrawn and a Notice of Allowance will be mailed. Prosecution on the merits remains closed. No further action is required by applicant at this time.</p> <p>4. ☐ Reopen Prosecution - A conference has been held. The rejection is withdrawn and a new Office action will be mailed. No further action is required by applicant at this time.</p>			
All participants:				
(1) <u>MANDY C LOUIE</u> .		(3) <u>Lee Visone</u> .		
(2) <u>Timothy Meeks</u> .		(4) _____.		
/MANDY C LOUIE/ Primary Examiner, Art Unit 1715	/TIMOTHY H MEEKS/ Supervisory Patent Examiner, Art Unit 1715	/LEE A VISONE/ Quality Assurance Specialist, OPQA		

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (01-22)

Approved for use through 05/31/2024. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL (Submitted Only via EFS-Web)

Application Number	15/739,606	Filing Date	2017-12-22	Docket Number (if applicable)	P11431US00_NP	Art Unit	1715
First Named Inventor	Steven P. Smith			Examiner Name	Mandy C LOUIE		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.

Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☐ Other _____

☒ Enclosed

☒ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

☒ The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No. 506801

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

Doc code: RCEX

Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (01-22)

Approved for use through 05/31/2024. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Kyle S. Coleman/	Date (YYYY-MM-DD)	2024-02-29
Name	Kyle S. Coleman	Registration Number	66257

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Attorney Docket No.
P11431US00_NP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of: Smith et al.	Confirmation No. 7148
Application No. 15/739,606	Group Art Unit: 1715
Filing Date: December 22, 2017	Examiner: Mandy C LOUIE
For: System and Method for Prescriptive Seed Treatment	

**AMENDMENT ACCOMPANYING REQUEST FOR CONTINUED EXAMINATION
(RCE)**

Mail Stop RCE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

VIA EFS-WEB

Commissioner:

In reply to the Final Office Action mailed August 29, 2023, a Request for Continued Examination has been submitted. With due respect, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims in this paper.

Remarks follow the amendments section of this paper.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-35 (Cancelled).

Claim 36 (New): A prescriptive seed treatment method comprising the steps of:
providing a planter, a seed drop tube, a substance receptacle, a substance applicator,
a seed, and a seed-applied substance;
calculating a location within a field where the seed will be delivered to the soil by the
planter;
selecting, based at least in part on a condition, a combination of the seed and the
seed-applied substance to be delivered to the soil by the planter at least in part
by selecting a type of seed-applied substance and calculating a desired
application amount of the selected type of the seed-applied substance to be
applied to and carried by the seed to the soil;
generating the combination of the seed and seed-applied substance prior to the
combination being delivered to the soil at least in part by:
delivering an amount of the selected type of the seed-applied substance from
the substance receptacle to the substance applicator, wherein the
delivered amount of the selected type of the seed-applied substance is
greater than the desired application amount of the selected type of the
seed-applied substance and calculated to enable the substance
applicator to apply the desired application amount of the selected type of

the seed-applied substance to the seed; and

the substance applicator providing the delivered amount of the selected type of the seed-applied substance for applying the desired application amount of the selected type of the seed-applied substance to the seed for creating the combination of the seed and seed-applied substance between a discharge of the seed drop tube and prior to delivery of the combination of the seed and the seed-applied substance to the soil for planting; and

delivering the combination of the seed and the selected type of the seed-applied substance to the soil at the calculated location within the field for planting;

wherein the type of the seed-applied substance, the desired application amount of the selected type of the seed-applied substance, and the delivered amount of the selected type of the seed-applied substance can vary as the planter changes locations within the field.

Claim 37 (New): The prescriptive seed treatment method of claim 36, further comprising:

calculating an application efficiency of the substance applicator to apply the selected type of the seed-applied substance to the seed at the desired application amount of the selected type of the seed-applied substance for calculating the delivered amount of the selected type of the seed-applied substance.

Claim 38 (New): The prescriptive seed treatment method of claim 36, further comprising:

calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance, wherein the range comprises a maximum amount of the selected type of the seed-applied substance and a minimum amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance.

Claim 39 (New): The prescriptive seed treatment method of claim 36, wherein the desired amount of the selected type of seed-applied substance is determined by calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance, wherein the range comprises a maximum amount of the selected type of the seed-applied substance and a minimum amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance; and wherein the amount delivered to the seed is between the minimum and maximum amounts.

Claim 40 (New): The prescriptive seed treatment method of claim 39, wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance is based on the recommended label rate of the selected type of the

seed-applied substance.

Claim 41 (New): The prescriptive seed treatment method of claim 39, wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance is based on a location within the field where the seed will be planted.

Claim 42 (New): The prescriptive seed treatment method of claim 39, wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance can vary based on the selected type of seed-applied substance.

Claim 43 (New): The prescriptive seed treatment method of claim 36, wherein the seed comprises a microscale surface area for carrying the desired application amount of the selected type of the seed-applied substance and the desired application amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed-applied substance calculated for generating the combination of the seed and seed-applied substance by applying the selected seed-applied substance directly to the microscale surface area of the seed.

Claim 44 (New): The prescriptive seed treatment method of claim 36, wherein the seed comprises a microscale surface area for carrying the desired application amount of the selected type of the seed-applied substance and the delivered amount of the

selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed-applied substance calculated for generating the combination of the seed and seed-applied substance.

Claim 45 (New): A prescriptive seed treatment method comprising the steps of:

providing a planter, a substance applicator, a seed having a microscale surface area,
and a seed-applied substance;

calculating a location within a field where the seed will be delivered to the soil by the planter;

prescriptively selecting, based at least in part on a condition and the calculated location within the field, a combination of the seed and one or more types of the seed-applied substance for delivering to the soil to plant at the location within the field;

calculating a microscale application amount of the selected one or more types of the seed-applied substance to be applied to and carried on the seed to the soil within the field;

generating the combination of the seed and the selected one or more types of the seed-applied substance prior to the combination being delivered to the soil at the location at least in part by the substance applicator applying the microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed; and

delivering the combination of the seed and the selected one or more types of the

seed-applied substance to the soil within a field at the calculated location;
wherein the selected one or more types of the seed-applied substance and the
microscale amount of the selected one or more types of the seed-applied
substance can vary as the planter changes locations within the field.

Claim 46 (New): The prescriptive seed treatment method of claim 45, further
comprising:

providing one or more substance receptacles plumbed in fluid communication on the
planter with the substance applicator;

delivering the selected one or more types of the seed-applied substance from the one
or more substance receptacles to the substance applicator in time for
generating the combination at the location within the field prior to delivering the
combination to the soil.

Claim 47 (New): The prescriptive seed treatment method of claim 45, further
comprising:

delivering an amount of the selected one or more types of the seed-applied substance
from one or more substance receptacles to the substance applicator, wherein
the delivered amount of the selected one or more types of the seed-applied
substance is greater than the microscale application amount of the selected
one or more types of the seed-applied substance and calculated to enable the
substance applicator to apply the microscale application amount of the

selected one or more types of the seed-applied substance to the microscale surface area of the seed.

Claim 48 (New): The prescriptive seed treatment method of claim 45, further comprising:

varying the one or more types of the seed-applied substance, the microscale application amount of the selected one or more types of the seed-applied substance, and the delivered amount of the selected one or more types of the seed-applied substance as the planter changes locations within the field.

Claim 49 (New): The prescriptive seed treatment method of claim 45, further comprising:

calculating an application efficiency of the substance applicator to apply the selected one or more types of the seed-applied substance to the seed at the microscale application amount of the selected one or more types of the seed-applied substance for calculating the delivered amount of the selected one or more types of the seed-applied substance.

Claim 50 (New): A prescriptive seed treatment method, comprising:

providing a planter for planting a seed in soil within a field, a seed delivery mechanism, a substance receptacle, a substance applicator, a seed-applied substance, a seed flow path beginning at a discharge of the seed delivery

mechanism and terminating just prior to the soil, a seed-applied substance flow path originating from the substance applicator, and an intersection of the seed flow path and seed-applied substance flow path, wherein the substance applicator is disposed at the discharge of the seed delivery mechanism and includes a discharge oriented toward the seed flow path to provide the intersection of the seed flow path and the seed-applied substance flow path after discharge of the seed from the discharge of the seed delivery mechanism and before the seed contacts the soil;

selecting, based at least in part on a condition and a position of the planter within the field, a combination of the seed and the seed-applied substance at least in part by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance;

generating the combination of the seed and the selected type of the seed-applied substance within the seed flow path at least in part by:

delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator into the seed-applied substance flow path, wherein the delivered amount of the selected type of the seed-applied substance into the seed-applied substance flow path is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-

applied substance flow path to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path; and
delivering the combination of the seed and the selected type of the seed-applied substance to the soil for planting.

Claim 51 (New): The prescriptive seed treatment method of claim 50, further comprising:

delivering the desired application amount of the selected type of the seed-applied substance to the seed at the intersection of the seed flow path and seed-applied substance flow path before the seed contacts the soil.

Claim 52 (New): The prescriptive seed treatment method of claim 50, further comprising:

optimizing the delivered amount of the selected type of the seed-applied substance at the intersection of the seed flow path and seed-applied substance flow path with an optimized discharge pattern of the selected type of the seed-applied substance for optimizing the desired application amount of the selected type of the seed-applied substance applied to the seed within the seed flow path.

Claim 53 (New): The prescriptive seed treatment method of claim 50, further comprising:

selecting a spray pattern for the discharge of the substance applicator based on at least one of a type of the seed, a size of the seed, or a shape of the seed to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-applied substance flow path for the spray pattern to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path.

