

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PRECISION PLANTING LLC

Petitioner,

v.

MASCHIO GASPARDO S.p.A.,

Patent Owner

U.S. Patent No. 8,770,121

DECLARATION OF DR. MARK FLEMING

1. I am Dr. Mark Fleming and I work in Naperville, Illinois.
2. I have been retained as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“USPTO”), which I understand involves U.S. Patent No. 8,770,121 (“the ’121 patent”) (Ex. 1001). The ’121 patent is assigned on its face to Maschio Gaspardo S.p.A. (“Maschio”). Although my time is billed at the rate of \$375 per hour for the time I spend on this matter, no part of my compensation is dependent

on the outcome of this proceeding, and I have no other interest in the outcome of this case or the '121 patent.

3. I have been asked to evaluate the '121 patent, along with its prosecution history and related prior art to determine whether the purported invention claimed in the '121 patent is anticipated—*i.e.*, lacked novelty—or would have been obvious to a person of ordinary skill in the art at the time of priority claim of the '121 patent. My qualifications and opinions are set forth below.

My Background, Education, and Experience

4. I am currently the Chief Technical Officer at Fusion Engineering, LLC in Naperville, Illinois. Fusion Engineering is an engineering consulting and technical services company that offers engineering services, including engineering analysis, testing, design and manufacturing review. This includes heavy equipment machinery, such as products used for agriculture and planting. For example, my work at Fusion has involved consulting for companies on design and development of “off-highway equipment.” “Off-highway equipment” refers to vehicles or machines that are not meant to

- be driven on roads, including agricultural, mining, and construction equipment. I have worked at Fusion Engineering since 2014.
5. I am also an adjunct professor of mechanical engineering at Northwestern University in Evanston, Illinois, where I have taught undergraduate and graduate level courses on finite element analysis, failure analysis, and mechanistic data science since 2014. Finite element analysis is a numerical method for solving engineering problems involving complex geometries and structures. Failure analysis is an investigation, conducted by collecting and analyzing data, to determine the factors that caused the failure of a product or its performance. Mechanistic data science is a field of study that analyzes data in physical or engineering contexts to derive insights and meaning from that data. I have used each of these disciplines to study and analyze the design and structure of agricultural and planting equipment. I have used finite element analysis to study the performance and design of machinery, such as agricultural equipment. Using finite element analysis, I have analyzed how to improve the durability of these products. For example, I performed a finite element analysis on a tillage machine, used

- to “till” or remove debris from farm fields before planting, to determine the cause of a fracture in the machine that caused injury.
6. As part of my work as a professor, I also research and teach multiscale methods. Multiscale methods refers to the process of breaking down complex engineering problems by modeling and analyzing a structure at different scales. The idea is that complex products can be accurately modeled and analyzed on a smaller scale if proportionality is maintained. Again, I have used this in my work in the agricultural and planting fields. For instance, I have in the past developed multiscale methods to analyze filtration efficacy and the design of certain composite materials.
 7. I received a Bachelor of Science degree in mechanical engineering from the University of Nebraska–Lincoln in 1992. As part of my education, I took courses on machine design, dynamics and controls, and manufacturing processes and techniques. I continue to use these fields as part of my work on the design analysis and testing of mechanical equipment, including agricultural and planting equipment. I received a Master of Science degree in Theoretical and Applied Mechanics from Northwestern University in 1994 and a Doctor of Philosophy degree in

- Theoretical and Applied Mechanics from Northwestern University in 1997. As part of my graduate education, I took courses on engineering mechanics, computer simulations, and kinematics (motion).
8. While an undergraduate at the University of Nebraska–Lincoln, I worked for agronomy professors from 1988 to 1992. During that time, I performed agricultural research that included studying the effects of tillage and crop rotation of corn and soybeans on soil compaction, erosion, and crop production. I assisted with the preparation and planning of crop rotations and tillage practices used in the research plots. I also participated in spring planting, summer crop monitoring, and fall harvesting and tracked seed characteristics, including moisture and seed size. I participated in the planting process by filling hoppers with seeds and engaging in many other planting tasks. Through this experience, I became familiar with the science and process of planting and seeding, including the process of depositing seeds into the ground, factors that affect that process, and factors that affect overall planting success, productivity, and yield. Seed spacing was important in the research plots because it affected the plant growth rates, which in turn affected soil erosion and crop yield.

9. After receiving my Ph.D. in Theoretical and Applied Mechanics from Northwestern University in 1997, I was a design and manufacturing engineer at CNH (formerly Case Corporation) in Burr Ridge, Illinois from 1997 to 2003. CNH designs and manufactures equipment for agricultural and construction use, including seed planting and seed harvesting equipment. During my time at CNH, I participated in the design and development of seed planters and combine harvesters. For example, I worked on the design of a new planter called the “pivot tool bar planter.” As part of that work, I needed to understand the components, structures, and design of the planter. During my time at CNH, we were developing the vacuum seed meter, and understanding that technology was important for my engineering design analysis work. During that process, I studied and analyzed planters with various seed meters to understand and improve the durability of the design of these planters and how they planted seed in the ground.
10. Through my work at CNH, I became familiar with the design, function, and operation of seed planting technology. I also gained further familiarity with the science and process of planting and seeding, including the process

of depositing seeds into the ground, the factors that affect that process, and the factors that affect planting success, productivity, and yield.

11. After my work at CNH, I became Senior Director of Mechanical Engineering at Packer Engineering, Inc. in Naperville, Illinois, and then at ITC Experts in Sugar Grove, Illinois. I was at Packer from 2003 to 2011 and ITC from 2011 to 2014. Packer and ITC were engineering consulting companies that provided engineering investigation and analysis, including testing, design and manufacturing review, and reconstruction work.
12. At Packer and ITC, I provided engineering services, including design analysis and testing, for companies that design and manufacture mechanical equipment, including agricultural equipment. For example, I analyzed the design and structure of mechanical equipment, including agricultural equipment such as tillage machines. I also offered expert consulting services on patent infringement cases involving planters and vacuum seed meters. My work in one case involved using high-speed videos to test and analyze how seeds moved on vacuum seed meters. Through this work, I also gained further familiarity with planting and seeding technologies, including the process of depositing seeds into the

ground, the factors that affect that process, and the factors that affect planting success, productivity, and yield.

13. I am a registered professional engineer in the state of Illinois (license # 062.057502) and have been since 2004. I am currently a member of the American Society of Mechanical Engineers (ASME), Society of Automotive Engineers (SAE), ASM International, and United States Association for Computational Mechanics (USACM). I am also a member of the Northwestern University Mechanical Engineering industrial advisory board. I am also a member of the Pi Tau Sigma mechanical engineering honor society and the Tau Beta Pi engineering honor society.
14. I have been retained as an expert consultant on more than thirty cases, including cases involving agricultural equipment, such as the work described above. I have further provided expert testimony in nineteen cases and for arbitration. I have been retained as an expert in patent cases on five prior occasions.
15. I am not an attorney and offer no legal opinions. But in the course of my work, I have had extensive experience studying the design and manufacture of heavy equipment, including products used for agriculture

and planting. My curriculum vitae is attached as Exhibit 1018 to this report and includes further details on my background, education, and experience in seed planting systems and technology, and is incorporated in its entirety into this paragraph.

Overview of U.S. Patent No. 8,770,121

16. I have reviewed the specification and claims of U.S. Patent No. 8,770,121 (Ex. 1001), which was nationalized in the United States on October 8, 2012, and the prosecution history of the '121 patent (Ex. 1002). I understand that the '121 patent is based on a PCT application filed November 10, 2011, but that PCT application claims priority to an Italian application filed November 12, 2010 (the "November 2010 Italian Application"). While there may be a question about whether the '121 patent is entitled to a priority date of November 12, 2010, I have been asked to assume at this time that the time of invention of the '121 patent is the filing date of the November 2010 Italian Application. I therefore understand that prior art constitutes publications and patent materials that were published before November 12, 2010.

17. The '121 patent describes a seed distribution element for precision seed drills.
18. The '121 patent purportedly allows minimizing the time to replace the disc by mounting a thrust-bearing element in the movable portion of the housing. (Ex. 1001, 1:50–2:19). In this manner the '121 patent purportedly tries to solve the problem presented by prior art solutions that relieved the heavy load on the seal by including a thrust-bearing element in the fixed portion of the housing. (*Id.*) The presented prior art configuration required the disc to be attached to the thrust-bearing element, which lengthened the operation of replacing the disc. (*Id.*) This configuration also required the seed collection chamber to be within the movable portion of the housing, which in turn required removal of the seed collection chamber from the hopper. (*Id.*)
19. The claims of the '121 patent include the following exemplary independent claims. (Ex. 1001, Claims 1 and 10). For purposes of an element-by-element analysis later in this report, the differences in the language between Claim 1 and Claim 10 have been highlighted in red text below. Of note, the elements of Claim 10 are nearly identical to the elements of

Claim 1, except Claim 10 addresses a retrofit kit and recites that the elements in the movable portion be “pre-assembled.” The other minute differences in language between the claims do not appear to meaningfully change the claim scope.

Claim 1	Claim 10
1. A seed distribution element for precision pneumatic seed drills, comprising: a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed, a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion, a seed collection chamber being defined in the fixed portion, a pneumatic suction chamber being defined in the movable portion, the sowing disc being interposed between the fixed and movable portions and having opposed surfaces delimiting the chambers,	10. A kit for the retrofitting of seed distribution elements of precision pneumatic seed drills wherein the distribution elements are of the type including: a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed, a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion, a seed collection chamber being defined in the fixed portion, a pneumatic suction chamber being defined in the movable portion, the sowing disc being interposed between the fixed and movable portions and having opposed surfaces delimiting the chambers,

the sowing disc having at least one ring of selector holes extending between the opposed surfaces, and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the fixed and movable portions are closed against one another, wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes, wherein the seed distribution element further comprises a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.	the sowing disc having at least one ring of selector holes extending between the opposed surfaces, and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the portions are closed against one another, wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes, wherein the kit comprises: the movable portion pre-assembled with: a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.
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20. Moreover, all claims dependent from Claim 10 (*i.e.*, Ex. 1001, Claims 11–16) contain the language “wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim [1–7],”¹

¹ This claim language lacks clarity because the “at least one feature” recitation makes it unclear what “feature” (if fewer than all) is required to satisfy the claim limitation. Thus, dependent claims 11–16 suffer indefiniteness problems.

referring to the Claims dependent on Claim 1. Thus, if the prior art referenced in this declaration discloses corresponding elements of Claims 1–9 and can also be established to be suitable for retrofitting with the thrust-bearing element preassembled in the movable portion, the prior art would necessarily also disclose every element of Claims 10–16.

21. In addition, I have reviewed a related patent EP2637492 (Ex. 1004, the “European ’492 patent”) and the records of a European opposition proceeding involving the European ’492 patent (Ex. 1004). I understand that the European ’492 patent claims common priority to the November 2010 Italian Application. Thus, I understand the European ’492 patent’s earliest possible priority date is also November 12, 2010.
22. A comparison of the claims of the European ’492 patent (Ex. 1004) with the ’121 patent (Ex. 1001) reveals that the claimed subject matter of the ’121 patent overlaps substantially with the European ’492 patent. I have provided below a side-by-side comparison with Claim 1 of the ’121 patent (Ex. 1001) and claim 1 of the European ’492 patent (Ex. 1004), with

Nevertheless, for purposes of this declaration, I have been asked to assume claims 11–16 are definite and that their reference to prior dependent claims requires the presence of all limitations recited in the prior-referenced dependent claim.

differences (aside from numeral references in the European '492 patent)
highlighted in yellow.

Claim 1 of '121 patent (Ex. 1001)	Claim 1 of European '492 patent (Ex. 1004)
1. A seed distribution element for precision pneumatic seed drills, comprising: a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed, a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion, a seed collection chamber being defined in the fixed portion, a pneumatic suction chamber being defined in the movable portion, the sowing disc being interposed between the fixed and movable portions and having opposed surfaces delimiting the chambers, the sowing disc having at least one ring of selector holes extending between the opposed surfaces, and	1. A seed distribution element (1) for precision pneumatic seed drills (3), of the type including: - a sowing disc (16) which is rotated by a motor-driven transmission shaft (20) at controlled speed, - a housing (10) with a fixed portion (11) and a portion (12) which is movable relative to the fixed portion (11) and can be closed against it, - a seed collection chamber (15) being defined in the fixed portion (11), - a pneumatic suction chamber (17) being defined in the movable portion (12), - the sowing disc (16) being interposed between the portions (11, 12) and having opposed surfaces delimiting the chambers (15, 17), - the sowing disc (16) having at least one ring of selector holes (23) extending between the opposed surfaces, and - a seal (24) which is arranged on the movable portion (12) and is capable of

a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the fixed and movable portions are closed against one another, wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes, wherein the seed distribution element further comprises a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.	sliding contact with the facing surface of the disc (16) when the portions (11, 12) are closed against one another, wherein the seed distribution element (1) further comprises a suction device for producing a pressure differential between the opposed surfaces in the region of a circumferential segment of the ring of holes (23), characterized in that the seed distribution element (1) further comprises a thrust-bearing element (26) of the sowing disc (16), which thrust-bearing element (26) is supported rotatably in the movable portion (12) in order to withstand at least some of the axial load produced by the disc (16) on the seal (24).
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Legal Principles

23. The opinions I express in this declaration involve the application of my technical knowledge and experience to evaluating certain prior art with respect to the '121 patent. In preparing this declaration, certain patent law concepts have been explained to me by legal counsel, including the legal standard for interpreting claims, as well as those for assessing written descriptions, enablement, anticipation, and obviousness.

24. I understand that patentability must be analyzed from the perspective of a Person of Ordinary Skill In The Art (“POSA”) in the same field as the challenged patent as of the “effective filing date” of the claims. I understand that a POSA is a hypothetical individual presumed to know the relevant art as of the effective filing date of the claims and has the same level of skill as the ordinary practitioner of the art at issue.
25. I understand that patent claims should be interpreted in accordance with their ordinary meaning as understood by a POSA at the time of the effective filing date in light of the claim language, patent specification, and prosecution history, unless the patentee unambiguously defines or otherwise modifies the meaning of a claim term.
26. I understand that a patent claim is unpatentable if the subject matter of the claim is anticipated or would have been obvious to a POSA as of the effective priority date.
27. I understand that a claim is anticipated if a single prior art reference discloses all the elements of the claimed invention either expressly or inherently. I understand that a claim is obvious if one or more prior art

disclosures would have rendered the claimed invention as a whole obvious to a POSA.

28. I understand that when evaluating obviousness, I should consider (a) the scope and content of the prior art, (b) the differences between the prior art and the claimed invention, (c) the level of ordinary skill in the art, and (d) any “secondary considerations” of non-obviousness. I am informed that if present, these secondary considerations concern real-world evidence of non-obviousness of the claimed invention, and that the evidence must be related to the allegedly novel features of the claimed invention.
29. I further understand that a claim may be obvious based on itself, based on multiple references combined with one another, or pursuant to the knowledge and skill of a POSA. I also understand there must have been a reason that would have prompted a POSA to combine the features of the prior art to arrive at the claimed subject matter, and that this is sometimes referred to as a “motivation to combine.”
30. I also understand that a POSA must have reasonably expected that the combination would work, which is sometimes referred to as a “reasonable expectation of success.”

The Level of Ordinary Skill In the Art

31. I understand the level of ordinary skill in the art is pertinent to analyzing a patent's validity in view of prior art, particularly with respect to whether a patent claim is obvious. I understand that this hypothetical person of ordinary skill in the art is understood to have normal skills and knowledge of a person in a certain technical field at the time of the invention at issue. I further understand that factors that may be considered to decide the level of ordinary skill in the art include: (1) the educational level of the inventor, (2) the types of problems encountered in the art, (3) the prior art solutions to those problems, (4) rapidity with which innovations are made in the field, (5) the sophistication of the technology, and (6) the educational level of active workers in the field. Moreover, I understand a person of ordinary skill in the art is presumed to be knowledgeable of the universe of available prior art.
32. Having considered these factors and the disclosure and claims of the '121 patent, and based upon my experience and education discussed above, I believe as of November 12, 2010, a person of ordinary skill in the art with respect to the '121 patent would have the following qualifications: at least

a bachelor's degree in mechanical or agricultural engineering (or similar) and 2–4 years of experience in the design or manufacture of agricultural equipment.