REMARKS

In the Final Office Action, the Examiner took the following actions:

- I. Claim(s) 1 is/are rejected under 35 U.S.C. 102(a1) under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398];
- II. Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398] in view of Wendte [US 20150223391];
- III. Claim(s) 2-8, 13-14, 17, 21, 25-27 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101];
- IV. Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091];
- V. Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675];
- VI. Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and

Ochampaugh as applied to claim 2 or 3 above, and further
in view of Borstmayer [US 6112679];

VII. Claims 15-16 is/are rejected under 35 U.S.C. 103 as being
unpatentable over Wilkerson in view of Wendt and
Ochampaugh as applied to claim 2 or 3 above, and further
in view of Ochampaugh2 [US 20120115911];

VIII. Claim(s) 28-32, 34-35 is/are rejected under 35 U.S.C. 103
as being unpatentable over Knake [US 4356934] in view of
Wilkerson and Wendt, and further in view of Fink [US
5931882]; and

IX. Claim 33 is/are rejected under 35 U.S.C. 103 as being
unpatentable over Knake in view of Wilkerson and Wendt
and Fink as applied to claim 32 above, and further in view
of Muhr [US 20020104262].

The Final Office Action may contain statements characterizing the related art
and/or the claims. Regardless of whether any such statement is expressly identified
and/or discussed herein, Applicant reserves the right to disagree with any such
statement or characterization in the Final Office Action.

Applicant cancels claims 1-35 without prejudice or disclaimer of its subject matter
to pursue the canceled claims in one or more continuing applications. Claims 36-53 are
new. No new matter has been added. Claims 36-53 remain pending and under
examination. For at least the following reasons, Applicant respectfully requests
reconsideration, withdrawal of the rejections, and allowance of new claims 36-53.

Claim Rejections - 35 USC § 103

Claim(s) 1 is/are rejected under 35 U.S.C. 102(a1) under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398]. This rejection is respectfully traversed.

Claim(s) 1 is/are rejected under 35 U.S.C. 103 as obvious over Wilkerson [US 20080202398] in view of Wendte [US 20150223391]. This rejection is respectfully traversed.

Claim(s) 2-8, 13-14, 17, 21, 25-27 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt as applied to claim 1 above, and further in view of Ochampaugh [US 20130121101]. This rejection is respectfully traversed.

Claims 9-11, 19, 22-24 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Hunter [US 7869902] and Aanestad [US 20150250091]. This rejection is respectfully traversed.

Claims 18-21 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Reineccius [US 20120183675]. This rejection is respectfully traversed.

Claim 20 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Borstmayer [US 6112679]. This rejection is respectfully traversed.

Claims 15-16 is/are rejected under 35 U.S.C. 103 as being unpatentable over Wilkerson in view of Wendt and Ochampaugh as applied to claim 2 or 3 above, and further in view of Ochampaugh2 [US 20120115911]. This rejection is respectfully

traversed.

Claim(s) 28-32, 34-35 is/are rejected under 35 U.S.C. 103 as being unpatentable over Knake [US 4356934] in view of Wilkerson and Wendt, and further in view of Fink [US 5931882]. This rejection is respectfully traversed.

Claim 33 is/are rejected under 35 U.S.C. 103 as being unpatentable over Knake in view of Wilkerson and Wendt and Fink as applied to claim 32 above, and further in view of Muhr [US 20020104262]. This rejection is respectfully traversed.

Claims 1-35 are cancelled thereby mooted the rejections.

New Claims

Claims 36-53 are new. No new matter has been added.

Independent claim 36 is directed to a prescriptive seed treatment method and recites, “providing a planter, a seed drop tube, a substance receptacle, a substance applicator, a seed, and a seed-applied substance; calculating a location within a field where the seed will be delivered to the soil by the planter; selecting, based at least in part on a condition, a combination of the seed and the seed-applied substance to be delivered to the soil by the planter at least in part by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance to be applied to and carried by the seed to the soil; generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil at least in part by: delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator,

wherein the delivered amount of the selected type of the seed-applied substance is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the substance applicator to apply the desired application amount of the selected type of the seed-applied substance to the seed; and the substance applicator providing the delivered amount of the selected type of the seed-applied substance for applying the desired application amount of the selected type of the seed-applied substance to the seed for creating the combination of the seed and seed-applied substance between a discharge of the seed drop tube and prior to delivery of the combination of the seed and the seed-applied substance to the soil for planting; and delivering the combination of the seed and the selected type of the seed-applied substance to the soil at the calculated location within the field for planting; wherein the type of the seed-applied substance, the desired application amount of the selected type of the seed-applied substance, and the delivered amount of the selected type of the seed-applied substance can vary as the planter changes locations within the field.”

Wilkerson fails to teach the step of “calculating a location within a field where the seed will be delivered to the soil by the planter.” Wilkerson teaches “[s]ystem 200 can be attached to mobile farm equipment. System 200 can position and space one or more seeds 202 at predetermined distances apart along the length of a furrow 204 as the farm equipment moves in the direction of direction arrow X” [0027] and does not teach “calculating a location within a field where the seed will be delivered to the soil by the planter.” Spacing seeds at predetermined distances apart along a furrow is not the same as “calculating a location within a field where the seed will be delivered to the soil by the planter.” The Final Office Action agrees and states, “Wilkerson does not appear

to teach calculating a location where the seed will be planted by the planter.” p. 3, lines 16-18.

Wilkerson fails to teach the step of “selecting, based at least in part on a condition, a combination of the seed and the seed-applied substance to be delivered to the soil by the planter.” Wilkerson addresses inefficiencies in conventional in-furrow applications, where “protectant is sprayed in areas between the seeds 112” in a furrow, by developing systems and methods for in-furrow application chemicals for improving in-furrow chemical application.” [0010]. To improve in-furrow applications, Wilkerson discloses “[s]ystem 202 [shown in FIG. 2] can dispense a discrete volume of fluid F onto and/or near each seed 202 positioned in furrow 204.” [0027]. “System 200 can time the release of fluid F from fluid dispenser FD such that fluid F is released on and/or near each seed 202 in furrow 204. Fluid dispenser FD is shown in FIG. 2 spraying fluid F onto furrow 204 just after application of fluid F to seeds 202 in furrow 204. [0030] “In addition, control system CONT [shown in FIG. 2] can communicate with fluid dispenser FD for providing control signals to dispense fluid F on and/or near each seed 202 placed in furrow 204.” [0031]. “During operation seed 202 can arrive at target location TL at the predetermined time after passing sensed location SL and receive fluid F. The result is that fluid F is deposited directly on one or more seeds positioned in furrow 204 [shown in FIG. 2].” [0032]. As for the other fluid dispensing system 300, shown in FIG. 3, Wilkerson discloses, “[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S (or fluid) by fluid dispenser FD.” [0041]. In view of the foregoing, Wilkerson fails to teach “selecting, based at least in part on a condition, a combination of the seed and the seed-applied substance to be

delivered to the soil by the planter.”

Wilkerson fails to teach the step of “selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance to be applied to and carried by the seed to the soil.” Wilkerson teaches “[t]he fluid can be dispensed after the seeds are metered so as to coordinate the deposit of an amount of fluid with the deposit of a seed.” [0025]. No where in Wilkerson is it taught that a “desired application amount of the selected type of the seed-applied substance [is] applied to and carried by the seed to the soil.”

Wilkerson fails to teach “generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil at least in part by: delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator, wherein the delivered amount of the selected type of the seed-applied substance is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the substance applicator to apply the desired application amount of the selected type of the seed-applied substance to the seed.” Wilkerson teaches “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2] and does not teach the combination is delivered to the soil. Wilkerson teaches “apply[ing] a predetermined amount of fluid on and/or near the first seed [0049]; however, Wilkerson fails to disclose “the delivered amount of the selected type of the seed-applied substance is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the substance applicator to apply the desired application amount of the selected type of the seed-applied substance to the seed.”

Wilkerson fails to teach “the substance applicator providing the delivered amount of the selected type of the seed-applied substance for applying the desired application amount of the selected type of the seed-applied substance to the seed for creating the combination of the seed and seed-applied substance between a discharge of the seed drop tube and prior to delivery of the combination of the seed and the seed-applied substance to the soil for planting.” Wilkerson teaches “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2] and does not teach “creating the combination of the seed and seed-applied substance between a discharge of the seed drop tube and prior to delivery of the combination of the seed and the seed-applied substance to the soil for planting.”

Wilkerson fails to teach “delivering the combination of the seed and the selected type of the seed-applied substance to the soil at the calculated location within the field for planting.” Wilkerson teaches “[s]ystem 200 can be attached to mobile farm equipment. System 200 can position and space one or more seeds 202 at predetermined distances apart along the length of a furrow 204 as the farm equipment moves in the direction of direction arrow X” [0027] and “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2]. Additionally, the Final Office Action states, “Wilkerson does not appear to teach...planting the combination of the seed and seed-applied substance.” p.3, lines 18-19. Thus, in Wilkerson, no “combination of the seed and the selected type of the seed-applied substance [is delivered] to the soil at the calculated location within the field for planting.”

Wilkerson fails to teach “wherein the type of the seed-applied substance, the desired application amount of the selected type of the seed-applied substance, and the

delivered amount of the selected type of the seed-applied substance can vary as the planter changes locations within the field.” Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray band length along furrow 204 for a given field speed” [0035] so “fluid dispenser FD deposits fluid F on and/or near each seed S as it reaches a target location, generally designated TL” [0031]. Thus, in Wilkerson, no “type of the seed-applied substance, the desired application amount of the selected type of the seed-applied substance, and the delivered amount of the selected type of the seed-applied substance [is varied] as the planter changes locations within the field.”

Dependent claim 37 recites the step of “calculating an application efficiency of the substance applicator to apply the selected type of the seed-applied substance to the seed at the desired application amount of the selected type of the seed-applied substance for calculating the delivered amount of the selected type of the seed-applied substance.” Wilkerson teaches “apply[ing] a predetermined amount of fluid on and/or near the first seed [0049]; however, Wilkerson fails to disclose “calculating an application efficiency of the substance applicator to apply the selected type of the seed-applied substance to the seed at the desired application amount of the selected type of the seed-applied substance for calculating the delivered amount of the selected type of the seed-applied substance.”

Dependent claim 38 recites the step of “calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal

efficacy of the selected type of the seed-applied substance, wherein the range comprises a maximum amount of the selected type of the seed-applied substance and a minimum amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance.” Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray band length along furrow 204 for a given field speed. [0035]. Wilkerson does not teach calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal efficacy when applied to the seed.

Dependent claim 39 recites, “wherein the desired amount of the selected type of seed-applied substance is determined by calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance, wherein the range comprises a maximum amount of the selected type of the seed-applied substance and a minimum amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance; and wherein the amount delivered to the seed is between the minimum and maximum amounts. Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray band length along furrow 204 for a given field speed. [0035]. Wilkerson does not teach calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal efficacy where the amount delivered to the seed is between minimum and maximum amounts.

Dependent claim 40 recites, “wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance is based on the recommended label rate of the selected type of the seed-applied substance.” Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray band length along furrow 204 for a given field speed. [0035]. Wilkerson does not teach the minimum or the maximum amount of the seed-applied substance delivered to the seed is based on the recommended label rate of the selected type of the seed-applied substance.

Dependent claim 41 recites “wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance is based on a location within the field where the seed will be planted.” Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray band length along furrow 204 for a given field speed” [0035] so “fluid dispenser FD deposits fluid F on and/or near each seed S as it reaches a target location, generally designated TL” [0031]. Thus, in Wilkerson, no “at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance is based on a location within the field where the seed will be planted.”

Dependent claim 42 recites, “wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance can vary based on the selected type of seed-applied substance.” Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray

band length along furrow 204 for a given field speed” [0035] so “fluid dispenser FD deposits fluid F on and/or near each seed S as it reaches a target location, generally designated TL” [0031]. Wilkerson does not teach the range or the minimum or the maximum amount of the seed-applied substance delivered to the seed can vary based on the selected type of the seed-applied substance.

Dependent claim 43 recites, “wherein the seed comprises a microscale surface area for carrying the desired application amount of the selected type of the seed-applied substance and the desired application amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed-applied substance calculated for generating the combination of the seed and seed-applied substance by applying the selected seed-applied substance directly to the microscale surface area of the seed.” Wilkerson teaches “[s]ystem 200 can be attached to mobile farm equipment. System 200 can position and space one or more seeds 202 at predetermined distances apart along the length of a furrow 204 as the farm equipment moves in the direction of direction arrow X” [0027] and “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2]. Wilkerson does not teach applying microscale amounts of the selected seed-applied substance directly to the microscale surface area of the seed so calculated for generating the combination of the seed and the seed-applied substance.

Dependent claim 44 recites, “wherein the seed comprises a microscale surface area for carrying the desired application amount of the selected type of the seed-applied

substance and the delivered amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed-applied substance calculated for generating the combination of the seed and seed-applied substance.” Wilkerson teaches “[s]ystem 200 can be attached to mobile farm equipment. System 200 can position and space one or more seeds 202 at predetermined distances apart along the length of a furrow 204 as the farm equipment moves in the direction of direction arrow X” [0027] and “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2]. Wilkerson does not teach from the delivery amount applying microscale amounts of the selected seed-applied substance directly to the microscale surface area of the seed so calculated for generating the combination of the seed and the seed-applied substance.

Independent claim 45 is directed to a prescriptive seed treatment method and recites, “providing a planter, a substance applicator, a seed having a microscale surface area, and a seed-applied substance; calculating a location within a field where the seed will be delivered to the soil by the planter; prescriptively selecting, based at least in part on a condition and the calculated location within the field, a combination of the seed and one or more types of the seed-applied substance for delivering to the soil to plant at the location within the field; calculating a microscale application amount of the selected one or more types of the seed-applied substance to be applied to and carried on the seed to the soil within the field; generating the combination of the seed and the selected one or more types of the seed-applied substance prior to the combination being delivered to the soil at the location at least in part by the substance applicator applying the

microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed; and delivering the combination of the seed and the selected one or more types of the seed-applied substance to the soil within a field at the location; wherein the selected one or more types of the seed-applied substance and the microscale amount of the selected one or more types of the seed-applied substance can vary as the planter changes locations within the field.”

Wilkerson fails to disclose the step of “calculating a location within a field where the seed will be delivered to the soil by the planter.” Wilkerson teaches “[s]ystem 200 can be attached to mobile farm equipment. System 200 can position and space one or more seeds 202 at predetermined distances apart along the length of a furrow 204 as the farm equipment moves in the direction of direction arrow X” [0027] and does not teach “calculating a location within a field where the seed will be delivered to the soil by the planter.” Spacing seeds at predetermined distances apart along a furrow is not the same as “calculating a location within a field where the seed will be delivered to the soil by the planter.” The Final Office Action agrees and states, “Wilkerson does not appear to teach calculating a location where the seed will be planted by the planter.” p. 3, lines 16-18.

Wilkerson fails to teach the step of “prescriptively selecting, based at least in part on a condition and the calculated location within the field, a combination of the seed and one or more types of the seed-applied substance for delivering to the soil to plant at the location within the field.” Wilkerson addresses inefficiencies in conventional in-furrow applications, where “protectant is sprayed in areas between the seeds 112” in a furrow, by developing systems and methods for in-furrow application chemicals for improving

in-furrow chemical application.” [0010]. To improve in-furrow applications, Wilkerson discloses “[s]ystem 202 [shown in FIG. 2] can dispense a discrete volume of fluid F onto and/or near each seed 202 positioned in furrow 204.” [0027]. “System 200 can time the release of fluid F from fluid dispenser FD such that fluid F is released on and/or near each seed 202 in furrow 204. Fluid dispenser FD is shown in FIG. 2 spraying fluid F onto furrow 204 just after application of fluid F to seeds 202 in furrow 204. [0030] “In addition, control system CONT [shown in FIG. 2] can communicate with fluid dispenser FD for providing control signals to dispense fluid F on and/or near each seed 202 placed in furrow 204.” [0031]. “During operation seed 202 can arrive at target location TL at the predetermined time after passing sensed location SL and receive fluid F. The result is that fluid F is deposited directly on one or more seeds positioned in furrow 204 [shown in FIG. 2].” [0032]. As for the other fluid dispensing system 300, shown in FIG. 3, Wilkerson discloses, “[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S (or fluid) by fluid dispenser FD.” [0041]. In view of the foregoing, Wilkerson fails to teach “prescriptively selecting, based at least in part on a condition and the calculated location within the field, a combination of the seed and one or more types of the seed-applied substance for delivering to the soil to plant at the location within the field.”

Wilkerson fails to teach the step of “calculating a microscale application amount of the selected one or more types of the seed-applied substance to be applied to and carried on the seed to the soil within the field.” Wilkerson teaches “[t]he fluid can be dispensed after the seeds are metered so as to coordinate the deposit of an amount of fluid with the deposit of a seed.” [0025]. No where in Wilkerson is it taught that “a

microscale application amount of the selected one or more types of the seed-applied substance [is] applied to and carried on the seed to the soil within the field.”

Wilkerson fails to teach “generating the combination of the seed and the selected one or more types of the seed-applied substance prior to the combination being delivered to the soil at the location at least in part by the substance applicator applying the microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed.” Wilkerson teaches “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2] and does not teach the combination is delivered to the soil. Wilkerson teaches “apply[ing] a predetermined amount of fluid on and/or near the first seed [0049]; however, Wilkerson fails to disclose “generating the combination of the seed and the selected one or more types of the seed-applied substance prior to the combination being delivered to the soil at the location at least in part by the substance applicator applying the microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed.”

Wilkerson fails to teach “delivering the combination of the seed and the selected one or more types of the seed-applied substance to the soil within a field at the calculated location.” Wilkerson teaches “[s]ystem 200 can be attached to mobile farm equipment. System 200 can position and space one or more seeds 202 at predetermined distances apart along the length of a furrow 204 as the farm equipment moves in the direction of direction arrow X” [0027] and “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2]. Additionally, the Final Office Action states, “Wilkerson does not appear to teach...planting the combination of

the seed and seed-applied substance.” p.3, lines 18-19. Thus, in Wilkerson, no “combination of the seed and the selected one or more types of the seed-applied substance [is delivered] to the soil within the field for planting at the calculated location.”

Wilkerson fails to teach “wherein the selected one or more types of the seed-applied substance and the microscale amount of the selected one or more types of the seed-applied substance can vary as the planter changes locations within the field.” Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray band length along furrow 204 for a given field speed” [0035] so “fluid dispenser FD deposits fluid F on and/or near each seed S as it reaches a target location, generally designated TL” [0031]. Thus, in Wilkerson, no “selected one or more types of the seed-applied substance and the microscale amount of the selected one or more types of the seed-applied substance [is varied] as the planter changes locations within the field.”

Dependent claim 46 recites the step of “providing one or more substance receptacles plumbed in fluid communication on the planter with the substance applicator; delivering the selected one or more types of the seed-applied substance from the one or more substance receptacles to the substance applicator in time for generating the combination at the location within the field prior to delivering the combination to the soil.

Dependent claim 47 recites the step of “delivering an amount of the selected one or more types of the seed-applied substance from one or more substance

receptacles to the substance applicator, wherein the delivered amount of the selected one or more types of the seed-applied substance is greater than the microscale application amount of the selected one or more types of the seed-applied substance and calculated to enable the substance applicator to apply the microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed.” Wilkerson teaches “apply[ing] a predetermined amount of fluid on and/or near the first seed [0049]; however, Wilkerson fails to disclose “the delivered amount of the selected one or more types of the seed-applied substance is greater than the microscale application amount of the selected one or more types of the seed-applied substance and calculated to enable the substance applicator to apply the microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed.”