33. I reach this conclusion based upon the following considerations and the aforementioned factors regarding a person of ordinary skill in the art:

a. Types of problems encountered in the art: seal wear leading to frequent maintenance issues/machine downtime and a design layout that allegedly, according to the '121 patent, requires excessive access time for replacing the seal and other components.

b. Prior art solutions to those problems: use of a thrust-bearing element to minimize load/wear on the seal. Bearings and other plate-like technologies, such as washers, are exceptionally well-known in engineering to receive and distribute axial loads by providing bearing surfaces for the transfer of forces.

c. Rapidity of innovation in the field: pneumatic/vacuum precision seed distribution elements have been known in the art since the 1960s. Additionally, thrust-bearing elements have been well-known in engineering

for centuries.² The Machinery's Handbook has an entire section dedicated to information about thrust bearings.³ Moreover, the Mechanical Engineering Design textbook, which is often used to teach undergraduates in mechanical engineering, also contains a section on thrust bearings.⁴

d. Sophistication of the technology: pneumatic precision planters have a limited number of components and use basic engineering principles.

e. Educational and experience level of workers in the field: commonly a bachelor's degree in mechanical engineering, agricultural engineering or a related engineering field.

34. Based on my experience and education, I consider myself (both now and as of November 12, 2010) to at least be a person of ordinary skill in the art with respect to the field of technology implicated by the '121 patent.

35. I have been asked to evaluate the '121 patent's claims and prior art references through the eyes of a hypothetical person of ordinary skill in the

² Juvinall, Robert C., *Fundamentals of Machine Component Design*, John Wiley & Sons, 1983.

³ Oberg, Erik. *Machinery's Handbook 28*. Industrial Pr., 2008.

⁴ Shigley, Joseph Edward, et al. *Mechanical Engineering Design*. McGraw-Hill, 2004.

art at the time of the claimed invention of the '121 patent (i.e., prior to its earliest possible November 12, 2010 priority date).

Technological Primer

36. In the agricultural implement industry, the concept of precision seed placement is critical. If seeds are placed too close together, they compete for nutrients and resources, neither plant reaches its full potential, and the harvest is reduced. If seeds are placed too far apart, the crop efficiency drops, and the harvest is again reduced. Therefore, optimizing the spacing of the seeds is crucial and is often accomplished using a precision planter including a vacuum (pneumatic) seed meter.
37. Vacuum seed meters generally function by providing a seed disk within a seed distribution element. Generally speaking, the seed disk separates two chambers of the seed distribution element: a seed collection chamber is positioned on one side of the seed disk while a vacuum chamber is positioned on the opposite side. The desired seed type is loaded into a hopper which feeds the seed collection chamber. The vacuum chamber creates a pressure differential along perforated holes on the seed disk. A vacuum pump connected via a hose to the vacuum chamber is used to

create the pressure differential. (It should be noted that a vacuum seed meter is sometimes referred to as a pneumatic seed meter because pneumatic means operated by a gas under pressure. In the case of a seed meter, the pneumatic nature of it creates the pressure differential, or vacuum, through the seed plate. A vacuum seed meter is a pneumatic seed meter.) As the seed disk rotates within the seed distribution element, individual seeds are sucked on to the perforations due to said pressure differential. These seeds are then moved to a discharge location by virtue of the rotation of the seed disk and delivered one-at-a-time to the soil by a seed tube. By adhering a single seed to each perforation, better control over the planting precision is achieved.

38. A seal is generally positioned against the seed disk on the vacuum side of the seed meter to assist in creating the pressure differential across the seed disk. This seal can wear over time due to the sliding contact from the seed disk as it rotates. Thus, vacuum seed meters are generally designed such that they can be disassembled for maintenance and cleaning.
39. The wear rate of the seal can be minimized by reducing the load on the seal during operation. This can be accomplished through an element that

provides axial support to counteract a portion of the thrust force created on the seal by the seed plate due to the vacuum pressure. In the '121 patent, this element is referred to as a “thrust-bearing element.”

40. At the time of the November 12, 2010 priority date for the '121 patent, vacuum seed meters with seals and thrust-bearing elements were well-known and well-practiced. Indeed, the '121 patent applicants admitted that many of the claimed elements were known in the prior art. Table 1 compares the elements of the claims with the prior art that is identified in the specification of the '121 patent (bold text in the left column is used to indicate the claim elements in Applicant Admitted Prior Art, and bold text in the right column is the supporting evidence).

Claim	Applicant Admitted Prior Art (8,770,121)
Claim 1	
1. A seed distribution element for precision pneumatic seed drills, comprising:	“In precision pneumatic seed drills it is known to use sowing elements which are each equipped with a seed distribution element (hereinafter, in brief, distributor) for distributing one seed at a time in a controlled delivery while the sowing element moves along a sowing track.” (Ex. 1001, 1:19–23)
a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed,	“This is inevitable in the known machines since it is obligatory to mount on the fixed portion the transmission which drives in rotation the motor-driven shaft which rotates the disc .” (Ex. 1001, 1:63–65).

a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion,	“In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing, that is to say the portion which is fixed to the framework of the sowing elements.” (Ex. 1001, 1:55–59) “However, positioning the thrust-bearing element on the fixed portion entails the pneumatic suction chamber being provided on the fixed portion, or on the same side at which the thrust-bearing element is placed, while the seed collection chamber must be provided in the movable portion.” (Ex. 1001, 1:66–2:3)
the sowing disc being interposed between the fixed and movable portions and having opposed surfaces delimiting the chambers,	“It is equally known to use seed distributors which use an air pressure differential between opposed faces of a sowing disc (or selector) provided with one or more rings of through holes. The operating principle is based on the fact that, as a result of the pressure differential between the opposed faces of the disc, a seed adheres to each hole and is then transported by the rotation of the sowing disc from the seed selection zone to the point at which the pressure differential ceases and the seed is released to drop through a sowing pipe into the furrow or sowing track.” (Ex. 1001, 1:24–33).
the sowing disc having at least one ring of selector holes extending between the opposed surfaces,	“It is equally known to use seed distributors which use an air pressure differential between opposed faces of a sowing disc (or selector) provided with one or more rings of through holes.” (Ex. 1001, 1:24–27)
and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the fixed and movable portions are closed against one another,	“For the correct functioning of such distributors it is necessary to ensure an effective pneumatic seal between the face of the disc that is subjected to suction and a seal which delimits the pneumatic suction chamber.” (Ex. 1001, 1:38–41)
wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes,	“It is equally known to use seed distributors which use an air pressure differential between opposed faces of a sowing disc (or selector) provided with one or more rings of through holes. The operating principle is based on the fact that, as a result of the pressure differential between the opposed faces of the disc, a seed adheres to each hole and is then transported by the rotation of the sowing disc from the seed selection zone to the point at which the pressure differential ceases and the

	seed is released to drop through a sowing pipe into the furrow or track.” (Ex. 1001, 1:24–35)
wherein the seed distribution element further comprises a thrust-bearing element of the sowing disc,	“Seed drills have been developed which are equipped with a thrust-bearing element which relieves the heavy load on the seal. In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing” (Ex. 1001, 1:53–57)
which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.	“Seed drills have been developed which are equipped with a thrust-bearing element which relieves the heavy load on the seal. In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing” (Ex. 1001, 1:53–57)
Claim 2	
2. The seed distribution element according to claim 1, wherein the thrust-bearing element is rotated with the disc when the fixed and movable portions are closed against one another.	“Seed drills have been developed which are equipped with a thrust-bearing element which relieves the heavy load on the seal. In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing” (Ex. 1001, 1:53–57)
Claim 8	
8. A sowing element for precision seed drills comprising a frame on which a seed distribution element according to claim 1 is mounted.	“In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing, that is to say the portion which is fixed to the framework of the sowing elements. ” (Ex. 1001, 1:55–59)
Claim 9	
9. A seed drill comprising a supporting structure on which a plurality of sowing elements according to claim 8 are mounted.	“In precision pneumatic seed drills it is known to use sowing elements which are each equipped with a seed distribution element (hereinafter, in brief, distributor) for distributing one seed at a time in a controlled delivery while the sowing element moves along a sowing track.” (Ex. 1001, 1:19–23).

Claim Construction

41. I understand that in *inter partes* review proceedings, claim terms “shall be construed using the same claim construction standard that would be used

to construe the claim in a civil action under [35 U.S.C. 282\(b\)](#), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. Any prior claim construction determination concerning a term of the claim in a civil action, or a proceeding before the International Trade Commission, that is timely made of record in the *inter partes* review proceeding will be considered.”

I have followed these principles in my analysis.

42. The phrase “motor-driven transmission drive shaft” appears in the claims of the ’121 patent, which recite, for instance, “a sowing disc which is rotated by a motor-driven transmission drive shaft at a controlled speed.” (Ex. 1001, Claim 1). The term “motor-driven transmission drive shaft” does not appear anywhere within the specification of the ’121 patent. (Ex. 1001, 1:1–4:9). Rather, the Abstract of the ’121 patent refers to a “motor-driven transmission shaft (20).” Elsewhere in the specification the terms “transmission,” “motor-driven”, “drive shaft” and “shaft” (20) are used individually or in various combinations (emphasis added below):

- the **transmission** which drives in rotation the **motor-driven shaft** which rotates the disc (Ex. 1001, 1:64–65)
- The sowing disc 16 is removably mounted on a **motor-driven drive shaft** 20, supported in the fixed portion 11 and driven in rotation at predetermined adjustable speeds by a **transmission** which is not shown (Ex. 1001, 2:60–63)
- The presence of the **transmission** requires the **shaft** 20 to be mounted on the fixed portion of the housing (Ex. 1001, 2:64–65)
- The keying between the **shaft** 20 and disc 16 is obtained by means of a polygonal profile 21 at the free end of the **shaft** 20 (Ex. 1001, 2:65–67)
- drive element 32 which comprises a coupling device constrained for rotation with the thrust-bearing plate but with radial and/or circumferential clearance in such a way as to be self-centered in the rotational coupling with the **drive shaft** of the disc 16 (Ex. 1001, 3:38–42)
- The drive element 32 is coupled by means of an internal polygonal profile 35 (similar to that adopted for box-end wrenches) to the

polygonal profile 21 of the free end of the **shaft** 20” (Ex. 1001, 3:48–50)

- The drive element 32 is thus self-centering relative to the **drive shaft** 20 by which it is driven (Ex. 1001, 3:53–54)
- Provision is also made for the thrust-bearing element 26 to be made idle and not be driven in rotation by the **shaft** 20 (Ex. 1001, 3:58–59)

43. The use of the terms “transmission,” “motor-driven”, “drive shaft” and “shaft” in these excerpts is inconsistent. It is unclear whether the “motor-driven transmission drive shaft” is referring to element 20 or a larger assembly. In the abstract, element 20 appears to be referred to as a “transmission shaft,” whereas elsewhere the specification indicates the transmission is not shown. The specification of the ’121 patent provides no additional details to assist a POSA in understanding what the term “motor-driven transmission drive shaft” means, principally because there is no disclosure in the specification of a motor and, indeed, the specification expressly states the “transmission [] is not shown.” (Ex. 1001, 2:62–63). Nevertheless, while the transmission is not expressly shown, the **location** of the narrower claim term “transmission drive shaft” is more

specifically explained in light of the foregoing evidence and other evidence available. Notably, “The presence of the **transmission** requires the **shaft 20 to be mounted on the fixed portion** of the housing.” (Ex. 1001, 2:64–65). Furthermore, the specification states, “...**it is obligatory to mount on the fixed portion the transmission** which drives in rotation the motor-driven shaft that rotates the disc.” (Ex. 1001, 1:63–65). These two passages relate the transmission and, particularly, its driven shaft to be located on the *fixed side* of the seed distribution element.

44. Moreover, in the European opposition proceeding involving the European ’492 patent, Maschio Gaspardo made arguments relating to the location of the drive shaft. Notably, Maschio Gaspardo’s attorneys argued that a German version of the Amazone Manual (Ex. 1008) “does not discloses [sic] a motor-driven transmission shaft rotated at a controlled speed a [sic] sowing disc” because “[i]t can be clearly seen from e.g. Fig. 39 in page 53 that the sowing disc is toothed and it is driven by a gear provided in the fixed portion.” (Ex. 1005, at p. 674-675). Figure 39 in page 53 is excerpted below:

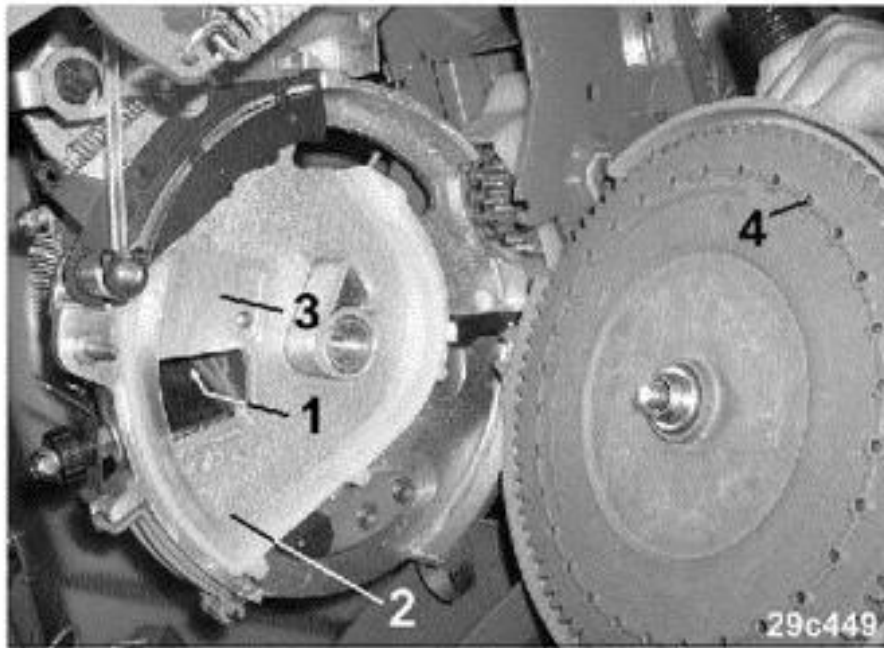


Fig. 39

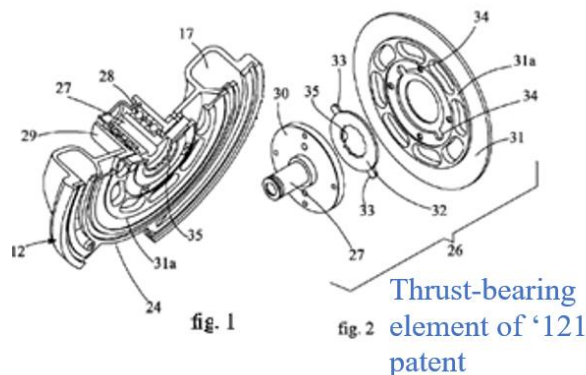
(Ex. 1005, at p. 657, see also Ex. 1008 and/or Ex. 1011, FIG. 39). As discussed above, the '121 patent's specification and figures, which shares priority to and is the same as the European '492 patent, only discloses a centrally located drive shaft (Ex. 1001, numeral 20 in fig. 1). Thus, Maschio Gaspardo appears to be arguing that the peripherally driven shaft depicted in Figure 39, above, is not a transmission drive shaft as understood in the claims. Therefore, based upon the arguments made by the patent owner's counsel and the disclosure in the '121 patent, "transmission drive shaft" should be construed generally to mean "a drive

shaft on the fixed portion of the housing and centered relative to the sowing disc.”

45. The phrase “thrust-bearing element” appears in the claims of the ’121 patent, which recite, for instance, “wherein the seed distribution element further comprises a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.” (Ex. 1001, Claim 1).
46. A “thrust bearing” is a well-known term of art in engineering and is “a bearing which sustains axial loads and prevents axial movement of a loaded shaft.” (Ex. 1017, p. 2147). The balls of traditional thrust bearings are positioned in-line with the axial force transmitted through the plate as thrust bearings are designed specifically to transmit axial load. However, in the ’121 patent, a hyphen connects the words “thrust” and “bearing” and the word “element” is added to the term. Thus, these changes indicate that the “thrust-bearing element” of the ’121 patent is unique from the standard “thrust bearing” term of art. Indeed, a comparison between a traditional thrust bearing (shown in the following photo) and the bearings in Figures

1 and 2 of the '121 patent (Ex. 1001) shows substantial differences in the geometry between the two:

Traditional thrust bearing



47. Moreover, the '121 patent states that the “thrust-bearing element 26 comprises a shaft 27 rotatably mounted by means of bearings 28 in a seat 29 of the movable portion 12. The shaft 27 has flanging 30 by means of which it is fixed to a thrust-bearing plate 31 which can bear on that surface of the disc which faces the seal 24 in a zone radially inside the ring of holes 23 in order to withstand at least some of the axial load produced by the disc 16 on the seal 24.” (Ex. 1001, 3:25–32). The “thrust-bearing plate” itself does not ride on bearings but rather it is connected to the shaft. The shaft is supported by roller bearings that are not in-line with the axial force. Thus, the specification indicates that the term “thrust-bearing element” does not refer to a traditional “thrust bearing”, but more generally refers to

an element that provides support against an axial force. Indeed, this reasoning and more general definition were adopted by the European Patent Office in a hearing regarding European patent 2,637,492. As shown in the excerpt below, the European Patent Office interpreted the exact same claim language: “thrust-bearing element” as I have:

The interpretation of the claimed feature “thrust-bearing element” is in dispute. In the field of mechanical engineering the term “thrust bearing” (without hyphen) has a usual and recognized meaning. For example, Wikipedia under the entry “thrust bearing” cited by the appellant gives the definition that it is “a particular type of rotary bearing. Like other bearings they permanently rotate between parts, but they are designed to support a predominantly axial load”, and gives examples (thrust ball bearing, roller thrust bearing, Mitchell type thrust bearing). The Collins online dictionary (www.collinsdictionary.com/dictionary/) also cited gives as definition: “a low friction bearing on a rotating shaft that resists axial thrust in the shaft”, citing as a common example “a collar which bears against a ring of well-

lubricated stationary and sometimes tilting pads”. Similar definitions can be found elsewhere, as for instance in the online “engineering dictionary” ([http:// www.engineering-dictionary.org/Thrust bearing](http://www.engineering-dictionary.org/Thrust_bearing)), cited by the appellant-proprietor.

However, in the contested claim 1, the hyphenation and unusual combination with the term “element” and the indication that the element prevents axial movement of a disc instead of that of a shaft renders the combined term ambiguous. Thus it is unclear to the skilled person reading the claim from the combined term alone whether the expression is used in its normal (engineering) sense or is meant to convey a different or wider meaning.

To the extent that on first reading of the claim alone they might not fully understand the technical significance of the term “thrust-bearing element” the skilled reader, with their mind willing to understand, would therefore consult the rest of the patent, its description, figures and other claims in order to resolve any ambiguity. There, the thrust-bearing element is

described in detail in paragraphs [0019] to [0023] in reference to figures 1 and 2, as element 26 comprising shaft 27 rotatably mounted by bearings 28 in a seat 29 and with a flange 30 fixed to a “thrust-bearing plate” 31 which bears on the surface of the disc. This element is driven in rotation with the sowing disc 16. The central part of the arrangement is the “thrust-bearing plate” 31 (named so). Plate 31 is, however, not a bearing in the conventional sense, as it is not in sliding or rolling contact with any component—as bearings should be—but rotates with both the shaft 27 and the disc 16, between which it is located. Rather, it bears against the disc 16 and is therefore meant to absorb any thrust produced by the disc on the seal. Neither plate 31 alone nor element 26 including the plate corresponds to what the skilled person would recognize as a classical thrust bearing, cf. the figures of the Wikipedia entry.

Consequently, by drawing on the description and drawings to gain a better understanding of the subject-matter of the claims, the skilled person realizes that the term “thrust-bearing” is used

not to define a thrust bearing in the usual sense. Rather, they will conclude that it is used in the contested patent in a general sense to define the function of bearing or providing support against an axial force. Thus, contrary to the submissions of the appellant proprietor, the claimed feature “thrust-bearing element”, in the context of the patent, should not be given the restricted interpretation of the appellant proprietor of rotary bearings in the form of ball bearings or similar, but the wider interpretation of an element having a function to provide support against an axial load.

The claim further requires that the thrust-bearing element withstands at least some of the axial load produced by the disc on the seal. This load is produced by the vacuum on the side of the disc where the seal is provided. The vacuum causes the disc to move axially against the seal, thereby producing the load. Thus, any element that restrains the axial movement of the disc when vacuum is applied, as does the thrust-bearing element of the described embodiment, meets the claimed limitation.

(Ex. 1005, at p. 233 – 235). I agree with the European Patent Office’s analysis and conclusions as to the construction of “thrust-bearing element,” particularly given the common priority of the ’121 patent and European ’492 patent, the common specification, and the overlapping claim language.

48. The phrase “is supported rotatably in the movable portion” also appears in the claims of the ’121 patent, which recite, for instance, “which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.” (Ex. 1001, Claim 1).

49. The European Patent Office in a hearing regarding European patent 2,637,492 construed this term to only require that the thrust-bearing element be located within the movable portion, but it did not necessarily need to be supported by the movable portion:

The meaning of the expression “is supported rotatably in the movable portion” in claims 1 and 10 is also in dispute. In the board's understanding the expression only requires that the thrust-bearing element is located within the movable portion, though not necessarily supported by it, as also held by the

opposition division. The skilled person has no reason to disregard this interpretation since it is a logical and credible reading of this feature that also makes technical sense and is not in contradiction to the rest of the patent. Indeed, according to the claim, the movable portion of the housing defines a suction chamber. Therefore, a thrust-bearing element located in the suction chamber and thus at the suction side of the rotating disk, is properly located to bear forces caused by that suction, however the element may be supported.

(Ex. 1005, at p. 235). I agree with this construction as the term requires that the thrust-bearing element be supported rotatably and that it be **in** the movable portion, but the term does not require the thrust-bearing element be supported rotatably **by** or **on** the movable portion. Reviewing the specification of the '121 patent further supports this meaning because the drafters of the specification repeatedly used the phrase “mounted on” when describing other components or prior art arrangements, thus demonstrating the drafters of the patent knew the distinction between “in” and “on.” (See, e.g., Ex. 1001, 1:55–57, 2:56, 2:60–61,

3:22–24). The specification even discloses, in reference to Figure 1, “a thrust-bearing element indicated as a whole by 26 is **mounted on** the movable portion.” (Ex. 1001, 3:22–24). Thus, the ’121 patent disclosure describes an arrangement in which the thrust-bearing element is physically mounted on the movable portion, but the patentee has claimed it more broadly “in the movable portion.” Thus, if the thrust-bearing element is in the movable portion and is rotatably supported in some fashion, the claim limitation would be met.

The Scope and Content of the Prior Art

U.S. Patent No. 7,228,807 (Ex. 1006):

50. With the understanding that the ’121 patent’s priority date is November 12, 2010, U.S. Patent No. 7,228,807 to VenHuizen (“VenHuizen”) (Ex. 1006) is prior art to the ’121 patent because VenHuizen issued June 12, 2007, more than a year before the priority date of the ’121 patent.
51. The ’807 VenHuizen patent discloses a vacuum seed meter in which a seed disk is rotatably mounted within the housing. (Ex. 1006, Abstract, 1:13-17, 5:44-59, and 6:11-13). The patent also discloses two mating half shells of the seed meter that are connected via a hinge. (Ex. 1006, Figs. 6-10, 5:59-62, and 7:19-21). When the two half shells are closed, the seed disk

separates the seed chamber and vacuum chamber. (Ex. 1006, 1:13-22, 3:14-17, 6:36-40, and 7:31-36). A handle is mounted on a hub and extends through the seed disk into the movable portion. (Ex. 1006, Fig. 6, 5:62-67, and 6:1-5). The hub is supported rotatably. (Ex. 1006, Figs. 4-10). The handle locks the seed disk onto the hub, absorbing at least a portion of the axial load. (Ex. 1006, 5:62-67, 6:1-5, Figs. 6-10).

52. A person of ordinary skill in the art looking at the '121 patent would consider VenHuizen to be important when considering the validity of the claims of the '121, and indeed, the '121 patent specifically identifies VenHuizen as relevant prior art: "An example of such devices is disclosed in U.S. Pat. No. 7,228,807" (Ex. 1001, 1:35-37).

EP 0536543 A1 to Fiorido (Ex. 1007):

53. With the understanding that the '121 patent's priority date is November 12, 2010, EP 0536543 A1 to Fiorido ("Fiorido") (Ex. 1007) is prior art to the '121 patent because Fiorido published April 14, 1993, more than a year before the priority date of the '121 patent.
54. Fiorido discusses a precision-type single seed planter. (Ex. 1007, Title, Abstract, 1:1-2 and 23-25, 4:31-34, and 5,7-9). Fiorido discloses a split

casing wherein the two sides can be separated or joined by means of pins and bolts. (Ex. 1007, 5:10-13 and 22-27, Figs. 1-3). Inter-positioned between the two halves of the casing is a perforated selector element (seed disk) with a suction blower on one side and a seed container on the other side. (Ex. 1007, 1:23-37, Figs. 1-3). A seal is disclosed on the vacuum side of the seed disk. (Ex. 1007, 7:53-58 and Fig. 2). A driving disk is mounted upon a shaft, which is rotatably supported by bearings on the movable side of the housing. (Ex. 1007, 5:49-55, Figs. 2-3). The driving disk adjoins the seed disk and therefore absorbs a portion of the axial load. (*Id.*)

55. A person of ordinary skill in the art looking at the '121 patent would consider Fiorido to be important when considering the validity of the claims of the '121 patent because Fiorido is in the same field of endeavor of the '121 patent in that Fiorido discloses a pneumatic precision seed drill. Further, Fiorido is reasonably pertinent to the problem faced by the inventor of the '121 patent because it discloses the elements and arrangement of components in the vacuum seed meter intended to decrease machine downtime.

Amazon Manual (Ex. 1011):

56. Exhibit 1011 is an Amazone Operator's Manual ("Amazone Manual") for various precision airplanters having model numbers ED 302, ED 452, ED 452-K, ED 602-K, and ED 902-K. (Ex. 1011, at 1). An "airplanter" is a pneumatic (or vacuum) planter of the type described and claimed by the '121 patent. Amazone is a prominent European agricultural implement manufacturer that has participated predominantly in the European agriculture implement market for decades.
57. The first page of the Amazone Manual states that it is "Printed in Germany," (*Id.* at 1.) The identifying data listed on page 3 of the Amazone Manual recites that it is applicable to "ED 02" machines manufactured by "Amazonen-Werke" having a "200 bar" maximum, which corresponds to the maximum pressure of the vacuum suction employed in the planter. (*Id.* at 3).
58. The third page of the Amazone Manual contains a section titled "Formal remarks to this instruction manual" that lists the following information:

Document Number:	MG 1239
Date of edition:	10.05
© Copyright AMAZONEN-WERKE H. DREYER GmbH & Co. KG, 2005	
All rights reserved.	

- (*Id.* at 3.) The document number (“MG 1239”) is effectively a part number for the Amazone Manual that enables the manufacturer (and others, for that matter) to treat the manual like a unique part. The “Date of edition” is the date of the manual, in this case “10.05” corresponds to October 2005. Of course, the copyright legend indicates Amazone claims copyright protection for the Amazone Manual as of 2005. This type of information is commonly listed in agricultural implement manuals, and I have seen this type of information many times in my career from various manufacturers.
59. Almost every page of the Amazone Manual includes the notation “10.05” which is consistent with a 2005 date of publication. (Ex. 1011).
60. Like many manuals for agricultural implements issued in the industry, the Amazone Manual is first made available by the manufacturer when products are available to the public for purchase. The Amazone Manual is typical in this regard and includes a welcome message (“Preface”) on page 4 that thanks the customer for buying the implement, encourages the customer to make sure nothing is damaged upon receipt of the implement, and encourages the customer to read the manual before operating the device. (*Id.* at 4). The Amazone Manual further states “Before the first

operation, please read and adhere to this instruction manual and the safety advice. After having thoroughly read the instruction manual you can make fullest use of the advantages of your recently purchased machine.” (*Id.*). Thus, as is common in the industry, Amazone seeks for users of its agricultural implements, including purchasers the implements, to safely operate its machinery, which is best accomplished after reading the instructions. Ensuring such safe operation is commonly achieved with manuals like the Amazone Manual being shipped with and otherwise made available to operators and owners of the implement, in this case owners of precision air planters described by the Amazone Manual.

61. Agricultural implement manuals also list vital information showing users of the machinery how to operate, maintain, and seek additional assistance if necessary. Agricultural implements available for purchase almost always have a manual like the Amazone Manual available on both the manufacturer’s website and with the machine itself when purchased. Page 3 of the Amazone Manual (Ex. 1011, p. 3) has a section at the top labeled “Identification data” that includes areas to fill in machine-specific information like a serial number, the machine’s date of manufacture,

factory of manufacture, weight and power specifications. This is typical in the agricultural implement industry. (*Id.* at 3.)

62. I have visited the Amazone-Werke website available at info.amazone.de and clicked icon of the British flag to view the website in the English language. I then conducted a search for “ed02” to view a listing of material available from Amazone relating to the Amazone Manual. A screenshot of the webpage with the search results is attached as Exhibit 1019 and is reproduced below:

Declaration of Dr. Mark Fleming
Re: U.S. Patent No. 8,770,121

AMAZONE Info-Portal

Welcome page | Register | Log-in | Help | Contact | Imprint

Home > All search results (31)

24

Rubrics

- Products
- Type of document
- Component
- Manufacturer

Search

ed02 >>

Item language

All languages

Saved queries

Top 5

- Streutabelle ED02 (Körner)
- Betriebsanleitung ED02
- Operation manual ED02
- Operation manual Micro gr...
- Kezelési útmutató ED02

Name	Size	Date
작동 설명서 ED02 (ko)	KO	07.02.2014
Betriebsanleitung ED02	DE	8 MB 25.03.2013
Инструкция по эксплуатации ED02	RUS	8 MB 25.03.2013
Manuale di istruzioni ED02	IT	35 MB 25.09.2012
Οδηγίες χειρισμού BA ED02	GR	18.04.2011
Prospekttext ED (F)	FR	106 kB 01.02.2011
Naudojimo instrukcija ED02	LT	22 MB 18.02.2010
Kullanım kılavuzu ED02	TR	22 MB 30.01.2009
Betriebsanleitung Koppelrahmen KR 9002/12002/ED02	DE	21 MB 27.02.2008
Manual de Instruções ED02	PT	23 MB 31.05.2007
Instrucţiuni de utilizare ED02	RO	23 MB 03.04.2007
Upute za uporabu ED02	HR	23 MB 03.04.2007
Naudojimo instrukcija ED02	BG	43 MB 29.03.2007
Uputstvo za korišćenje ED02	SR	23 MB 22.03.2007
Návod na obsluhu ED02	CZ	25 MB 20.03.2007
Navodila za uporabo ED02	SL	52 MB 28.11.2006
Manual del operador ED02	ES	8 MB 20.04.2006
Kezelési útmutató ED02	HU	8 MB 20.04.2006
Notice d'utilisation ED02	FR	8 MB 14.03.2006
Brugsanvisning ED02	DK	8 MB 07.02.2006
Bedieningshandleiding ED02	NL	8 MB 07.02.2006
Operation manual ED02	EN	8 MB 19.01.2006
Instrukcja obsługi ED02	PL	8 MB 19.01.2006
Streutabelle ED02 (Körner)		2 MB 22.12.2005

1 2

63. This Amazone webpage shows various information relating to, and translations of, the Amazone Manual. But, of pertinent interest, the third entry from the bottom of the search result list identifies the document named “Operation manual ED02” in the “EN” (English) language of a size “8 MB” with at “Date” of “19.01.2006”:

	Operation manual ED02	EN	8 MB	19.01.2006		
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64. That date, according to European convention, is January 19, 2006. The available date of January 19, 2006 is consistent with a first publication of the Amazone Manual of October 2005. Furthermore, clicking on the “Operation manual ED02” link on the Amazone website brings up very same document number MG 1239 that is referenced in the Amazone Manual on page 3. (Ex. 1011, at 3).
65. Further confirming the availability of the Amazone Manual long before the critical date of the ’121 patent, examination of waybackmachine.com, which maintains historical archives of available website material, demonstrates that the operating manual was available also in the German language (Ex. 1008) as of December 2005. For instance, the English-language translation provided at the webpage archive taken August 31, 2009, which is attached as Exhibit 1020, shows the ED02 operating instructions in the German language was available for download as of “22.12.2005”⁵:

5

https://web.archive.org/web/20090831044207/http://info.amazone.de/frontend.aspx?sprache=0&langid_system=0&ninfos=48&path=99*88-94*112