Dependent claim 48 recites the step of “varying the one or more types of the seed-applied substance, the microscale application amount of the selected one or more types of the seed-applied substance, and the delivered amount of the selected one or more types of the seed-applied substance as the planter changes locations within the field. Wilkerson teaches “[t]he pulse-width of the actuation signal can correspond with the time required to produce a desired spray band length along furrow 204 for a given field speed. [0035]. Thus, in Wilkerson, there is no varying of “the one or more types of the seed-applied substance, the microscale application amount of the selected one or more types of the seed-applied substance, and the delivered amount of the selected one or more types of the seed-applied substance as the planter changes locations

within the field.”

Dependent claim 49 recites the step of “calculating an application efficiency of the substance applicator to apply the selected one or more types of the seed-applied substance to the seed at the microscale application amount of the selected one or more types of the seed-applied substance for calculating the delivered amount of the selected one or more types of the seed-applied substance.” Wilkerson teaches “apply[ing] a predetermined amount of fluid on and/or near the first seed [0049]; however, Wilkerson fails to disclose “calculating an application efficiency of the substance applicator to apply the selected type of the seed-applied substance to the seed at the desired application amount of the selected type of the seed-applied substance for calculating the delivered amount of the selected type of the seed-applied substance.”

Independent claim 50 is directed to a prescriptive seed treatment method and recites, “providing a planter for planting a seed in soil within a field, a seed delivery mechanism, a substance receptacle, a substance applicator, a seed-applied substance, a seed flow path between beginning at a discharge of the seed delivery mechanism and terminating just prior to the soil, a seed-applied substance flow path originating from the substance applicator, and an intersection of the seed flow path and seed-applied substance flow path, wherein the substance applicator is disposed at the discharge of the seed delivery mechanism and includes a discharge oriented toward the seed flow path to provide the intersection of the seed flow path and the seed-applied substance flow path after discharge of the seed from the discharge of the seed delivery

mechanism and before the seed contacts the soil; selecting, based at least in part on a condition and a position of the planter within the field, a combination of the seed and the seed-applied substance at least in part by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance; generating the combination of the seed and the selected type of the seed-applied substance within the seed flow path at least in part by: delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator into the seed-applied substance flow path, wherein the delivered amount of the selected type of the seed-applied substance into the seed-applied substance flow path is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-applied substance flow path to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path; and delivering the combination of the seed and the selected type of the seed-applied substance to the soil for planting.”

Wilkerson fails to disclose “a planter for planting a seed in soil within a field, a seed delivery mechanism, a substance receptacle, a substance applicator, a seed-applied substance, a seed flow path beginning at a discharge of the seed delivery mechanism and terminating just prior to the soil, a seed-applied substance flow path originating from the substance applicator, and an intersection of the seed flow path and seed-applied substance flow path.” Wilkerson teaches a seed flow path that does not

terminate just prior to the soil as evidenced by the fact Wilkerson's nozzle 214 trails behind the open bottom end 208 of the seed tube ST, and seed tube ST, nozzle 214 and seed 202 move in the direction of arrow x. [0027; 0029; 0067-0069]. Thus, "the horizontal component of seed velocity can be used with planter velocity (v_p) to calculate lateral displacement between the seed landing location and the reference." [0068]. Because seed 202 is moving in the direction of arrow x, seed 202 moves forward through a lateral displacement (seed flow path) in the furrow 204 [0069].

Wilkerson fails to disclose "the substance applicator is disposed at the discharge of the seed delivery mechanism and includes a discharge oriented toward the seed flow path." Wilkerson teaches fluid dispenser FD is oriented toward the furrow (see FIGS. 2-3, 8, 10) so "[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S (or fluid) by fluid dispenser FD for forming a protective Zone around each seed 302. [0041].

Wilkerson fails to disclose "the intersection of the seed flow path and the seed-applied substance flow path [is] after discharge of the seed from the discharge of the seed delivery mechanism and before the seed contacts the soil." Wilkerson addresses inefficiencies in conventional in-furrow applications, where "protectant is sprayed in areas between the seeds 112" in a furrow, by developing systems and methods for in-furrow application chemicals for improving in-furrow chemical application." [0010]. To improve in-furrow applications, Wilkerson discloses "[s]ystem 202 [shown in FIG. 2] can dispense a discrete volume of fluid F onto and/or near each seed 202 positioned in

furrow 204.” [0027]. “System 200 can time the release of fluid F from fluid dispenser FD such that fluid F is released on and/or near each seed 202 in furrow 204. Fluid dispenser FD is shown in FIG. 2 spraying fluid F onto furrow 204 just after application of fluid F to seeds 202 in furrow 204. [0030] “In addition, control system CONT [shown in FIG. 2] can communicate with fluid dispenser FD for providing control signals to dispense fluid F on and/or near each seed 202 placed in furrow 204.” [0031]. “During operation seed 202 can arrive at target location TL at the predetermined time after passing sensed location SL and receive fluid F. The result is that fluid F is deposited directly on one or more seeds positioned in furrow 204 [shown in FIG. 2].” [0032]. As for the other fluid dispensing system 300, shown in FIG. 3, Wilkerson discloses, “[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S (or fluid) by fluid dispenser FD.” [0041]. In view of the foregoing, Wilkerson fails to teach “the intersection of the seed flow path and the seed-applied substance flow path [is] after discharge of the seed from the discharge of the seed delivery mechanism and before the seed contacts the soil.”

Wilkerson fails to disclose “selecting, based at least in part on a condition and a position of the planter within the field, a combination of the seed and the seed-applied substance at least in part by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance.” Wilkerson teaches “[t]he fluid can be dispensed after the seeds are metered so as to coordinate the deposit of an amount of fluid with the deposit of a seed” [0025] by “apply[ing] a predetermined amount of fluid on and/or near the first seed [0049];

however, Wilkerson fails to disclose “selecting, based at least in part on a condition and a position of the planter within the field, a combination of the seed and the seed-applied substance at least in part by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance.

Wilkerson fails to disclose “generating the combination of the seed and the selected type of the seed-applied substance within the seed flow path at least in part by: delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator into the seed-applied substance flow path.” Wilkerson teaches fluid dispenser FD is oriented toward the furrow (see FIGS. 2-3, 8, 10) so “[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S (or fluid) by fluid dispenser FD for forming a protective Zone around each seed 302. [0041].

Wilkerson fails to disclose “wherein the delivered amount of the selected type of the seed-applied substance into the seed-applied substance flow path is greater than the desired application amount of the selected type of the seed-applied substance.” Wilkerson teaches “apply[ing] a predetermined amount of fluid on and/or near the first seed [0049]. Therefore, Wilkerson does not disclose the “delivered amount of the selected type of the seed-applied substance into the seed-applied substance flow path is greater than the desired application amount of the selected type of the seed-applied substance.”

Wilkerson fails to disclose the delivered amount of the selected type of the seed-applied substance into the seed-applied substance flow path is “calculated to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-applied substance flow path to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path.” Wilkerson teaches a seed flow path that does not terminate just prior to the soil as evidenced by the fact Wilkerson’s nozzle 214 trails behind the open bottom end 208 of the seed tube ST, and seed tube ST, nozzle 214 and seed 202 move in the direction of arrow x. [0027; 0029; 0067-0069]. Thus, “the horizontal component of seed velocity can be used with planter velocity (v_p) to calculate lateral displacement between the seed landing location and the reference.” [0068]. Because seed 202 is moving in the direction of arrow x, seed 202 moves forward through a lateral displacement (seed flow path) in the furrow 204 [0069]. Thus, “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2].

Wilkerson fails to disclose “delivering the combination of the seed and the selected type of the seed-applied substance to the soil for planting.” Wilkerson teaches fluid dispenser FD is oriented toward the furrow (see FIGS. 2-3, 8, 10) so “[a]fter passing through seed tube ST and reaching a furrow FW, seeds 302 can be covered with a pulse of spray S (or fluid) by fluid dispenser FD for forming a protective Zone around each seed 302. [0041].

Dependent claim 51 recites the step of “delivering the desired application

amount of the selected type of the seed-applied substance to the seed at the intersection of the seed flow path and seed-applied substance flow path before the seed contacts the soil.” Wilkerson teaches a seed flow path that does not terminate just prior to the soil as evidenced by the fact Wilkerson’s nozzle 214 trails behind the open bottom end 208 of the seed tube ST, and seed tube ST, nozzle 214 and seed 202 move in the direction of arrow x. [0027; 0029; 0067-0069]. Thus, “the horizontal component of seed velocity can be used with planter velocity (v_p) to calculate lateral displacement between the seed landing location and the reference.” [0068]. Because seed 202 is moving in the direction of arrow x, seed 202 moves forward through a lateral displacement (seed flow path) in the furrow 204 [0069]. Thus, “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2].

Dependent claim 52 recites the step of “optimizing the delivered amount of the selected type of the seed-applied substance at the intersection of the seed flow path and seed-applied substance flow path with an optimized discharge pattern of the selected type of the seed seed-applied substance for optimizing the desired application amount of the selected type of the seed-applied substance applied to the seed within the seed flow path. Wilkerson teaches a seed flow path that does not terminate just prior to the soil as evidenced by the fact Wilkerson’s nozzle 214 trails behind the open bottom end 208 of the seed tube ST, and seed tube ST, nozzle 214 and seed 202 move in the direction of arrow x. [0027; 0029; 0067-0069]. Thus, “the horizontal component of seed velocity can be used with planter velocity (v_p) to calculate lateral displacement between the seed landing location and the reference.” [0068]. Because seed 202 is

moving in the direction of arrow x, seed 202 moves forward through a lateral displacement (seed flow path) in the furrow 204 [0069]. Thus, “fluid F is deposited directly on one or more seeds positioned in furrow 204” [0032; see FIG. 2] and “[a]n exemplary nozzle is a low-pressure nozzle that produces a 50-degree flat-fan pattern such as the nozzle with Part Number 5005 available from Spraying Systems Co.” [0059].