Name ▲ ▼		Size ▲ ▼	Date ▲ ▼		
 Operating instructions EDX 9000-T FOLDING		247 kB	31.03.2009		
 Operating instructions AMATRON+ EDX		1 MB	31.03.2009		
 Operating instructions EDX 9000-T		22 MB	24.03.2009		
 Operating instructions AMATRON+ EDX		1 MB	14.04.2008		
 Operating instructions coupling frame KR 9002/12002/ED02		21 MB	27.02.2008		
 Operating instructions ED-CONTROL		693 kB	20.03.2007		
 Operating instructions ED-Control		748 kB	21.02.2006		
 Scatter table ED02 (grains)		2 MB	22.12.2005		
 Operating instructions ED02		8 MB	22.12.2005		
 Operating instructions RP-ED		17 MB	25.11.2005		
 Operating instructions microgranule spreader		4 MB	11.04.2005		
 Operating instructions ED02		12 MB	23.03.2005		
 Operating instructions Airplanter ED 300 and ED 450-K (03/91)		7 MB	02.06.2004		
 Operating instructions ED-Control		573 kB	17.03.2004		
 Operating instructions Electronics ED		2 MB	17.03.2004		
 Operating instructions Electronics ED02		1 MB	17.03.2004		
 Operating instructions ED		15 MB	15.03.2004		
 Operating instructions ED-Pilot		635 kB	15.03.2004		
 Operating instructions microgranule spreader		2 MB	08.03.2004		
 Operating instructions ED		270 kB	25.02.2004		
1					

66. International manufacturers of agricultural equipment often translate their manuals into different languages corresponding to the markets they serve. In this instance, it comes as no surprise that a Germany-based agricultural company like Amazone would first publish its manual in the German language (Ex. 1008) and then translate it into other languages. (Ex. 1009-15). Indeed, Amazone's unique document identifiers can be correlated to a number of different translations of the same Amazone Manual, each of

which contains identical pictures as the Amazone Manual referenced herein. That catalogue is as follows:

Document No. ("MG")	Language	Date of Edition (from p. 3 of manual)	"Date" (from Amazone webpage)
1237	Danish	"10.05"	"07.02.2006"
1238	French	"10.05"	"14.03.2006"
1239	English	"10.05"	"19.01.2006"
1240	Dutch	"10.05"	"07.02.2006"
1304	Spanish	"10.05"	"20.04.2006"
1305	Hungarian	"10.05"	"20.04.2006"
1306	Polish	"10.05"	"19.01.2006"

67. These translations are attached hereto as Exhibits 1008 through 1015 (including English language manual Ex. 1011), respectively, and comparison of each and every figure of those manuals with the figures of the English-language version relied on herein as the Amazone Manual referenced demonstrates the manuals use identical pictures and figures. (See, e.g., p. 53, Figs. 39, 40, of each of Exhibits 1008 through 1015.) A

comparison of these Figures makes it is apparent that each of these ED02 manuals contain identical disclosures, all of which were dated long before the critical date of the '121 patent.

68. Thus, based upon my experience in the industry, the convention in the agricultural implement industry, the dating inside the Amazone Manual (document MG 1239), the dating on Amazone's own website, and cross-referencing the differently translated manuals for the same machinery (all of which have a date more than a year before the earliest priority date of the '121 patent), there can be no question that the Amazone Manual (each of Ex. 1008 – 1015) was available to the public more than a year of the earliest claimed priority date of the '121 patent.
69. With the understanding that the '121 patent's priority date is November 12, 2010, the Amazone Manual (Ex. 1011) is prior art to the '121 patent because the Amazone Manual was published and available to the interested public by approximately October 2005, but no later than January 2006, which is more than a year before the priority date of the '121 patent.
70. The Amazone Manual discloses a precision-type single seed planter with a split casing. (Ex. 1011, Cover page, p. 32, 36, 41, 53, 54, and 166). Inter-

positioned between the two halves of the casing is a perforated seed disk with a suction blower on one side and a seed reservoir on the other side. (Ex. 1011, p. 48, 53, and 54). A seal is disclosed on the vacuum side of the seed disk. (Ex. 1011, p. 166, Fig. 227). A driving disk is located on the periphery of the device to drive the seed disk at a selected speed. (Ex. 1011, p. 48, 53, and 62-63). Two figures from the Amazone Manual are shown below:

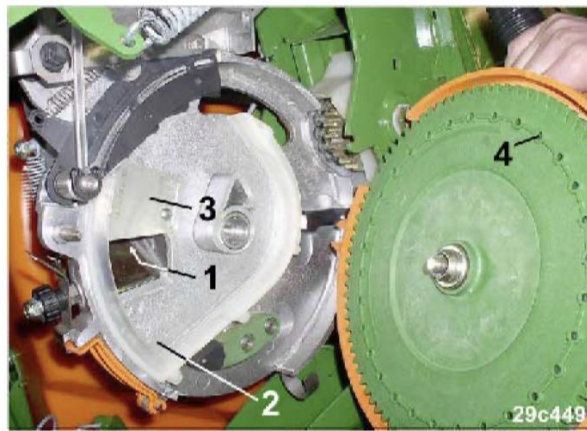


Fig. 39



Fig. 40

(Ex. 1011, at 53).

71. A person of ordinary skill in the art looking at the Amazone Manual would consider the Amazone Manual to be important when considering the validity of the claims of the '121 patent because the Amazone Manual is in the same field of endeavor of the '121 patent in that the Amazone Manual discloses a precision seed meter including a seal on the vacuum

side of the seed meter and, as discussed below, discloses that the vacuum side of the seed meter is on the movable portion of the housing.

Applicant Admitted Prior Art (“AAPA”)

72. Reading the specification of the ’121 patent makes clear that the patent owner understood various features of the claimed invention was well-known in the prior art. Indeed, as previously discussed, the applicant admits that the following were well-known in the prior art:

- pneumatic seed drills
- seed distribution elements
- sowing discs
- motor-driven transmission shafts
- housings with a fixed and movable portion
- sowing discs interposed between the fixed and movable portions with opposed surfaces delimiting the chambers
- sowing discs with at least one ring of selector holes extending between the opposed surfaces
- seals

- pressure differentials between opposed surfaces in the region of a circumferential segment of the ring of holes
- thrust-bearing elements that withstand at least some portion of the axial load produced by the disc on the seal
- thrust-bearing elements that rotate with the disc
- frames upon which seed distribution elements are mounted
- a plurality of sowing elements mounted to the frame

**Comparison of the Claimed Invention and the Prior Art from
the Perspective of a Person of Ordinary Skill in the Art**

73. As set forth in the following analysis, a person of ordinary skill in the art at the time of the invention would recognize that the foregoing prior art teaches all of the limitations of each of the challenged claims of the '121 patent. Table 1 summarizes which claims are anticipated and which claims are obvious over the prior art.

Table 1: Summary of the '121 invalidity in light of the prior art

	<i>Anticipated by</i>	<i>Obvious over</i>
Claim 1	<i>VenHuizen ('807)</i> <i>Fiorido ('543)</i>	<i>Fiorido ('543) + AAPA</i> <i>Amazon Manual + Fiorido ('543) + AAPA</i>
Claim 2	<i>VenHuizen ('807)</i> <i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i> <i>Amazon Manual + Fiorido ('543) + AAPA</i>
Claim 3	<i>VenHuizen ('807)</i> <i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i> <i>Amazon Manual + Fiorido ('543) + AAPA</i>

Claim 4	<i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i>
Claim 5	<i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i>
Claim 7	<i>VenHuizen ('807)</i>	<i>Fiorido ('543) + VenHuizen ('807)</i> <i>Amazon Manual + VenHuizen ('807)</i>
Claim 8	<i>VenHuizen ('807)</i>	<i>Fiorido ('543) + VenHuizen ('807) + AAPA</i> <i>Amazon Manual</i>
Claim 9	<i>VenHuizen ('807)</i>	<i>Fiorido ('543) + VenHuizen ('807) + AAPA</i> <i>Amazon Manual</i>
Claim 10	<i>VenHuizen ('807)</i> <i>Fiorido ('543)</i>	<i>Fiorido ('543) + AAPA</i> <i>Amazon Manual + Fiorido ('543) + AAPA</i>
Claim 11	<i>VenHuizen ('807)</i> <i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i> <i>Amazon Manual + Fiorido ('543)</i>
Claim 12	<i>VenHuizen ('807)</i> <i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i> <i>Amazon Manual + Fiorido ('543) + AAPA</i>
Claim 13	<i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i>
Claim 14	<i>Fiorido ('543)</i>	<i>*Fiorido ('543)</i>
Claim 16	<i>VenHuizen ('807)</i>	<i>Fiorido ('543) + VenHuizen ('807)</i> <i>Amazon Manual + VenHuizen ('807)</i>

**All elements of the dependent claim are presented in Fiorido by itself; however, whether the claim is anticipated by Fiorido or obvious over Fiorido depends from the related independent claim.*

Analysis of the Prior Art with Respect to the '121 Claims

Claim 1

74. Claim 1 is: (a) anticipated by VenHuizen ('807); (b) is anticipated by Fiorido ('543); (c) is obvious over Fiorido ('543) in view of Applicant Admitted Prior Art; and (d) is obvious over the Amazon Manual in view of Fiorido ('543) and Applicant Admitted Prior Art, as shown in the following analysis.

VenHuizen ('807)

A seed distribution element for precision pneumatic seed drills, comprising:

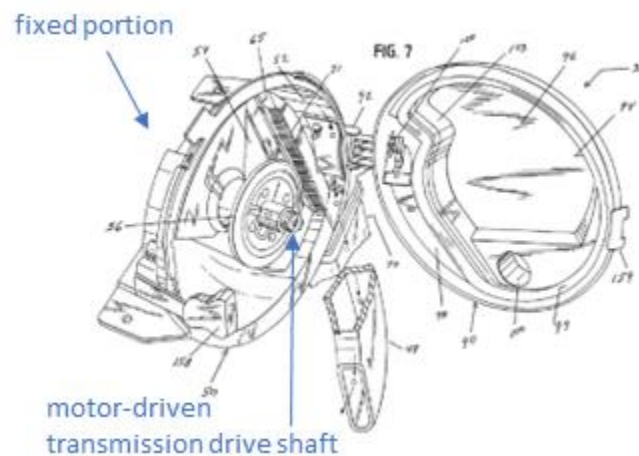
75. VenHuizen discloses a device for improving the spacing between seeds planted by a John Deere vacuum planter. VenHuizen also discloses a metering unit (seed distribution element) that singulates seeds and drops them into a chute for planting: “The heart of the John Deere planter is a metering unit which retains a circular rotatable seed disk that separates the interior of the metering unit into two chambers, one on each side of the disk. The seed disks employed in the machine have a plurality of holes, with the centers thereof spaced to define a circle with its center at the center of the disk and having a radius a little less than the radius of the disk. A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the chamber on the opposite side of the disk. The diameter of the holes in the seed disks are sized such that, when operating properly, the vacuum will draw one seed against the aperture of each hole in the disk and retain the seed as the disk rotates to a position above a seed tube, at which point the disk moves away from the vacuum chamber and the seed falls away from the disk and into the seed tube to be planted.” (Ex. 1006, 1:14–29). Thus, VenHuizen discloses a seed distribution element

(metering unit) for precision pneumatic seed drills (the John Deere vacuum planter).

a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed,

76. VenHuizen discloses a sowing disk: “The heart of the John Deere planter is a metering unit which retains a circular rotatable seed disk that separates the interior of the metering unit into two chambers, one on each side of the disk.” (Ex. 1006, 1:14–17). VenHuizen also discloses a gearing assembly connected to the wheels that rotates a drive member on the inner shaft of the metering unit. “A gearing assembly, not shown, connected to the wheels 26 rotates a drive member, also not shown, which rotates a shaft 42 that extends through the metering unit and drives the metering unit 36 such that the rate at which the metering unit discharges seeds is coordinated to the ground speed of the planter.” (Ex. 1006, 5:43–49). A motor in the system causes the drive wheels of the tractor and precision planter to rotate. This, in turn, transmits torque to cause the shaft and singling discs to rotate. Therefore, the VenHuizen discloses a motor-driven transmission. Figure 7 of VenHuizen shows that the driveshaft is on the fixed portion of the

housing and it is centered relative to the sowing disc; this therefore constitutes a transmission drive shaft. (Ex. 1006, Fig. 7). The sowing disc is rotated at a controlled speed which is coordinated to the ground speed of the planter. (Ex. 1006, 5:40-49).



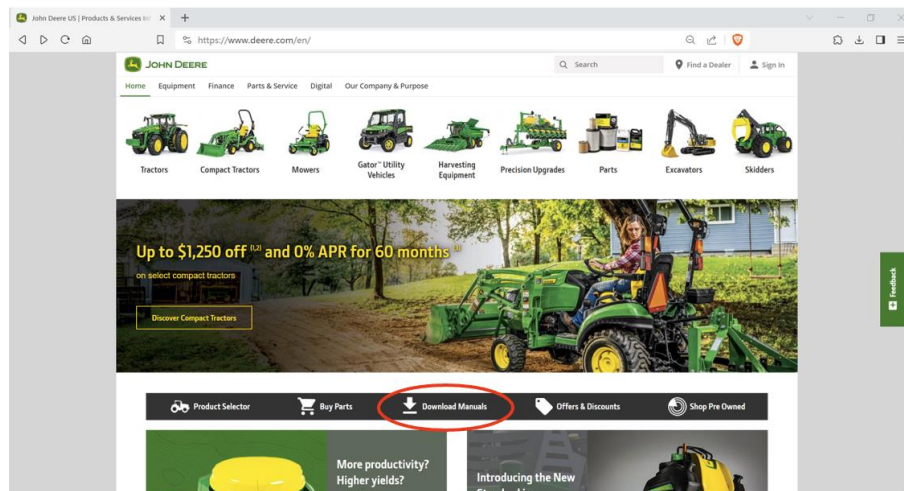
a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion,

77. VenHuizen discloses a housing with a first member (fixed portion) and a second housing member (movable portion) attached by a pivot pin to the first housing member: “the metering unit 36 includes a first housing member 50, having a generally cylindrical outer wall 52 and a planar rear wall 54 thereby forming a cavity” (Ex. 1006, 5:59–62), “...the metering unit 36 includes a second housing member 90 attached by a pivot pin 92

to the first housing member 50.” (Ex. 1006, 7:19–21). The disclosure of the second housing member joined to the first housing member via a pivot pin indicates that the second housing member is the movable portion. VenHuizen further discloses that the movable portion is closed against the fixed portion : “...the housing members 50, 90 are assembled against each other...” (Ex. 1006, 7:28-29).

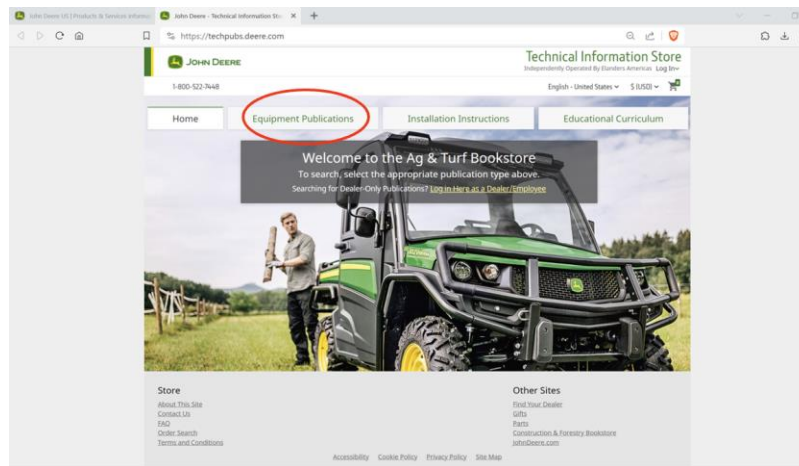
78. The first member of VenHuizen is the fixed portion because it communicates with the seed hopper containing seeds to be planted. (Ex. 1006, 5:30-34 and 7:62-64). Further, the John Deere manual for the seed meter disclosed in VenHuizen (Ex. 1006, 1:38-45) shows and describes the first member as the fixed portion of the seed meter housing: “Assemble the vacuum meter assembly onto hopper and secure meter with nuts” (Ex. 1016, 125-16), “replace hopper on unit and secure with latch” (Ex. 1016, 35-10). Attached as Exhibit 1016 is the manual for the John Deere 7200 Max Emerge Flex-Fold planter which is referred to in VenHuizen as the product the seed meter of VenHuizen will be used with. (Ex. 1006, 3:10-21). I procured the Deere 7200 manual from the John Deere website, which is a location a POSA would expect it to be found because Deere, as

well as other agricultural implement manufacturers, regularly maintain manuals and other equipment documentation indexed on a publicly available location at the manufacturer's website for interested parties to locate and access historical documentation. In particular, at the Deere website (www.deere.com/en/), I clicked on the "Download Manuals" button:

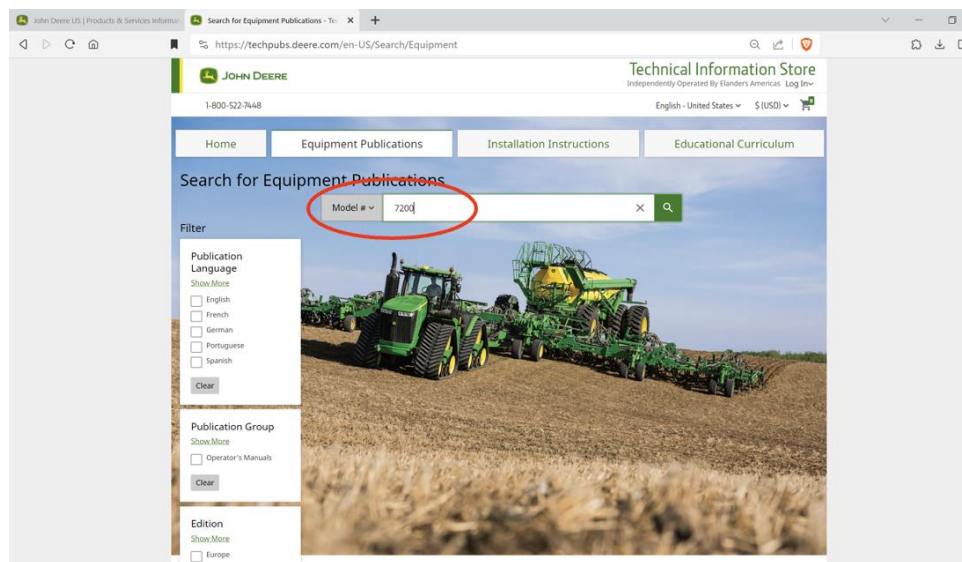


I then clicked on the "Equipment Publications" button on the newly presented webpage:

Declaration of Dr. Mark Fleming
Re: U.S. Patent No. 8,770,121

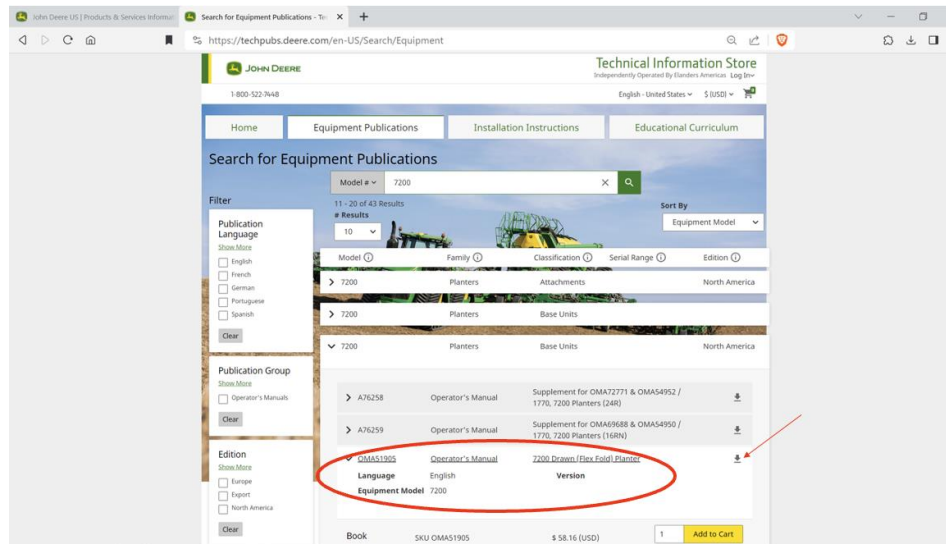


I then typed in “7200” in to the search bar for the Model 7200:



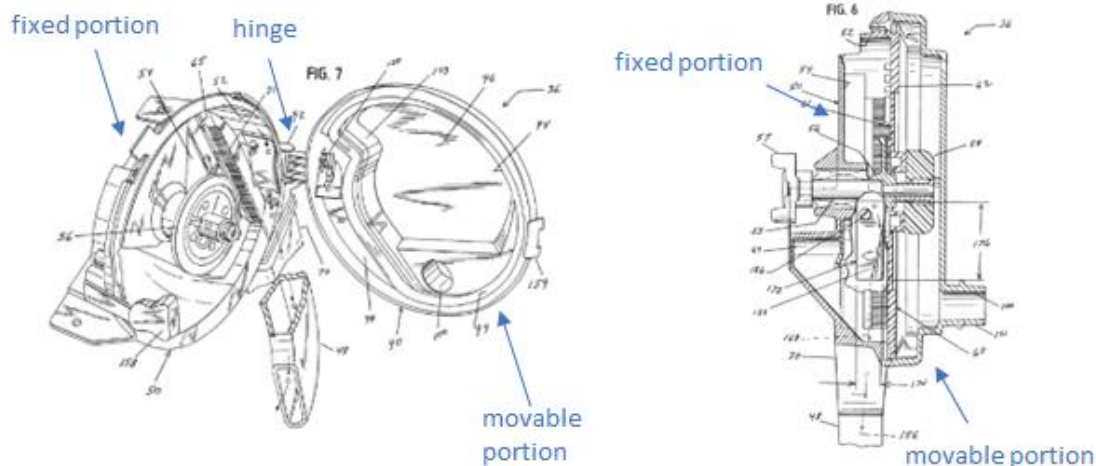
From the search results, I was able to download the Deere 7200 manual by clicking the downward pointing arrow:

Declaration of Dr. Mark Fleming
Re: U.S. Patent No. 8,770,121



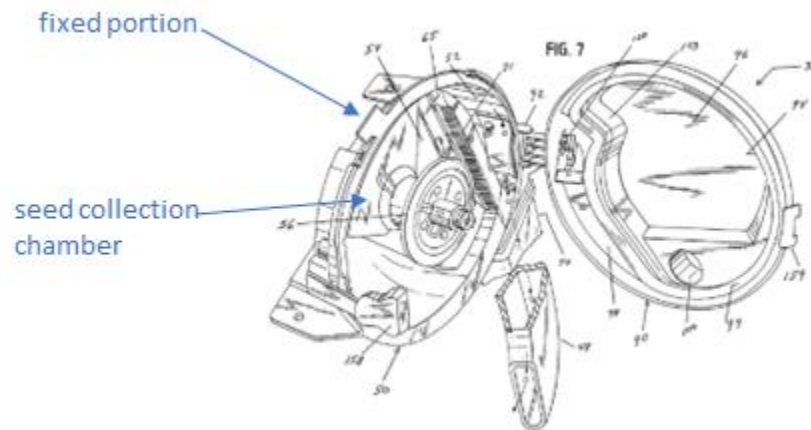
On its face, the Deere 7200 manual is over twenty years old. For instance on page 7, the manual includes a legend stating “COPYRIGHT © 1990” showing it was published in 1990. Examination of the Deere 7200 manual also shows it appears to be complete and I see nothing in the manual calling into question the manual’s legitimacy.

79. Accordingly, a POSA would understand which side of VenHuizen is fixed and which side is movable. (see Ex. 1006, Figs. 6-7, annotations added).



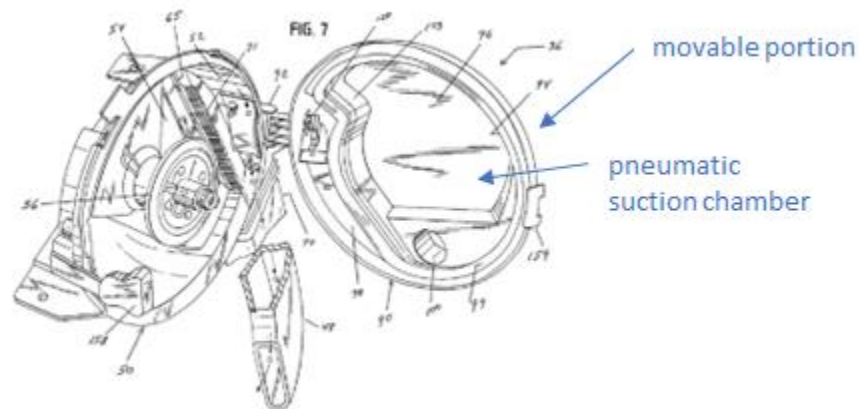
a seed collection chamber being defined in the fixed portion,

80. VenHuizen discloses a seed collection chamber in the fixed portion of the housing: “the first housing 50 includes an upwardly opening access port 69 in the rear wall 52 into which the lower end of the chute from the hopper 32 extends, allowing seeds to enter the first housing member 50.” (Ex. 1006, 6:37–41). “A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the chamber on the opposite side of the disk.” (Ex. 1006, 1:20–22). “...wherein seed is introduced into a first cavity in the metering unit defined by a first surface of the seed disk and a vacuum is drawn in a second cavity defined by the second surface of the seed disk.” (Ex. 1006, 3:14–16).



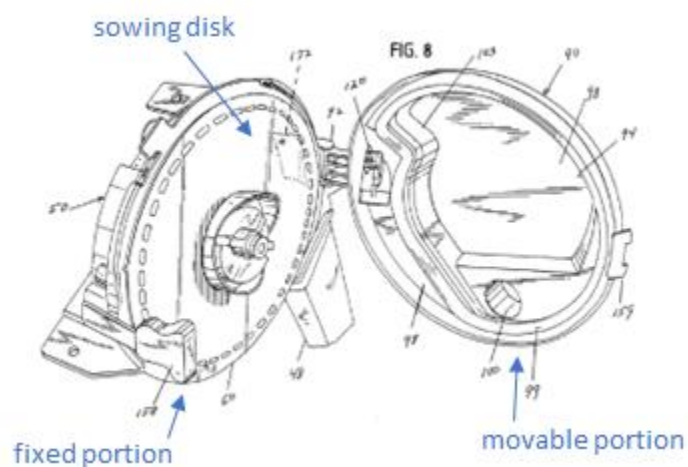
a pneumatic suction chamber being defined in the movable portion,

81. VenHuizen discloses a vacuum chamber in the movable portion of the housing: “The second housing member 90 further has an aperture 100 in the rear wall 96 and the outer surface of the second housing member has a tubular protrusion 101 the inner opening of which communicates with the aperture 100 and is adapted to receive a vacuum hose, not shown, leading from a vacuum pump.” (Ex. 1006, 7:31–36) “A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the chamber formed on the opposite side of the disk.” (Ex. 1006, 1:20–22).



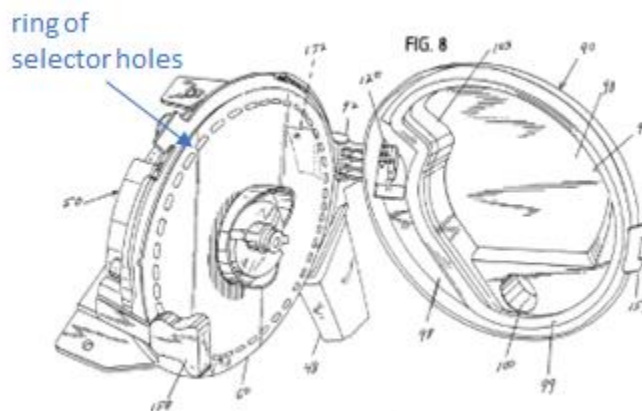
the sowing disc being interposed between the fixed and movable portions and having opposed surfaces delimiting the chambers,

82. VenHuizen discloses a seed disk (sowing disc) interposed between the fixed and movable portions: “A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the chamber formed on the opposite side of the disk.” (Ex. 1006, 1:20–22).



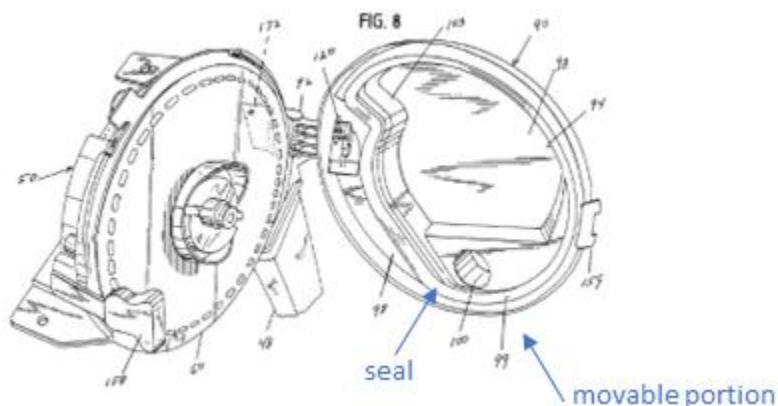
the sowing disc having at least one ring of selector holes extending between the opposed surfaces,

83. VenHuizen discloses a seed disk (sowing disc) with a ring of selector holes: “the seed disks employed in the machine have a plurality of holes, with the centers thereof spaced to define a circle having a radius a little less than the radius of the disk.” (Ex. 1006, 1:17–20); “Extending around a circle which is spaced a short distance within the outer circumference of the seed disk 60 are a plurality of spaced transverse holes 67–67.” (Ex. 1006, 6:27–31).



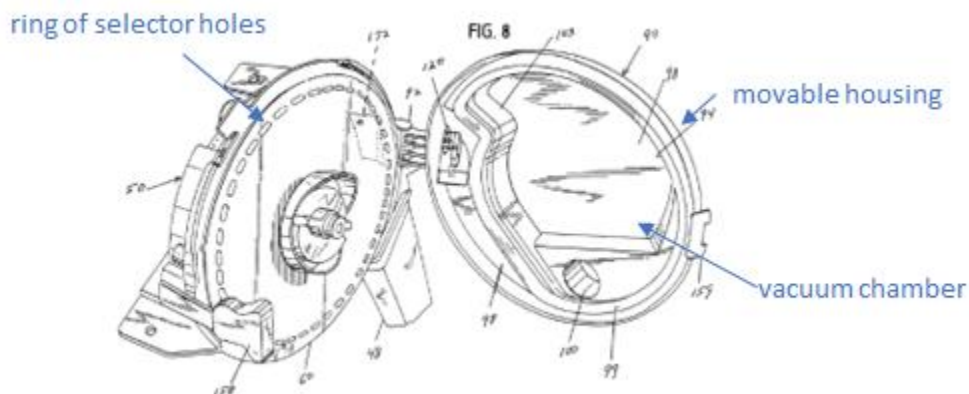
and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the fixed and movable portions are closed against one another,

84. VenHuizen discloses a seal on the movable portion that seals (by sliding contact) against the seed disk when the housing member is assembled together: “The tubular outer wall 96 includes an intrusion portion 98 including a generally radial wall 103, and around the inner edge of the outer wall 94 and the intrusion portion 98 is a rubberized sealing member 99 which seals against the second surface 62 of a seed disk 60 when the housing members 50, 90 are assembled against each other.” (Ex. 1006, 7:23–29). Because VenHuizen discloses that the seal is around the inner edge of the outer wall, the seal is fixed. VenHuizen also discloses that the seal contacts the surface of the seed disk; therefore, the seal must be in sliding contact with the disk as the disk rotates. (*See also* Ex. 1006, Fig. 8 annotated below).



wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes,

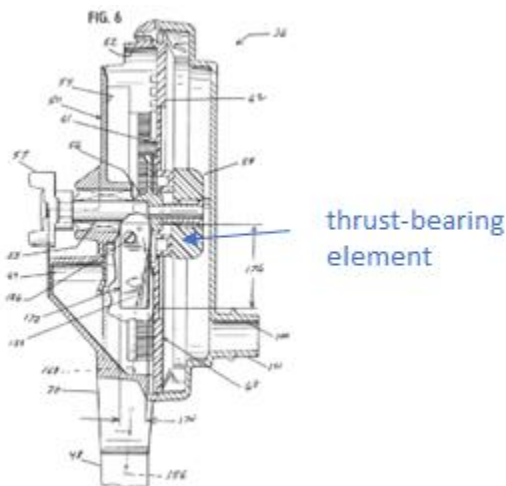
85. VenHuizen discloses a vacuum (pressure differential) on one side of the seed disk such that the vacuum is drawn through the ring of holes on the seed disk: When the metering unit 36 is operating properly, the vacuum in the second chamber is drawn through the plurality of holes 67–67 of the seed disk 60 except for those holes 67–67 positioned beyond the sealing member 99 (defined by the intrusion portion 98).” (Ex. 1006, 7:64–8:1).