Dependent claim 53 recites the step of “selecting a spray pattern for the discharge of the substance applicator based on at least one of a type of the seed, a size of the seed, a shape of the seed to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-applied substance flow path for the spray pattern to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path.” Wilkerson teaches “[a]n exemplary nozzle is a low-pressure nozzle that produces a 50-degree flat-fan pattern such as the nozzle with Part Number 5005 available from Spraying Systems Co.” [0059]; however, Wilkerson fails to disclose “selecting a spray pattern for the discharge of the substance applicator based on at least one of a type of the seed, a size of the seed, a shape of the seed to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-applied substance flow path for the spray pattern to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path.”

The deficiencies in Wilkerson pertaining to new claims 36-53 are outlined preceding paragraphs. Wendte, Ochampaugh, Hunter, Reineccius, Borstmayer, Ochampaugh2, and Knake, whether taken alone or applied in combination with each other, do not disclose claims 36-53 or address the deficiencies identified in Wilkerson. In view of the foregoing, Applicant respectfully requests allowance of claims 36-53.

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

This is a request for a three month extension of time, the small entity fee of \$592 for which is being paid at the time of filing this response. A subsequent RCE request in amount of \$800 (small entity) is included herewith; however, please grant any extensions of time required to enter this response and charge any additional required fees (including the fees under 37 C.F.R. §1.17(e)(1) for a subsequent Request for Continued Examiner) to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: February 29, 2024

By: /Kyle S. Coleman/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	03/22/2024	EXAMINER	
Goodhue, Coleman & Owens, P.C. 7300 Westown Parkway, Suite 110 West Des Moines, IA 50266			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			03/22/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

<i>Decision Granting Request for Prioritized Examination (Track I)</i>	Application No. 15/739,606	Applicant(s) Smith et al.	
	Examiner CHERYL P GIBSON BAYLOR	Art Unit OPET	AIA (FITF) Status Yes

1. THE REQUEST FILED 01 March 2024 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☐ for an original nonprovisional application (Track I).

B. ☒ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to CHERYL GIBSON BAYLOR at (571)272-3213. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/CHERYL GIBSON BAYLOR/ Paralegal Specialist, OPET	
--	--



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	05/10/2024	EXAMINER	
Goodhue, Coleman & Owens, P.C. 7300 Westown Parkway, Suite 110 West Des Moines, IA 50266			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			05/10/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@appcoll.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/29/24 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

(a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 36-53 rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which

was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 36 recites “calculating a desired application amount of the selected type of the seed-applied substance to be applied to and carried by the seed to the soil...wherein the delivered amount of the selected type of the seed-applied substance is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the substance applicator to apply the desired application amount...” however upon examination of the originally filed specification, it appears that the applicant’s disclosure does not provide support for delivering amount of the selected type of seed-applied substance is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the substance applicator to apply the desired application amount. The closest support appears to be in paragraph 0122, however, does not appear to describe how the desired amount is determined after delivering seed-applied substance greater than the desired amount. Therefore, further explanation is respectfully requested.

Claim 37 recites “calculating an application efficiency of the substance applicator” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claims 38 and 39 recite “calculating a range of the desired application amount of the selected type...for optimal efficacy of the selected type of seed-applied substance...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 40 recites “minimum or maximum amount of the selected type of seed applied substance is based on the recommended label rate...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 41 recites “minimum or maximum amount of the selected type of seed applied substance is based on a location...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 42 recites “minimum or maximum amount of the selected type of seed applied substance is based on can vary based on the selected type of seed applied substance...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 43 recites “seed comprises a microscale surface area...and the desired application amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed applied substance calculated for generating the combination...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 44 recites ““seed comprises a microscale surface area...and the delivered amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed applied substance calculated for generating the combination...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested. (It is noted that if the delivered amount is a microscale amount, the desired amount would be less than microscale amount, where it is unclear where support of this limitation is found in the specification as well).

Claim 45 recites “calculating a microscale application amount of the selected one or more types of seed-applied substance...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 46 recites “substance receptacles plumbed in fluid communication on the planter with the substance applicator...delivering the seed-applied substance...to the substance applicator in time for

generating the combination of the location within the field..." however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 47 recites wherein the delivered amount of the selected one or more types of the seed-applied substance is greater than the microscale application amount of the selected one or more types...calculated to enable the substance applicator to apply the microscale application amount..." however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 48 recites "microscale application amount of the selected one or more types of seed-applied substance..." however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 49 recites "calculating an application efficiency of the substance applicator...at the microscale application amount of the...seed-applied substance for calculating the delivered amount..." however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claims 50-51 recite "wherein the delivered amount of the selected type of the seed-applied substance into the seed-applied substance flow path is greater than the desired application amount of the selected type of the seed-applied substance and the calculated to enable the delivered amount of the selected type of the seed-applied substance..." however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 52 recites "optimizing the delivered amount...with an optimized discharge pattern of the selected type of the seed-applied substance for optimizing the desired application amount..." however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Claim 53 recites “selecting a spray pattern for the discharge of the substance applicator based on at least one of a type of...” however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached Monday to Friday 1:00PM to 4:00PM PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of: Smith et al.	Confirmation No. 7148
Application No. 15/739,606	Group Art Unit: 1715
Filing Date: December 22, 2017	Examiner: Mandy C LOUIE
For: System and Method for Prescriptive Seed Treatment	

AMENDMENT

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

VIA EFS-WEB

Commissioner:

In reply to the Office Action mailed May 10, 2024, the shortened statutory period for response to which expires on August 10, 2024 and extends through November 10, 2024, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims in this paper.

Remarks follow the amendments section of this paper.

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-35 (Cancelled).

Claim 36 (Previously presented): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed drop tube, a substance receptacle, a substance applicator, a seed, and a seed-applied substance;

calculating a location within a field where the seed will be delivered to the soil by the planter;

selecting, based at least in part on a condition, a combination of the seed and the seed-applied substance to be delivered to the soil by the planter at least in part by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance to be applied to and carried by the seed to the soil;

generating the combination of the seed and seed-applied substance prior to the combination being delivered to the soil at least in part by:

delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator, wherein the delivered amount of the selected type of the seed-applied substance is greater than the desired application amount of the selected type of the

seed-applied substance and calculated to enable the substance applicator to apply the desired application amount of the selected type of the seed-applied substance to the seed; and

the substance applicator providing the delivered amount of the selected type of the seed-applied substance for applying the desired application amount of the selected type of the seed-applied substance to the seed for creating the combination of the seed and seed-applied substance between a discharge of the seed drop tube and prior to delivery of the combination of the seed and the seed-applied substance to the soil for planting; and

delivering the combination of the seed and the selected type of the seed-applied substance to the soil at the calculated location within the field for planting;

wherein the type of the seed-applied substance, the desired application amount of the selected type of the seed-applied substance, and the delivered amount of the selected type of the seed-applied substance can vary as the planter changes locations within the field.

Claim 37 (Previously presented): The prescriptive seed treatment method of claim 36, further comprising:

calculating an application efficiency of the substance applicator to apply the selected type of the seed-applied substance to the seed at the desired application amount of the selected type of the seed-applied substance for calculating the

delivered amount of the selected type of the seed-applied substance.

Claim 38 (Previously presented): The prescriptive seed treatment method of claim 36, further comprising:

calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance, wherein the range comprises a maximum amount of the selected type of the seed-applied substance and a minimum amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance.

Claim 39 (Previously presented): The prescriptive seed treatment method of claim 36, wherein the desired amount of the selected type of seed-applied substance is determined by calculating a range of the desired application amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance, wherein the range comprises a maximum amount of the selected type of the seed-applied substance and a minimum amount of the selected type of the seed-applied substance for optimal efficacy of the selected type of the seed-applied substance; and wherein the amount delivered to the seed is between the minimum and maximum amounts.

Claim 40 (Previously presented): The prescriptive seed treatment method of claim 39,

wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance is based on the recommended label rate of the selected type of the seed-applied substance.

Claim 41 (Previously presented): The prescriptive seed treatment method of claim 39, wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance is based on a location within the field where the seed will be planted.

Claim 42 (Previously presented): The prescriptive seed treatment method of claim 39, wherein at least one of the range, the minimum or the maximum amount of the selected type of seed-applied substance can vary based on the selected type of seed-applied substance.

Claim 43 (Previously presented): The prescriptive seed treatment method of claim 36, wherein the seed comprises a microscale surface area for carrying the desired application amount of the selected type of the seed-applied substance and the desired application amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed-applied substance calculated for generating the combination of the seed and seed-applied substance by applying the selected seed-applied substance directly to the microscale surface area of the seed.

Claim 44 (Previously presented): The prescriptive seed treatment method of claim 36, wherein the seed comprises a microscale surface area for carrying the desired application amount of the selected type of the seed-applied substance and the delivered amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed-applied substance calculated for generating the combination of the seed and seed-applied substance.

Claim 45 (Previously presented): A prescriptive seed treatment method comprising the steps of:

providing a planter, a substance applicator, a seed having a microscale surface area, and a seed-applied substance;

calculating a location within a field where the seed will be delivered to the soil by the planter;

prescriptively selecting, based at least in part on a condition and the calculated location within the field, a combination of the seed and one or more types of the seed-applied substance for delivering to the soil to plant at the location within the field;

calculating a microscale application amount of the selected one or more types of the seed-applied substance to be applied to and carried on the seed to the soil within the field;

generating the combination of the seed and the selected one or more types of the

seed-applied substance prior to the combination being delivered to the soil at the location at least in part by the substance applicator applying the microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed; and
delivering the combination of the seed and the selected one or more types of the seed-applied substance to the soil within a field at the calculated location;
wherein the selected one or more types of the seed-applied substance and the microscale amount of the selected one or more types of the seed-applied substance can vary as the planter changes locations within the field.