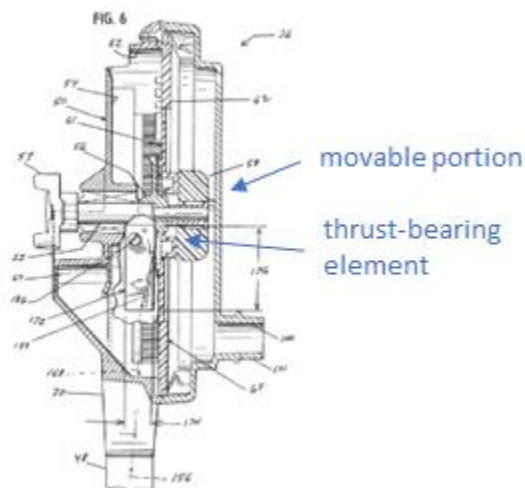
wherein the seed distribution element further comprises a thrust-bearing element of the sowing disc,

86. VenHuizen teaches a hub handle for locking the seed disk on the hub: “...the seed disk 60 has a generally circular body with first and second planar surfaces 61, 62, and having a wing shaped central opening 53. The

opening 53 is shaped to receive the winged hub handle 58, not shown, at the distal end of the retaining hub 56 of first housing member 50. Surrounding the central opening 53 on the second side 62 are two arcuately shaped opposing ramped surfaces 63, 64 and opposing locking notches 65, 66 for locking the seed disk 60 to the hub 56” (Ex. 1006, 6:20–28). This hub handle, which constrains the movement of the seed disk when a vacuum is applied, constitutes a thrust-bearing element.



thrust-bearing element) is positioned within the movable portion of the housing. Furthermore, VenHuizen discloses that the hub is threaded onto the cylindrical drive shaft and the handle is at the distal end of the retaining hub: “Extending from the rear wall 54, axially with respect to the cylindrical outer wall 52, is a tubular retaining hub 56 at the distal end of which is a handle” (Ex. 1006, 5:62–64), “...the retaining hub 56 is threaded on a cylindrical drive shaft 55 at the distal end of which are a pair of flanges 57 for drivingly engaging a drive member” (Ex. 1006, 6:1–4). The hub handle, which is locked to the hub, is therefore rotatably mounted.



88. As demonstrated by the foregoing analysis, VenHuizen expressly discloses every element of claim 1 and therefore anticipates claim 1.

Fiorido ('543)

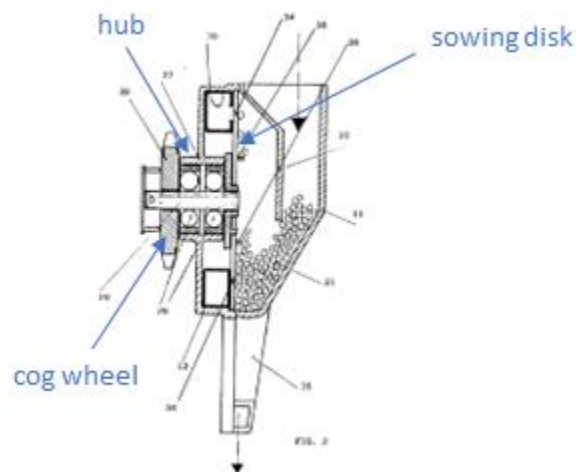
A seed distribution element for precision pneumatic seed drills, comprising:

89. Fiorido is directed at a precision-type single seed drilling planter: “The present invention relates to precision-type single-seed drilling planters...” (Ex. 1007, 1:1–2). Fiorido also discusses the employment of air suction across perforations (Ex. 1007, Abstract). A POSA would understand that Fiorido is directed at a seed distribution element for precision pneumatic seed drills.

a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed,

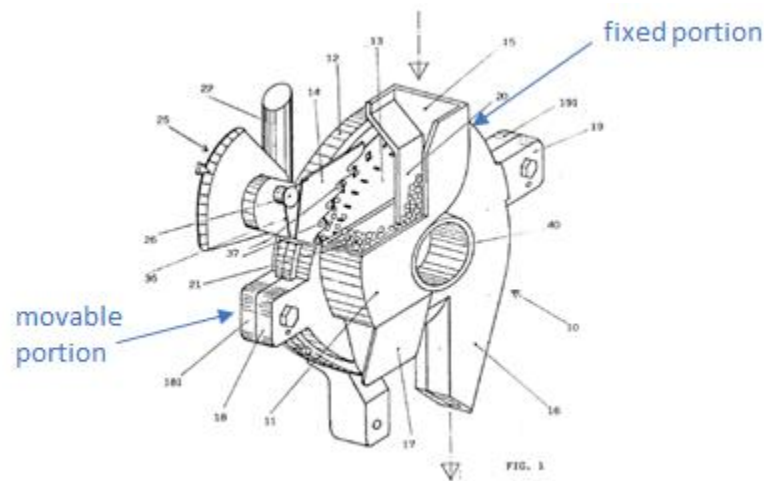
90. Fiorido discloses a perforated disk (sowing disk) to which seeds adhere via air suction: “The seeds 21, owing to the air suction through the conduit 22, the hole 23, the slit 24 and the perforations 34, are caused to adhere to the disk 13 and are lifted off the same disk, and get progressively separated, as they proceed in front of the slots 37 of the selector element 14.” (Ex. 1007, 7:29–34). The perforated disk is supported by a shaft and is rotatably driven: “The casing 12 is also provided with a perforated hub 27 (Figure 2) through which passes, as supported by bearings 28, a shaft 29 that may

- for instance be driven through a cog-wheel 30 to rotatably drive the disk 13, to which it is connected by means of a driving disk 31, a centering dowel 32 and a driving pin 33.” (Ex. 1007, 5:49–55). The driveshaft is on the fixed portion of the housing and centered relative to the sowing disc, and therefore constitutes a transmission drive shaft.
91. Fiorido discloses a cog-wheel as an example of a means to rotate the perforated disk. (Ex. 1007, 5:49-55 and Fig. 2 annotated below). A POSA would understand that the cog wheel could be part of the motor-driven transmission as a means to rotate the perforated disk.



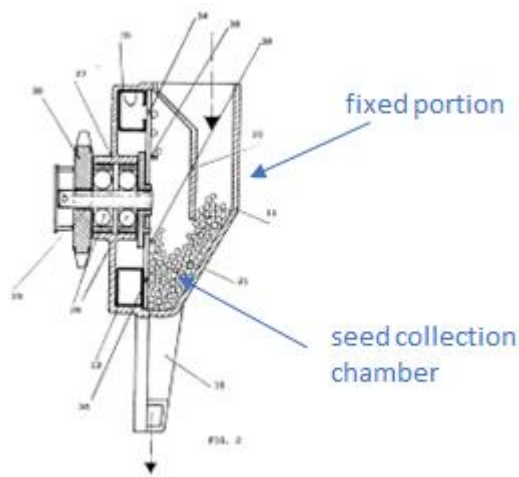
a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion,

92. Fiorido discloses a box-like casing (housing) with two portions. The second portion is movable relative to the first and can be closed against the first by means of pins or bolts: “The single-seed distributor means 10 is essentially formed by a seed container 11 and a box-like casing 12, with a perforated disk 13, associated with selector element 14, arranged therebetween.” (Ex. 1007, 5:10–13). “Said seed container 11 is further provided with projections 18, 19 that are adapted to cooperate with respective projections 181 and 191 of the casing 12 to effect the connection and the closure (by means of holes, pins, and bolts) of the container 11 with casing 12.” (Ex. 1007, 5:22–27). While Fiorido is agnostic as to which side is fixed, Fiorido expressly states that its seed container 11 can be modified “to possibly introduce the support and driving elements for the disk 13 from the opposite side of the device.” (Ex. 1007, 8:1–6). Because the drive can be introduced from either side, either side may be the fixed side. The non-fixed side is movable with respect to the fixed side.



a seed collection chamber being defined in the fixed portion,

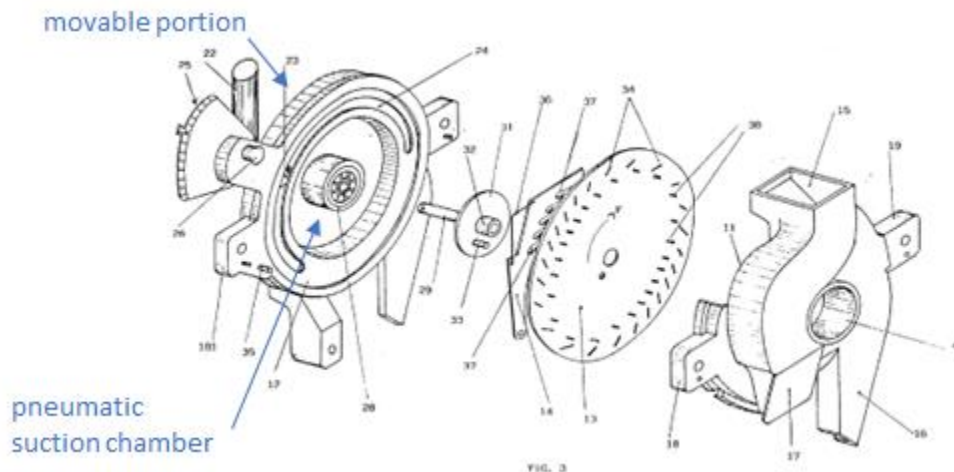
93. Fiorido discloses a seed container in the fixed portion connected to the hopper for loading seeds: “The seed container 11 is provided on its upper portion with a hopper 15 for loading the seeds, and on its lower portion with an unloading conduit 16 for depositing the seeds into the ground...” (Ex. 1007, 5:14–16). Again, Fiorido is agnostic as to which side is fixed but expressly states that its seed container 11 can be modified “to possibly introduce the support and driving elements for the disk 13 from the opposite side of the device.” (Ex. 1007, 8:1–6). Therefore, a POSA would understand that Fiorido’s design teaches that the seed collection chamber can be in the fixed portion.



a pneumatic suction chamber being defined in the movable portion,

94. Fiorido discloses a box-like casing connected with an air suction device which is in the opposite portion of the housing: “The box-like casing 12 is connected with an air suction device (for instance, a motor-driven fan of known type, not shown in the Figure) through a suction conduit 22 which terminates in a hole 23 (Figure 3) in correspondence of a suction slit 24 that is provided along a circumferential arc in the body of the casing 12.” (Ex. 1007, 5:33–39). If it is argued that the seed collection chamber is not defined in the fixed portion and the vacuum chamber is not defined in the movable portion, Fiorido discloses that the fixed and movable sides may be swapped because the motor-driven transmission drive shaft can be introduced on either side. A POSA would have known that the vacuum

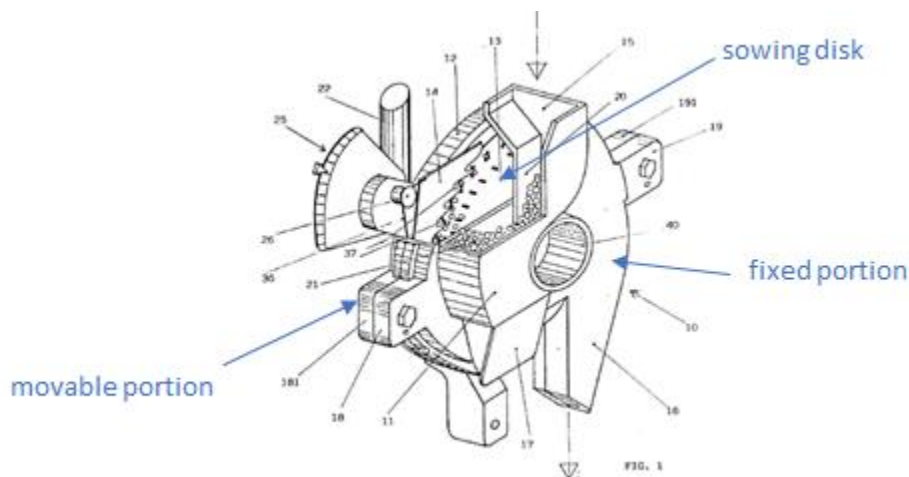
chamber must be on the opposite side from the seed chamber. Further, as admitted in the '121 patent, a POSA would have known the seal's thrust-bearing element must be on the vacuum side to alleviate axial load on the seal. (Ex.1001, 1:53-55, 63-65). Consequently, Fiorido discloses either the seed or suction chamber may be on the fixed side and the function of the thrust-bearing element dictates it be on the vacuum side. Thus, while Fiorido is agnostic as to which side is movable, a POSA would understand that Fiorido's design teaches that the pneumatic suction chamber can be in the movable portion.



the sowing disc being interposed between the fixed and movable portions and

having opposed surfaces delimiting the chambers,

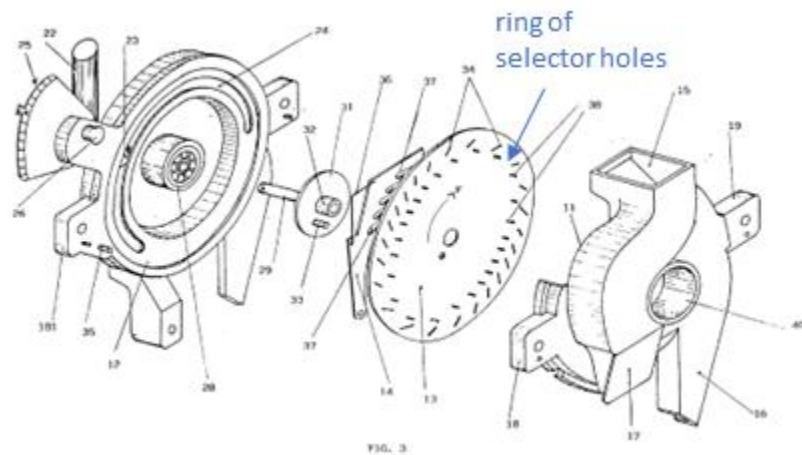
95. Fiorido discloses a perforated disk (sowing disk) being located between the fixed seed container and movable box-like casing: “The single-seed distributor means 10 is essentially formed by a seed container 11 and a box-like casing 12, with a perforated disk 13, associated with selector element 14, arranged therebetween.” (Ex. 1007, 5:10–13).



the sowing disk having at least one ring of selector holes extending between the opposed surfaces,

96. Fiorido discloses the perforated disk (sowing disk) having one or more sequences of concentric circular perforations (at least one ring of selector holes). Fiorido states that a suction blower creates a negative pressure through the perforations to keep seeds adhered to the disk, indicating the

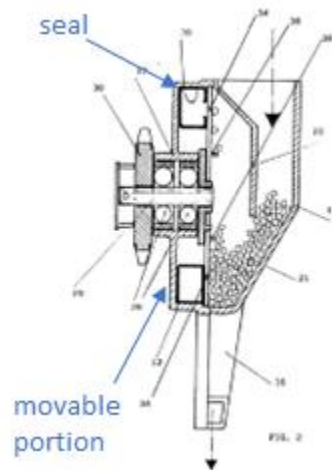
holes extend through opposite surfaces of the perforated disk. "[T]he withdrawal of the seeds from the loading container, their separation and their distribution according to a one-by-one pattern are performed by means of a rotating perforated disk having one or more sequences of concentric circular perforations, and co-operating on one side with a suction blower, which creates a negative pressure of the air through the perforations of the disk and thereby keeps the seeds adhering to the disk until the unloading zone is reached, and on the other side with a mechanical separator which enables the seeds to be selected one by one and causes excess seeds to fall back into the container." (Ex. 1007, 1:25–37).



and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the fixed and movable

portions are closed against one another,

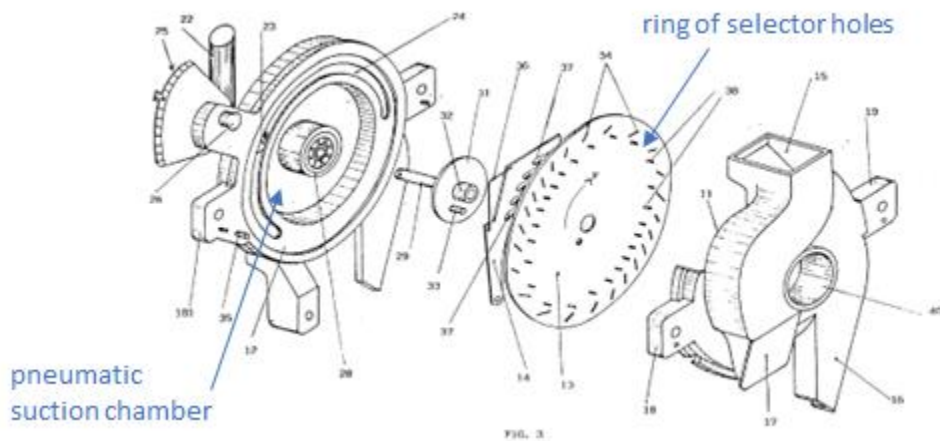
97. Fiorido discloses a hollow sealing ring (seal) between the casing (movable portion) and the disk (disc). Fiorido shows suction slit 24 as only extends along a portion of the circumference of the casing and states “there will be only one seed for each perforation 34 that keeps adhering to the disk 13 and that will then come off the same disk when it reaches the unloading area in correspondence of the unloading conduit 16, where the seed is no longer subjected to the air suction effect, since the suction slit 24 is in fact terminated.” (Ex. 1007, 7:38–45). Thus, it would not make sense to mount the seal on the rotating disc because seal would not cease in the unloading area. Therefore, a POSA would understand that Fiorido discloses the seal on the movable portion of the housing. When mounted to the movable portion, the seal would necessarily be in sliding contact with the rotating disk to maintain the seal when the two portions of the housing were closed together.



wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes,

98. Fiorido discloses a pressure differential between the opposed surfaces of the perforated disk through the perforations which keeps the seeds adhered to the disk: “the withdrawal of the seeds from the loading container, their separation and their distribution according to a one-by-one pattern are performed by means of a rotating perforated disk having one or more sequences of concentric circular perforations, and co-operating on one side with a suction blower, which creates a negative pressure of the air through the perforations of the disk and thereby keeps the seeds adhering to the disk until the unloading zone is reached, and on the other side with a mechanical separator which enables the seeds to be selected one by one

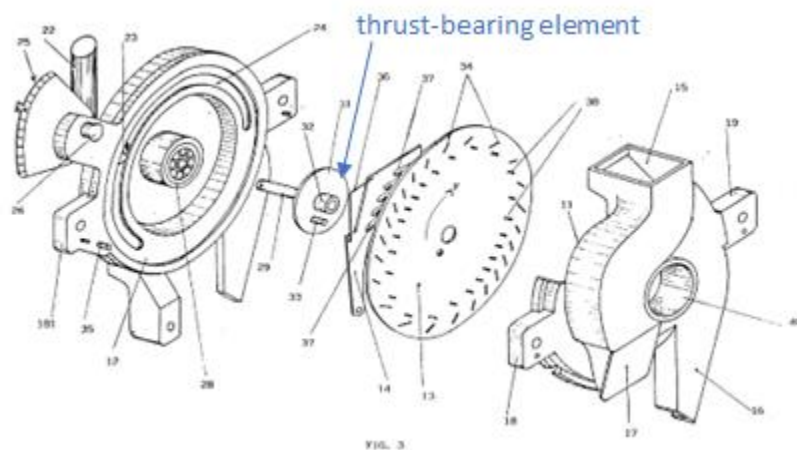
and causes excess seeds to fall back into the container.” (Ex. 1007, 1:25–37). As shown in Ex. 1007, Figure 3, the pressure differential is established along a circumferential segment of the ring of holes adjacent to the opening in the seal. See also Ex. 1007, 7:40–45 discussing how the seeds unload when no longer subjected to air suction.



wherein the seed distribution element further comprises a thrust-bearing element of the sowing disc,

99. Fiorido teaches a shaft supported by bearings that is connected to a driving disk, a centering dowel, and a pin: “The casing 12 is also provided with a perforated hub 27 (Figure 2) through which passes, as supported by bearings 28, a shaft 29 that may for instance be driven through a cog-wheel

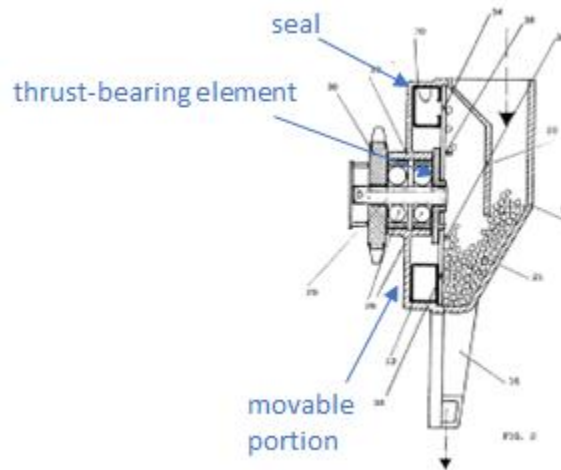
30 to rotatably drive the disk 13, to which it is connected by means of a driving disk 31, a centering dowel 32 and a driving pin 33.” (Ex. 1007, 5:49–55). The driving disk mounts against the perforated disk constraining the movement of the disk in the axial direction and withstanding some of the load applied to the seal by the disk when a vacuum is applied. This constitutes a thrust-bearing element.



which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.

100. The shaft, bearings, and driving disk are rotatably supported by bearings in the casing (movable portion of the housing). The driving disk mounts against the perforated disk constraining the movement of the disk in the

axial direction and withstanding some of the load applied to the seal by the disk when a vacuum is applied.



101. As demonstrated by the preceding analysis, Fiorido anticipates Claim 1.

Fiorido ('543) in view of Applicant Admitted Prior Art

102. If the patent holder were to argue that Fiorido does not disclose all the elements of claim 1 as arranged in the claim, the analysis above demonstrates that claim 1 is obvious over Fiorido in view of Applicant Admitted Prior Art. Fiorido discloses each of the elements. If the patent holder argues that Fiorido does not disclose the combination of “a pneumatic suction chamber being defined in the movable portion” and “[a] thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on

the seal” as arranged in the claim (Ex. 1001, Claim 1), Fiorido’s disclosure teaches to modify Fiorido to arrive at this arrangement. As described above, Fiorido discloses that the drive element may be introduced into either side of the seed distributor housing. (Ex. 1007, 8:1-6). Further, a POSA would know that the vacuum chamber must be on the opposite side from the seed chamber. Additionally, Applicant Admitted Prior Art teaches that the thrust-bearing element must rotate with the disc: “In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing.” (‘121 Patent, 1:53-57).

103. Therefore, if Fiorido’s drive element is moved from one side to the other, a POSA would know Fiorido’s thrust-bearing element must still be provided on the vacuum side to relieve axial load on the seal. A POSA would have a reasonable expectation of success as one could modify Fiorido to provide the rotatable thrust-bearing element in the same side as the vacuum chamber to relieve load on the seal, regardless of which side the drive shaft enters. Thus, a POSA would be using the structures of Fiorido for the purpose disclosed by Fiorido.

Amazone Manual in view of Fiorido ('543) and Applicant Admitted Prior Art

A seed distribution element for precision pneumatic seed drills, comprising:

104. The Amazone Manual (Ex. 1011) discloses a precision pneumatic seed drill that contains a seed distribution element which distributes seeds to the furrow: “On the deepest point (Fig. 40/2) of the singling disc the vacuum stops and the seed drops into the seed furrow formed by the sowing coulters.” (Ex. 1011, p. 53).



Fig. 35

a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed,

105. A motor in the system causes the drive wheels of the tractor and precision airplanter to turn. This, in turn, transmits torque to cause the singling discs to rotate: “The drive wheels of the precision airplanter drive the singling

discs” (Ex. 1011, p. 48). Therefore, the Amazone Manual discloses a motor-driven transmission.

106. The mechanism that directly drives the disc is a gear offset to the outer portion of the housing and is directly mounted to the frame. Given the proposed construction provided above, there is no drive shaft mounted on the fixed portion of the housing that is centered relative to the sowing disc. Therefore, the Amazone precision airplanter manual does not disclose a “transmission drive shaft,” as argued by Gasparido in the European File History.

107. But if an argument is made that it is unnecessary for a drive shaft to be mounted to the fixed portion and centered relative to the sowing disk, the shaft supporting the gear that drives the sowing disk would meet the claim limitation.

108. Moreover, it would have been obvious to a POSA to use the centrally located, center-driven motor-driven transmission drive shaft of Fiorido on the fixed side of Amazone’s seed disk to rotate the disk. It would be a simple substitution of the peripherally located gearing of Amazone with the centrally located mechanism of Fiorido on the fixed side, a substitution

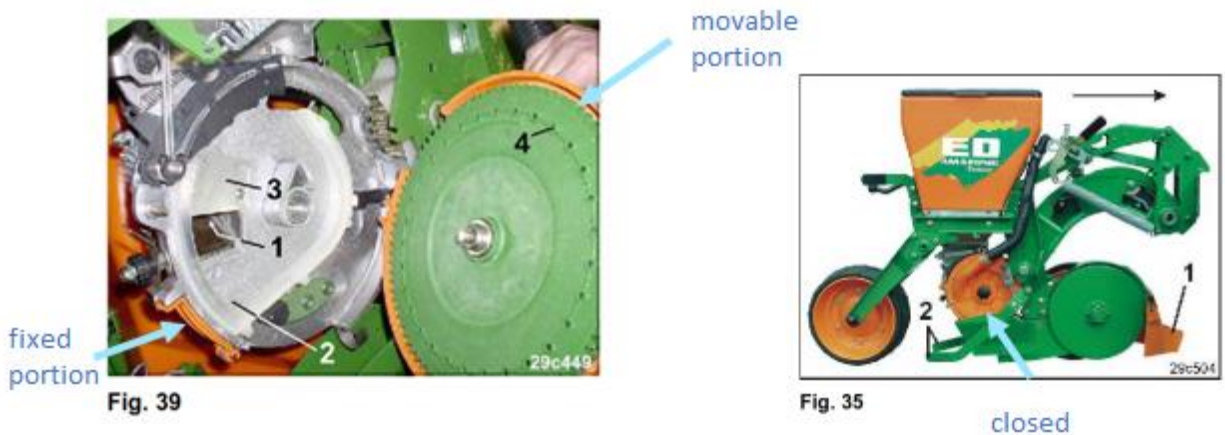
well within the capabilities of a person of ordinary skill in the art. A POSA would have an expectation of success using the centrally located motor-driven transmission shaft of Fiorido because centrally located drive shafts on the fixed side of the seed disk were well known standard driving mechanisms in seed disks for decades before the priority date of the '121 patent, as is shown above by Fiorido and VenHuizen. The speed of the sowing discs is adjusted (controlled) via gearbox settings: “The rev. speed of the singling discs is adjusted on the setting gearbox and on the secondary gearbox. Gearbox rev. speed changes result in a change of grain spacing in the soil.” (Ex. 1011, p. 48)



Fig. 39

a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion,

109. The Amazone Manual discloses a seed meter. As shown in the figures of the manual, the seed meter has a housing with a portion that is fixed and a portion that is movable relative to the fixed portion and can be closed against the fixed portion. (Ex. 1011, p. 53).



a seed collection chamber being defined in the fixed portion,

110. The Amazone Manual discloses a seed collection chamber in the fixed portion: “The seed slips out of the seed hopper through the opening (Fig. 39/1) into the seed store area (Fig. 39/2) of the singling disc.” (Ex. 1011, p. 53, Fig. 3). Figure 39 illustrates the seed collection chamber in the fixed portion, as annotated below.

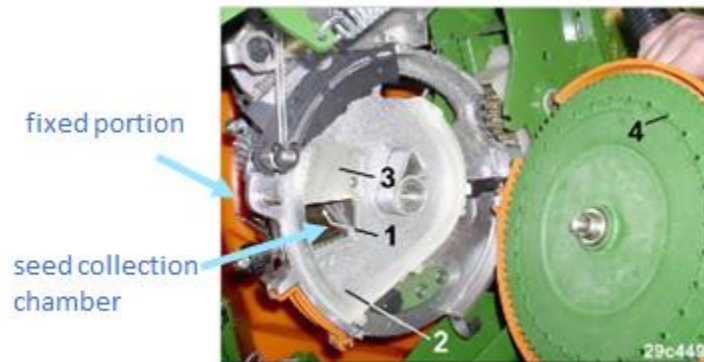
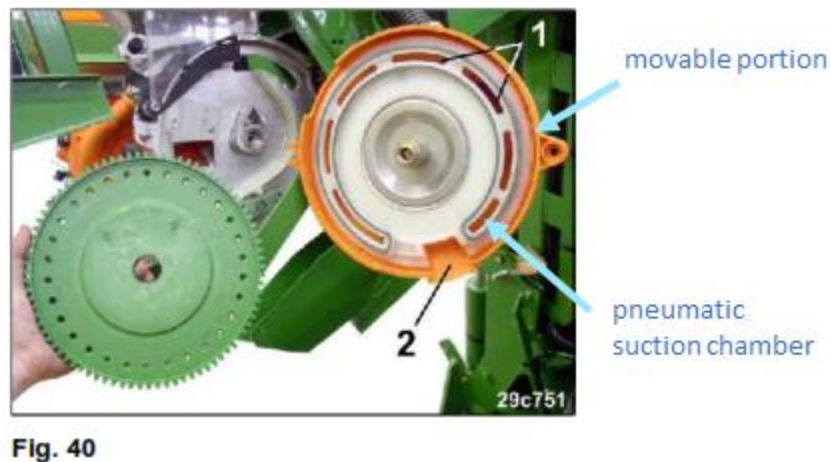


Fig. 39

a pneumatic suction chamber being defined in the movable portion,

111. The Amazone Manual discloses a pneumatic suction chamber in the movable portion: “The impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc. The seeds are drawn by vacuum off the seed store area on to the holes (Fig. 39/4). The air leaves the seed housing via the slits (Fig. 40/1) of the suction kidney.” (Ex. 1011, p. 53, Fig. 40). Figure 40 illustrates the vacuum chamber in the movable portion, as annotated below.



the sowing disc being interposed between the fixed and movable portions and having opposed surfaces delimiting the chambers,

112. The Amazone Manual discloses a singling disc (sowing disc) interposed between the seed store area of the fixed portion and the vacuum chamber of the movable portion: “The seed slips out of the seed hopper through the opening (Fig. 39/1) into the seed store area (Fig. 39/2) of the singling disc. The impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc. The seeds are drawn by vacuum off the seed store area on to the holes (Fig. 39/4). The air leaves the seed housing via the slits (Fig. 40/1) of the suction kidney.” (Ex. 1011, p.53). The singling discs have opposing sides that constitute the surfaces that cooperatively define the respective seed collection and pneumatic suction chambers.



the sowing disc having at least one ring of selector holes extending between the opposed surfaces,

113. The Amazone Manual discloses singling discs (sowing discs) depicted with a ring of selector holes that extend between opposed surfaces. Further, the manual describes that “the impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc” (Ex. 1011, p. 53), indicating the holes extend between the opposed surfaces. (See also Ex. 1011, p. 54, as annotated below).



Fig. 44

and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the fixed and movable portions are closed against one another,

114. The Amazone Manual discloses a PE-foam profile seal and the figures show this seal on the movable portion. The seal is affixed to the suction kidney which has an opening at the deepest point of the singling disc. (Ex. 1011, p. 166, Fig. 227 annotated below). This opening is aligned with the area where the suction stops and the seed is dropped into the furrow. Based on the description in the manual of the vacuuming stopping at the deepest point, the suction kidney does not rotate, and therefore, the affixed seal does not rotate (Ex. 1011, p. 53). Thus, a POSA would understand that the

seal makes sliding contact with the facing surface of the disc when the fixed and movable portions are closed against one another.



Fig. 227

wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes,

115. The Amazone Manual discloses a pressure differential across the singling disc such that the seeds are drawn by vacuum onto the holes: “The seed is drawn by vacuum on to the holes of the rotating singling discs. The vacuum impeller (Fig. 27/2) provides the necessary vacuum. On the lower most point of the singling disc the vacuum stops and the seed grain drops into the seed furrow created by the sowing coulter (Fig. 27/3).” (Ex. 1011, p. 48). “The impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc. The seeds are drawn by vacuum off the seed store

area on to the holes (Fig. 39/4).” (Ex. 1011, p. 53). As indicated, the vacuum is applied only to a region of a circumferential segment of the ring of holes, and the seeds drop off the singling disc in the region where the vacuum stops.