Claim 46 (Previously presented): The prescriptive seed treatment method of claim 45, further comprising:

providing one or more substance receptacles plumbed in fluid communication on the planter with the substance applicator;
delivering the selected one or more types of the seed-applied substance from the one or more substance receptacles to the substance applicator in time for generating the combination at the location within the field prior to delivering the combination to the soil.

Claim 47 (Previously presented): The prescriptive seed treatment method of claim 45, further comprising:

delivering an amount of the selected one or more types of the seed-applied substance

from one or more substance receptacles to the substance applicator, wherein the delivered amount of the selected one or more types of the seed-applied substance is greater than the microscale application amount of the selected one or more types of the seed-applied substance and calculated to enable the substance applicator to apply the microscale application amount of the selected one or more types of the seed-applied substance to the microscale surface area of the seed.

Claim 48 (Previously presented): The prescriptive seed treatment method of claim 45, further comprising:

varying the one or more types of the seed-applied substance, the microscale application amount of the selected one or more types of the seed-applied substance, and the delivered amount of the selected one or more types of the seed-applied substance as the planter changes locations within the field.

Claim 49 (Previously presented): The prescriptive seed treatment method of claim 45, further comprising:

calculating an application efficiency of the substance applicator to apply the selected one or more types of the seed-applied substance to the seed at the microscale application amount of the selected one or more types of the seed-applied substance for calculating the delivered amount of the selected one or more types of the seed-applied substance.

Claim 50 (Previously presented): A prescriptive seed treatment method, comprising:

providing a planter for planting a seed in soil within a field, a seed delivery mechanism, a substance receptacle, a substance applicator, a seed-applied substance, a seed flow path beginning at a discharge of the seed delivery mechanism and terminating just prior to the soil, a seed-applied substance flow path originating from the substance applicator, and an intersection of the seed flow path and seed-applied substance flow path, wherein the substance applicator is disposed at the discharge of the seed delivery mechanism and includes a discharge oriented toward the seed flow path to provide the intersection of the seed flow path and the seed-applied substance flow path after discharge of the seed from the discharge of the seed delivery mechanism and before the seed contacts the soil;

selecting, based at least in part on a condition and a position of the planter within the field, a combination of the seed and the seed-applied substance at least in part by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance;

generating the combination of the seed and the selected type of the seed-applied substance within the seed flow path at least in part by:

delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator into the seed-applied substance flow path, wherein the delivered amount of the

selected type of the seed-applied substance into the seed-applied substance flow path is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-applied substance flow path to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path; and

delivering the combination of the seed and the selected type of the seed-applied substance to the soil for planting.

Claim 51 (Previously presented): The prescriptive seed treatment method of claim 50, further comprising:

delivering the desired application amount of the selected type of the seed-applied substance to the seed at the intersection of the seed flow path and seed-applied substance flow path before the seed contacts the soil.

Claim 52 (Previously presented): The prescriptive seed treatment method of claim 50, further comprising:

optimizing the delivered amount of the selected type of the seed-applied substance at the intersection of the seed flow path and seed-applied substance flow path with an optimized discharge pattern of the selected type of the seed-applied

substance for optimizing the desired application amount of the selected type of the seed-applied substance applied to the seed within the seed flow path.

Claim 53 (Previously presented): The prescriptive seed treatment method of claim 50, further comprising:

selecting a spray pattern for the discharge of the substance applicator based on at least one of a type of the seed, a size of the seed, or a shape of the seed to enable the delivered amount of the selected type of the seed-applied substance to occupy the intersection of the seed flow path and seed-applied substance flow path for the spray pattern to apply the desired application amount of the selected type of the seed-applied substance to the seed within the seed flow path.

REMARKS

In the Office Action, the Examiner took the following actions:

- I. Claims 36-53 rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement.

The Office Action may contain statements characterizing the related art and/or the claims. Regardless of whether any such statement is expressly identified and/or discussed herein, Applicant reserves the right to disagree with any such statement or characterization in the Office Action.

Claim Rejections - 35 USC§ 112

Claims 36-53 rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement.

Page 3 of the Non-Final Office Action states, "Claim 36 recites 'calculating a desired application amount of the selected type of the seed-applied substance to be applied to and carried by the seed to the soil...wherein the delivered amount of the selected type of the seed-applied substance is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the substance applicator to apply the desired application amount...' however upon examination of the originally filed specification, it appears that the applicant's disclosure does not provide support for delivering amount of the selected type of seed-applied substance is greater than the desired application amount of the selected type of the seed-applied substance and calculated to enable the substance applicator to

apply the desired application amount. The closest support appears to be in paragraph 0122, however, does not appear to describe how the desired amount is determined after delivering seed-applied substance greater than the desired amount. Therefore, further explanation is respectfully requested.”

Further support and explanation for **claim 36**, in addition to paragraph 0122, is provided at least at paragraphs 0021 and 0086. Paragraph 0021 discusses determining one or more amounts transferred so selected amount of seed-applied substance is applied to the seed. Paragraph 0086 discusses controlling the flow to ensure the proper amount of seed-applied substance to be applied to the seed is the delivered to the substance flow path and substance applicator. Inherent support is also provided in at least paragraphs 0013, 0069, 0077, 0084, 0095, 0097, 0103, 0125, and 0130. Paragraphs 0013 and 0084 discuss using an optimal type and amount of seed treatment substance (“a prescribed amount of one or more seed-applied substances”) and a prescriptive seed treatment that precisely selects an amount of seed treatment substance. Paragraph 0103 discusses very precise and accurate substance applicators apply the amount of the seed-applied substance necessary to accomplish its desired impact. Paragraph 0130 discusses adjusting the metering mechanism to adjust the amount of the applicable seed-applied being metered. Paragraphs 0069, 0077, 0084, 0095, 0097, 0125 discuss minimizing the amount of off residue and off target impacts from seed-applied substance discharged by the applicator but not applied to the seed. In view of the foregoing, the selected amount is greater than the desired application amount to obtain the prescribed amount of seed-applied substance given not all the seed-applied substance discharged from the applicator will land on the

seed.

Page 3 of the Non-Final Office Action states, "Claim 37 recites 'calculating an application efficiency of the substance applicator' however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested."

Paragraph 0021 discusses amounts of seed-applied substance being transferred from the substance receptacle through the flow paths so a selected amount of the seed-applied substance can be applied to the seed. Paragraph 0069 discusses producing the desired droplet size to enable a more precise application based on the amount of residue and off target impacts. A selected amount of a seed-applied substance cannot be applied to the seed without knowing the off target impacts (i.e., amount of seed-applied substance not applied to the seed) of the applicator.

Page 3 of the Non-Final Office Action states, "[c]laims 38 and 39 recite 'calculating a range of the desired application amount of the selected type...for optimal efficacy of the selected type of seed-applied substance...' however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested."

Paragraph 0013 discusses a precise selection of an amount for the seed-applied substance and that the optimal amount often varies between seed planting locations. Paragraph 0071 discusses the amount of seed-applied substance being prescriptively selected based on a batch. Paragraph 0103 discusses the desired application amount of a seed-applied substance necessary to accomplish the desired impact. Paragraph 0116 discusses selecting different amounts of a seed-applied

substance for optimal efficiency for the farmer to obtain desired results. Notwithstanding the foregoing, and with support provided above, claims 38 and 39 are amended to recite, "tailoring the desired application amount of the selected type...for optimal efficacy of the selected type of seed-applied substance..."

Page 3 of the Non-Final Office Action states, "[c]laim 40 recites 'minimum or maximum amount of the selected type of seed applied substance is based on the recommended label rate...' however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested."

Paragraph 0050 discusses selecting an amount of the seed-applied substance for reasons such as "causing the active ingredients to be at the appropriate levels and/or concentrations to be efficacious," Paragraph 0103 discusses selecting the desired application amount of a seed-applied substance necessary to accomplish the desired impact. Paragraph 0116 discusses selecting different amounts of a seed-applied substance for optimal efficiency for the farmer to obtain desired results. Notwithstanding the foregoing, and with support provided above, claim 40 is amended to recite, "minimum or maximum amount of the selected type of seed applied substance is based on appropriate amounts and concentrations to be efficacious... "

Page 4 of the Non-Final Office Action states, "[c]laim 41 recites 'minimum or maximum amount of the selected type of seed applied substance is based on a location...' however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested."

Paragraph 0053 discusses the amount of a seed-applied substance varying based on location. Paragraph 0071 discusses the amount of a seed-applied substance

being varied based on the field, region, row, and/or seed position. Paragraph 0131 discusses determining the amount of seed-applied substance to apply to a seed based on the seed planting location.

Page 4 of the Non-Final Office Action states, “[c]laim 42 recites ‘minimum or maximum amount of the selected type of seed applied substance is based on can vary based on the selected type of seed applied substance...’ however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.”

Paragraph 0106 discusses selecting the combination and therefore the seed and amount of seed-applied substance based on the type of seed-applied substance and application rate. Paragraph 0050 discusses the seed-applied substance being selected based on reasons including causing active ingredients to be at the appropriate levels and/or concentrations to be efficacious.

Page 4 of the Non-Final Office Action states, “[c]laim 43 recites ‘seed comprises a microscale surface area...and the desired application amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed applied substance calculated for generating the combination...’ however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.”

Paragraph 0069 discusses controlling the desired droplet size to enable more precise application for increasing accuracy and reducing residue and off target impacts of the seed-applied substance. Paragraph 0077 discusses the need for the substance applicator to be very precise. Paragraph 0103 discusses the need for a very precise

and accurate substance applicator, so the amount of the seed-applied substance applied to the seed accomplishes the desired impact. Notwithstanding the foregoing, and with support provided above, claim 43 is amended to recite, "seed comprises a seed surface area ... and the desired application amount of the selected type of the seed-applied substance comprises an amount of the selected type of the seed applied substance scaled to the seed surface area and calculated for generating the combination..."

Page 4 of the Non-Final Office Action states, "[c]laim 44 recites 'seed comprises a microscale surface area...and the delivered amount of the selected type of the seed-applied substance comprises a microscale amount of the selected type of the seed applied substance calculated for generating the combination...' however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested. (It is noted that if the delivered amount is a microscale amount, the desired amount would be less than microscale amount, where it is unclear where support of this limitation is found in the specification as well)."

Support for the delivered and selected amount is provided above in Applicant's remarks in support of claim 36. Support for the microscale surface area and seed-applied substance is provided above in Applicant's remarks in support of claim 43. Notwithstanding the foregoing, and with support provided above, claim 44 is amended to recite, "seed comprises a seed surface area...and the delivered amount of the selected type of the seed-applied substance comprises an amount of the selected type of the seed applied substance scaled to the seed surface area and calculated for generating the combination..."

Page 45 of the Non-Final Office Action states, “[c]laim 45 recites ‘calculating a microscale application amount of the selected one or more types of seed-applied substance...’ however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.”

Support for the selected amount is provided above in Applicant’s remarks in support of claim 36. Support for the microscale application amount is provided above in Applicant’s remarks in support of claim 43. Notwithstanding the foregoing, and with support provided above, claim 45 is amended to recite, "calculating an application amount of the selected one or more types of seed-applied substance scaled to the seed surface area..."

Pages 4-5 of the Non-Final Office Action states, “[c]laim 46 recites ‘substance receptacles plumbed in fluid communication on the planter with the substance applicator...delivering the seed-applied substance...to the substance applicator in time for generating the combination of the location within the field...’ however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.”

Paragraphs 0086-0089 and 0122 discuss the timing of fluid communication for generating the combination.

Page 5 of the Non-Final Office Action states, “[c]laim 47 recites ‘wherein the delivered amount of the selected one or more types of the seed-applied substance is greater than the microscale application amount of the selected one or more types...calculated to enable the substance applicator to apply the microscale application amount...’ however it appears that the originally filed disclosure does not

provide sufficient support. Further explanation is respectfully requested.”

Support for the delivered and selected amount is provided above in Applicant’s remarks in support of claim 36. Support for the microscale application amount is provided above in Applicant’s remarks in support of claim 43. Notwithstanding the foregoing, and with support provided above, claim 47 is amended to recite, “wherein the delivered amount of the selected one or more types of the seed-applied substance is greater than the application amount of the selected one or more types scaled to the seed surface area of the seed...calculated to enable the substance applicator to apply the application amount...”

Page 5 of the Non-Final Office Action states, “[c]laim 48 recites ‘microscale application amount of the selected one or more types of seed-applied substance...’ however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.”

Support for the microscale application amount is provided above in Applicant’s remarks in support of claim 43. Notwithstanding the foregoing, and with support provided above, claim 48 is amended to recite, “application amount of the selected one or more types of seed-applied substance...”

Page 5 of the Non-Final Office Action states, “[c]laim 49 recites ‘calculating an application efficiency of the substance applicator ... at the microscale application amount of the...seed-applied substance for calculating the delivered amount...’ however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.”

Support for calculating application efficiency of the substance applicator is

provided above in Applicant's remarks in support of claim 37. Support for the microscale application amount is provided above in Applicant's remarks in support of claim 43. Support for the delivered amount is provided above in Applicant's remarks in support of claim 36. Notwithstanding the foregoing, and with support provided above, claim 49 is amended to recite, "calculating an application efficiency of the substance applicator...at the application amount scaled to the seed surface area of the seed...seed-applied substance for calculating the delivered amount..."

Page 5 of the Non-Final Office Action states, "[c]laims 50-51 recite 'wherein the delivered amount of the selected type of the seed-applied substance into the seed-applied substance flow path is greater than the desired application amount of the selected type of the seed-applied substance and the calculated to enable the delivered amount of the selected type of the seed-applied substance...' however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested."

Support for the delivered and selected amount is provided above in Applicant's remarks in support of claim 36.

Page 5 of the Non-Final Office Action states, "[c]laim 52 recites 'optimizing the delivered amount...with an optimized discharge pattern of the selected type of the seed-applied substance for optimizing the desired application amount...' however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested."

Paragraph 0069 discusses optimizing the application amount by controlling the desired droplet size to enable more precise application for increasing accuracy and

reducing residue and off target impacts of the seed-applied substance. Paragraph 0077 discusses the need for the substance applicator to be very precise for optimizing application of the seed-applied substance. Paragraph 0103 discusses the need for a very precise and accurate substance applicator, so the application is optimized whereby the amount of the seed-applied substance applied to the seed accomplishes the desired impact. Paragraph 0130 discusses optimizing application by adjusting the metering mechanism to adjust the amount of the applicable seed-applied being metered.

Page 6 of the Non-Final Office Action states, “[c]laim 53 recites ‘selecting a spray pattern for the discharge of the substance applicator based on at least one of a type of...’ however it appears that the originally filed disclosure does not provide sufficient support. Further explanation is respectfully requested.”

Paragraph 0106 discusses selecting the combination and therefore the seed and amount of seed-applied substance based on the type of seed-applied substance and application rate. Paragraph 0050 discusses the seed-applied substance being selected based on reasons including causing active ingredients to be at the appropriate levels and/or concentrations to be efficacious. Paragraph 0069 discusses controlling the desired droplet size to enable more precise application for increasing accuracy and reducing residue and off target impacts of the seed-applied substance based at least on “provid[ing] control over the chemical composition.”

CONCLUSION

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 506801.

Respectfully submitted,

Goodhue, Coleman & Owens, P.C.

Dated: July 5, 2024

By: /Kyle S. Coleman/
Kyle S. Coleman
Reg. No. 66257
(515) 218-7888

<i>Examiner-Initiated Interview Summary</i>	Application No. 15/739,606	Applicant(s) Smith et al.		
	Examiner MANDY C LOUIE	Art Unit 1715	AIA (First Inventor to File) Status Yes	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
MANDY C LOUIE	Primary Examiner	Telephonic
Kyle Coleman	Attorney	

Date of Interview: 24 July 2024

Issues Discussed:

Proposed Amendment(s)

7/24/24 Examiner proposed amendments to overcome prior art and rejection, however, further consideration would be required by applicant. 7/25/24 applicant responded via email with their proposed amendments. Examiner provided further suggestions to overcome 112 1st paragraph issues regarding the dependent claims, and applicant returned with final amendments and new claims on 8/01/24. The new amendments were agreed upon with both parties; hence, an examiner's amendment is issued.

/MANDY C LOUIE/ Primary Examiner, Art Unit 1715	
<p>Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04</p> <p>Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing</p>	

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

<i>Notice of References Cited</i>	Application/Control No. 15/739,606		Applicant(s)/Patent Under Reexamination Smith et al.	
	Examiner MANDY C LOUIE		Art Unit 1715	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-4356934-A	1982-11-02	Knake; Raymond P.	A01C1/06	47/DIG.9
*	B	US-6148748-A	2000-11-21	Bardi; Danick J.	A01C7/081	111/905
*	C	US-6216615-B1	2001-04-17	Romans; William W.	A01C7/04	111/177
*	D	US-20020104262-A1	2002-08-08	Muhr, Blaine	A01C1/06	47/57.6
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 11-2023)

Notice of References Cited

Part of Paper No. 20240807



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

133690 7590 08/15/2024
Goodhue, Coleman & Owens, P.C.
7300 Westown Parkway, Suite 110
West Des Moines, IA 50266

EXAMINER

LOUIE, MANDY C

ART UNIT

PAPER NUMBER

1715

DATE MAILED: 08/15/2024

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148

TITLE OF INVENTION: System and Method for Prescriptive Seed Treatment

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	11/15/2024

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

133690 7590 08/15/2024

Goodhue, Coleman & Owens, P.C.
7300 Westown Parkway, Suite 110
West Des Moines, IA 50266

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148

TITLE OF INVENTION: System and Method for Prescriptive Seed Treatment

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	11/15/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
LOUIE, MANDY C	1715	427-004000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

Notice of Allowability	Application No. 15/739,606	Applicant(s) Smith et al.	
	Examiner MANDY C LOUIE	Art Unit 1715	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendments filed on 07/05/24.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 36 and 54-71. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov**.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☒ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)	5. ☒ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. ☐ Other _____.
4. ☒ Interview Summary (PTO-413), Paper No./Mail Date. <u>08/07/24.</u>	

/MANDY C LOUIE/ Primary Examiner, Art Unit 1715	
--	--

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Kyle Coleman on 8/1/24.

The application has been amended as follows:

Claim 36 is amended as followed:

Claim 36 (Currently amended): A prescriptive seed treatment method comprising the steps of:

providing a planter, a seed drop tube, a substance receptacle, a substance applicator, a seed, and a seed-applied substance;

calculating a location within a field where the seed will be delivered to the soil by the planter;

selecting, based at least in part on a condition, a combination of the seed and the seed-applied substance ~~to be delivered to the soil by the planter at least in part~~ by selecting a type of seed-applied substance and calculating a desired application amount of the selected type of the seed-applied substance to be applied to and carried by the seed to the soil;

generating the combination of the seed and the selected type of the seed-applied substance ~~prior to the combination being delivered to the soil~~ at least in part by individually applying the desired application amount of the selected type of the seed-applied substance to each seed as it is being delivered to the soil;

~~delivering an amount of the selected type of the seed-applied substance from the substance receptacle to the substance applicator, wherein the delivered amount of the selected type of the seed-~~

~~applied substance is greater than the desired application amount of the selected type of the seed-
applied substance and calculated to enable the substance applicator to apply the desired application
amount of the selected type of the seed-applied substance to the seed; and~~

~~the substance applicator providing the delivered amount of the selected type of the seed-
applied substance for applying the desired application amount of the selected type of the seed-applied
substance to the seed for creating the combination of the seed and seed-applied substance between a
discharge of the seed drop tube and prior to delivery of the combination of the seed and the seed-
applied substance to the soil for planting; and~~

delivering the combination of the seed and the selected type of the seed-applied substance to
the soil at the calculated location within the field for planting;

wherein the type of the seed-applied substance, and the desired application amount of the
selected type of the seed-applied substance, ~~and the delivered amount of the selected type of the seed-
applied substance~~ can vary as the planter changes locations within the field.

Claims 37-53 are cancelled.

Add the following new claims:

Claim 54 (New): The method of Claim 36 wherein the step of selecting, based at least in part on the
condition, the combination of seed and seed-applied substance further comprises selecting a seed type.

Claim 55 (New): The method of Claim 36 wherein the combination of seed and the selected type of the
seed-applied substance varies based at least in part on one of the following: a type of the seed, the type
of the seed-applied substance, and an application rate of the seed-applied substance.

Claim 56 (New): The method of Claim 36 wherein a controller can be used to calculate the location where the seed will be delivered to the soil, select, based at least in part on the condition, the combination of seed and seed-applied substance to plant at the location, generate the combination of the seed and the selected type of the seed-applied substance, or plant the combination of seed and the selected type of the seed-applied substance.

Claim 57 (New): The method of Claim 36 wherein the selected type of the seed-applied substance is applied to the seed proximate to the seed drop tube.

Claim 58 (New): The method of Claim 36 wherein the substance applicator comprises a nozzle to spray the selected type of the seed-applied substance onto the seed as the seed is delivered to the soil.

Claim 59 (New): The method of Claim 36 wherein the step of generating the combination of the seed and the selected type of the seed-applied substance further comprises:
providing a metering device; and
metering an amount of the selected type of the seed-applied substance from the substance receptacle through a substance flow path to the substance applicator with the metering device.

Claim 60 (New): The method of Claim 36 wherein the step of generating the combination of the seed and the selected type of the seed-applied substance further comprises:
providing a timing mechanism; and
calculating, with the timing mechanism, both delivery time of the selected type of the seed-applied substance from the substance receptacle through a substance flow path to the substance applicator and travel time of the seed through a seed flow path.

Claim 61 (New): The method of Claim 36 further comprising the steps of:

providing a mixer in fluid communication with the substance receptacle and a substance flow path; and

mixing the seed-applied substance prior to the selected type of the seed-applied substance being

applied to the seed.

Claim 62 (New): The method of Claim 36 further comprising the step of:

adjusting a mixture ratio of the seed-applied substance during operation of the planter.

Claim 63 (New): The method of Claim 36 wherein the substance applicator is associated with at least one of:

- a. a mixer in fluid communication with the substance receptacle and a substance flow path;
- b. a seed hopper configured to receive the seed from a seed receptacle;
- c. a seed meter configured to receive the seed from the seed hopper and further transfer it through a seed flow path; and
- d. the seed drop tube.

Claim 64 (New): The method of Claim 36 further comprising the steps of:

transferring the seed into the seed drop tube; and

applying the selected type of the seed-applied substance to the seed proximate to or within the seed

drop tube.

Claim 65 (New): The method of Claim 36 wherein the desired application amount of the selected type

of the seed-applied substance to be applied to the seed is either:

always the same amount of seed-applied substance; or

only either one specific amount of seed-applied substance or no amount of the seed-applied substance.

Claim 66 (New): The method of claim 36, wherein the type of the seed-applied substance and the desired application amount of the selected type of the seed-applied substance can vary as the planter changes location within the field by changing the type, number or amount of one or more of the seed-applied substances applied to the seed when generating the combination of the seed and the seed-applied substance.

Claim 67 (New): The method of claim 36, wherein the combination of seed and the selected type of the seed-applied substance can vary based at least in part upon a seed-applied substance type, a number of seed-applied substances, or the desired application amount of one or more of the selected type of seed-applied substance.

Claim 68 (New): The method of claim 36, wherein the combination of seed and the selected type of the seed-applied substance can vary based at least in part upon a seed type.

Claim 69 (New): The method of claim 36, wherein the seed drop tube comprises an air tube.

Claim 70 (New): The method of claim 36, wherein the seed drop tube comprises a brush tube.

Claim 71 (New): The method of claim 36, wherein the seed drop tube comprises a seed accelerator.

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance:

The instant invention is distinguished over the prior art of record by for the following reasons:

Knake [US 4356934] teaches an in-the-field seed treating method and apparatus in which the treating fluid is sprayed onto seeds as they move from seed hooper to planting tube and into a planting furrow [abstract]. Knake further teaches the seed spray treatment system to deliver seed treatment to the seeds between 0.2 to 0.7 gallons per hour [col 5, ln 5-15]. However, Knake fails to teach individually applying the desired application amount of the selected type of the seed-applied substance to each seed.

Bardi [US 6148748] teaches inline seed treating unit for air seeders [title], but also fails to teach individually applying the desired application amount of the selected type of the seed-applied substance to each seed.

Romans [US 6216615] teaches a method of controlled deposit of agricultural chemicals in coordination with seed singulation. Romans further teaches the insecticide falls from the chamber through the outlet port and into the drop tube; the insecticide continues to travel down the drop tube until it is deposited on the ground, typically in conjunction with the deposit of the seed from the seed meter [col 4, ln 15-25]. However, Romans fails to teach generating the combination of the seed and the selected type of the seed-applied substance at least in part by individually applying the desired application amount of the selected type of the seed-applied substance to each seed as it is being delivered to the soil, and delivering the combination of the seed and the selected type of the seed-applied substance to the soil at the calculated location within the field for planting (Roman teaches depositing the seed applied substance directly to the soil instead of generating a combination of the seed and seed applied substance prior to depositing to the soil).

Muhr [US 20020104262] teaches a seed inoculation system which can be attached to seeding implement to apply inoculant to seeds before or during the planting process, where the spray nozzle is arranged to spray the seed as it enters the hopper [0018]. However, Muhr fails to teach generating the combination of the seed and the selected type of the seed-applied substance at least in part by individually applying the desired application amount of the selected type of the seed-applied substance to each seed as it is being delivered to the soil, and delivering the combination of the seed and the selected type of the seed-applied substance to the soil at the calculated location within the field for planting.

Since the prior art of record neither teaches nor suggests the combination of limitations recited in the instant claims, one skilled in the art would not have been motivated to perform the claimed process.

Acknowledgement of Applicant's Amendments

The rejection of the claims under 35 U.S.C. 112, second paragraph, is withdrawn due to the above amendments.

Conclusion

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MANDY C LOUIE whose telephone number is (571)270-5353. The examiner can normally be reached on Monday to Friday 1:00PM to 4:00PM PT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-14231423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MANDY C LOUIE/
Primary Examiner, Art Unit 1715

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

133690 7590 08/15/2024

Goodhue, Coleman & Owens, P.C.
7300 Westown Parkway, Suite 110
West Des Moines, IA 50266

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

Kyle S. Coleman	(Typed or printed name)
/Kyle S. Coleman/	(Signature)
08/15/2024	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148

TITLE OF INVENTION: System and Method for Prescriptive Seed Treatment

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0.00	\$0.00	\$480	11/15/2024

EXAMINER	ART UNIT	CLASS-SUBCLASS
LOUIE, MANDY C	1715	427-004000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

Goodhue, Coleman & Owens, P.C.

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

INFLEXION POINT TECHNOLOGIES, LLC URBANDALE, IOWAPlease check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required)

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via the USPTO patent electronic filing system ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. **506801**

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29☐ Applicant asserting small entity status. See 37 CFR 1.27☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Kyle S. Coleman/Date 08/15/2024Typed or printed name Kyle S. ColemanRegistration No. 66257



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	10/01/2024	12102027	P11431US00_NP	7148

133690 7590 09/11/2024
Goodhue, Coleman & Owens, P.C.
7300 Westown Parkway, Suite 110
West Des Moines, IA 50266

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at <https://patentcenter.uspto.gov/>. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at <https://certifiedcopycenter.uspto.gov/index.html>. The Certified Copy Center may be reached at (800)972-6382.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment is 167 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Center (<https://patentcenter.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional inventors):

Steven P. Smith, Ankeny, IA;
Nicholas M. Iwig, Urbandale, IA;
Mark M. Iwig, Johnston, IA;
Pat Parks, Ankeny, IA;

APPLICANT(s) (Please see PATENT CENTER site <https://patentcenter.uspto.gov> for additional applicants):

Inflexion Point Technologies, LLC, Urbandale, IA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](https://selectusa.gov).



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/739,606	12/22/2017	Steven P. Smith	P11431US00_NP	7148
133690	7590	10/01/2024	EXAMINER	
Goodhue, Coleman & Owens, P.C. 7300 Westown Parkway, Suite 110 West Des Moines, IA 50266			LOUIE, MANDY C	
			ART UNIT	PAPER NUMBER
			1715	
			NOTIFICATION DATE	DELIVERY MODE
			10/01/2024	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTO@dockettrak.com
docketing@goodhue.com
eofficeaction@apcoll.com

APPLICATION NO.	ISSUE DATE	PATENT NO.
15/739,606	01-Oct-2024	12102027

Goodhue, Coleman & Owens, P.C.
7300 Westown Parkway, Suite 110
West Des Moines, IA 50266

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at <https://patentcenter.uspto.gov>

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit <https://www.uspto.gov/electronicgrants>