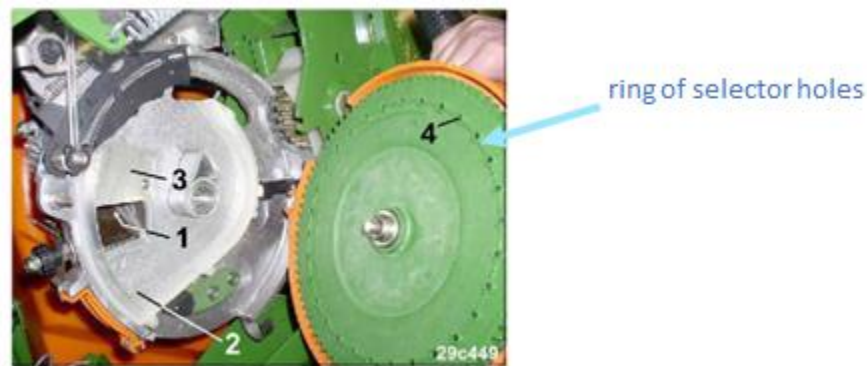


Fig. 39

wherein the seed distribution element further comprises a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.

116. The Amazone Manual discloses a circular element. (Ex. 1011, p. 166, Fig. 227 as annotated below). The manual does not state whether the circular element contacts the singling disk.

117. However, in view of the Applicant Admitted Prior Art, a POSA would be motivated to modify the circular element with the disclosure of Fiorido such that the circular element would contact the seed disk. This modification would result in a thrust-bearing element that would withstand at least some of the axial load produced by the disk on the seal, and would reduce the wear on the Amazone seal, consistent with the teachings in the Applicant Admitted Prior Art.



Fig. 227

118. A POSA would have reason to combine the teachings of the Amazone Manual with the disclosure of Fiorido. The Amazone Manual and Fiorido are both directed at an apparatus for precise positioning of a seed disk in a seed meter and disclose a seed disk with a plurality of apertures. Both relate to the same field of endeavor as the '121 patent—precision planting and

vacuum seed meters. Both also disclose a seed meter with two portions that close against one another.

119. A POSA would understand that Fiorido's driving disk structure could be adapted for use in Amazone's disclosed structure to provide a rotating thrust-bearing element. This thrust-bearing element would ensure that excessive load is not placed upon the seal disclosed in Amazone, reducing the wear on the seal. The Applicant admitted that the wear problem and the solution of a rotating thrust-bearing element were known (Ex. 1001, 1:53-57). Fiorido teaches that the driving disk 31 (thrust-bearing element) is connected to the disk 13 (sowing disc) (Ex. 1007, 5:49-55). Moreover, the Applicant Admitted Prior Art states that "the disc must be attached to the thrust-bearing element" (Ex. 1001, 1:59-60). Based upon the Applicant Admitted Prior Art, a POSA would understand that the thrust-bearing element, which must rotate with the disc, can be used to reduce wear on the seal. (Ex. 1001, 1:53-65). A POSA would have a reasonable expectation of success in combining the teachings of the Amazone Manual, Fiorido, and the Applicant Admitted Prior Art because the art recognized the need to use these basic structures (e.g., the thrust-bearing element and

seal) in combination and the substituted parts would continue to work in the same manner to achieve the same function. (See Ex. 1011, p. 166, Fig. 227 as annotated below).



Fig. 227

Claim 2

120. Claim 2 is: (a) anticipated by VenHuizen ('807); (b) anticipated by Fiorido ('543)⁶; and (c) obvious over the Amazone Manual in view of Fiorido ('543) and Applicant Admitted Prior Art as shown in the following analysis.

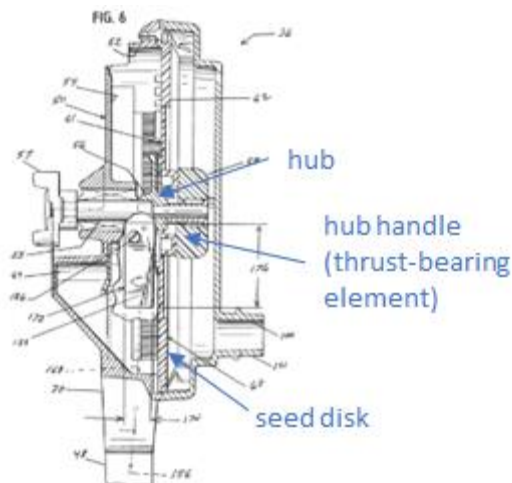
VenHuizen ('807)

The seed distribution element according to claim 1, wherein the thrust-

⁶ All elements of Claim 2 are presented in Fiorido; however, whether Claim 2 is anticipated by Fiorido or obvious over Fiorido depends from Claim 1.

bearing element is rotated with the disc when the fixed and movable portions are closed against one another.

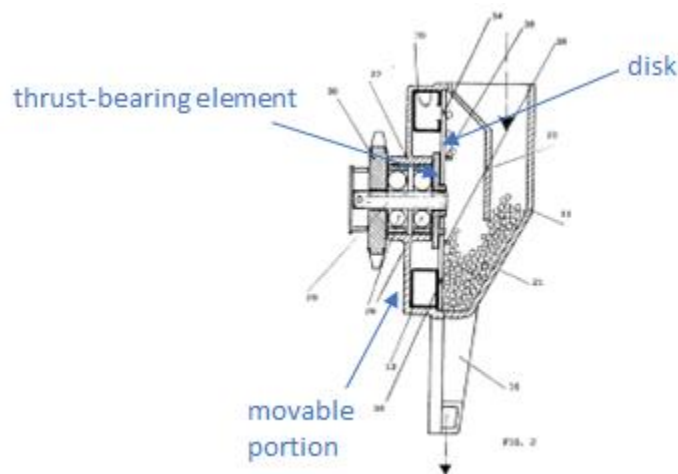
121. The seed disk of VenHuizen is locked in place on the hub via the hub handle. Together, the hub, hub handle (thrust-bearing element) and seed disk rotate when the fixed and movable portions are closed together. A POSA would understand that since the hub handle is attached to the retaining hub, rotation of the hub rotates the disc, which will rotate the hub handle 58. (See Ex. 1006, Fig. 6, as annotated below).



Fiorido ('543)

The seed distribution element according to claim 1, wherein the thrust-bearing element is rotated with the disc when the fixed and movable portions are closed against one another.

122. The driving disk (thrust-bearing element) of Fiorido is connected to the seed disk by means of a shaft, centering dowel, and pin. The shaft is supported by bearings and driven by means of a cog wheel (for instance): “The casing 12 is also provided with a perforated hub 27 (Figure 2) through which passes, as supported by bearings 28, a shaft 29 that may for instance be driven through a cog-wheel 30 to rotatably drive the disk 13, to which it is connected by means of a driving disk 31, a centering dowel 32 and a driving pin 33.” (Ex. 1007, 5:49–55). The pin couples the driving disk in rotation with the seed disk. Thus, the thrust-bearing element is rotated with the disk when the fixed and movable portions are closed against one another.



Amazone Manual in view of Fiorido ('543) and Applicant Admitted Prior Art

The seed distribution element according to claim 1, wherein the thrust-bearing element is rotated with the disc when the fixed and movable portions are closed against one another.

123. As discussed previously, the circular element of the Amazone manual, when modified per the disclosure of Fiorido and the teachings of the Applicant Admitted Prior Art, is a thrust-bearing element. A POSA would understand that the thrust-bearing element must be rotated with the disc. (Ex. 1001, 1:53–65). As disclosed in the '121 patent, it was known in the prior art that the thrust-bearing element rotated with the disk (see Ex. 1001 at 1:55–57, “In all cases, however, the thrust-bearing element, which must be rotated with the disk, is mounted on the fixed portion of the housing...”).
124. Fiorido discloses that the driving disk (thrust-bearing element) is connected to the seed disk by means of a shaft, centering dowel, and pin. (Ex. 1007, 5:49–55). The pin couples the driving disk in rotation with the seed disk, and therefore Fiorido teaches that the thrust-bearing element rotates with the sowing disk.

125. As discussed previously, a POSA would have reason to combine the teachings of the Amazone Manual with the teachings of Fiorido and Applicant Admitted Prior Art. A POSA would be motivated to have the thrust-bearing element rotate with the seed disk to avoid wear. A POSA would have a reasonable expectation of success in combining the teachings of the Amazone Manual, Fiorido, and the Applicant Admitted Prior Art because the art recognized the need and use for these basic structures (e.g., the thrust-bearing element and seal) and they would be used in the same way to achieve the same functional result as they had in the past. (See Ex. 1011, p. 166, Fig. 227 as annotated below).



Fig. 227

Claim 3

126. Claim 3 is: (a) anticipated by VenHuizen ('807); (b) anticipated by Fiorido ('543)⁷; and (c) is obvious over the Amazone Manual in view of Fiorido ('543) and Applicant Admitted Prior Art as shown in the following analysis.

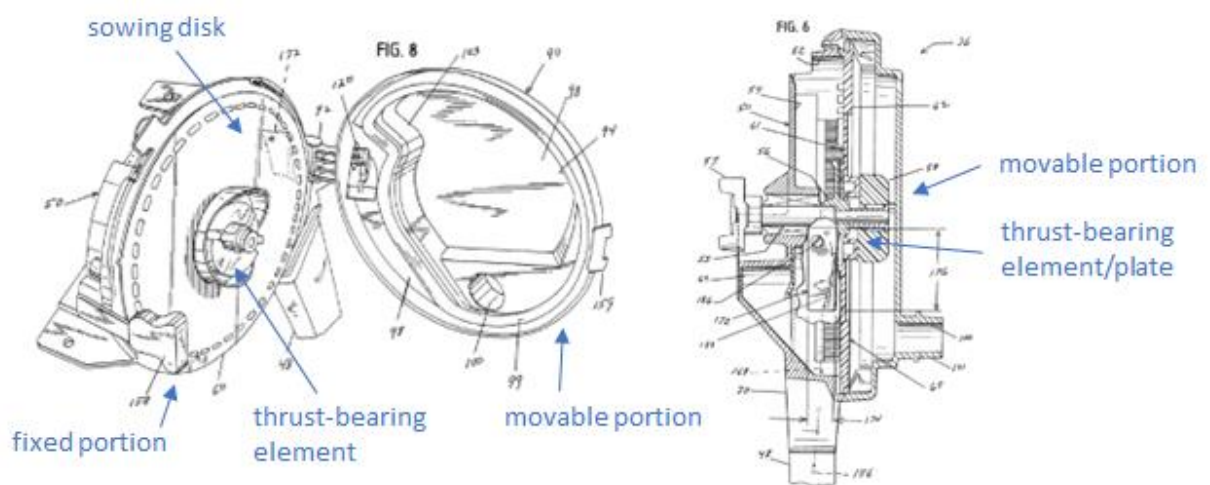
VenHuizen ('807)

The seed distribution element according to claim 1, wherein the thrust-bearing element comprises a thrust-bearing plate which can bear on that surface of the sowing disc which faces the seal, in a zone radially inside of the ring of holes.

127. The thrust-bearing element of VenHuizen includes a plate (i.e., a generally flat surface) which bears on the surface of the sowing disc facing the seal. Notably, as shown in the figure below, the hub handle 58 includes a surface on the left side that contacts the sowing disc 60 to constrain its axial movement. (Ex. 1006, 6:1–18, 22–27, Fig. 6 annotated below). That surface 62 of the sowing disc contacted by the handle 58, is located on the same side of the sowing disc as the seal. Furthermore, as seen in Figure 8

⁷ All elements of Claim 3 are presented in Fiorido; however, whether Claim 3 is anticipated by Fiorido or obvious over Fiorido depends from Claim 1.

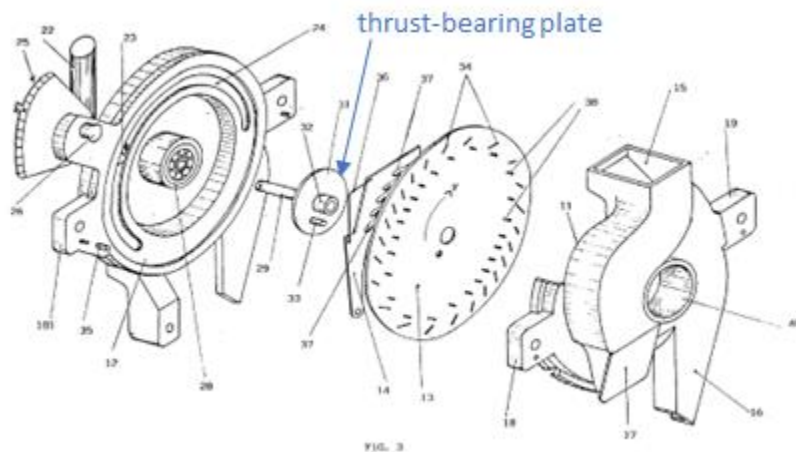
of Ex. 1006, annotated below, the hub handle 58 contacts the surface 61 of the disc radially inside the ring of selector holes. The generally flat surface of the thrust-bearing that contacts the sowing disc is a plate. The plate contacts the portion of the seed disk in a zone radially inside of the ring of holes when the disk is installed and the fixed and movable portions are closed.



Fiorido ('543)

The seed distribution element according to claim 1, wherein the thrust-bearing element comprises a thrust-bearing plate which can bear on that surface of the sowing disc which faces the seal, in a zone radially inside of the ring of holes.

128. Fiorido discloses a driving disk 31 supported rotatably in the casing 12. (Ex. 1007, 5:49–55, Figs. 2-3). The driving disk 31 is equivalent to the thrust-bearing plate. Because the driving disk 31 is located between the disk 13 and the casing 12, the suction in suction slit 24 would at least partially pull the disk 13 toward the driving disk 31 such that the driving disk withstands at least some of the axial load produced by the disk 13 on the seal 39. (Ex. 1007, FIG. 3 as annotated below). Fiorido, FIG. 2, shows the driving disk 31 bearing on the surface of the perforated disk 13 on a surface that faces the seal 39, and the driving disc 31 is in a zone that is radially inside of the holes or perforations formed through the perforated disk 13. (Ex. 1007, FIGS. 2–3).

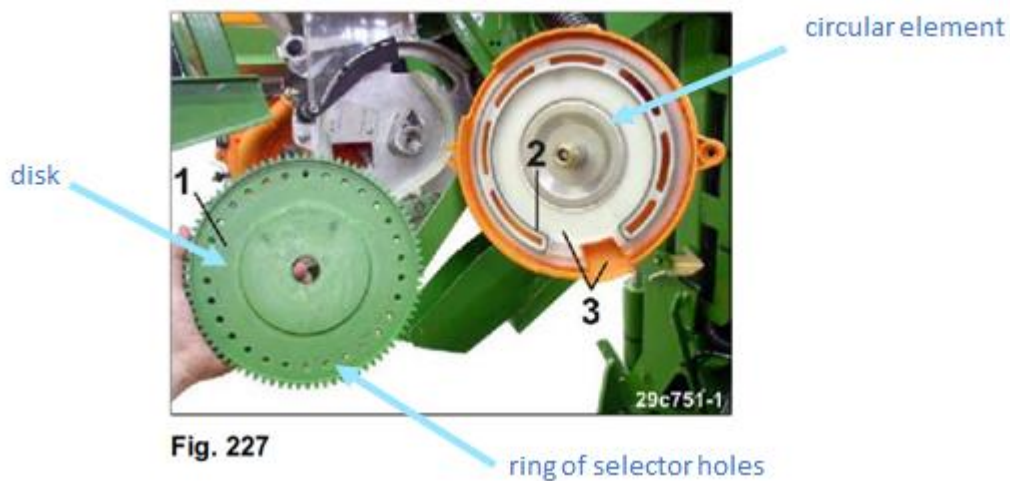


Amazone Manual in view of Fiorido ('543) and Applicant Admitted Prior Art

The seed distribution element according to claim 1, wherein the thrust-bearing element comprises a thrust-bearing plate which can bear on that surface of the sowing disc which faces the seal, in a zone radially inside of the ring of holes.

129. The thrust-bearing element of the Amazone manual as modified by Fiorido and Applicant Admitted Prior Art meets this limitation. When modified, the circular element of the Amazone manual would be a generally flat surface, constituting a thrust-bearing plate. As shown in Fig. 40 of the Amazone manual, the diameter of the circular element is less than the diameter of the ring of holes. Therefore, the thrust-bearing plate would bear on the surface of the sowing disk in a zone radially inside the ring of holes. As discussed previously, a POSA would have reason to combine the teachings of the Amazone Manual with the teachings of Fiorido and Applicant Admitted Prior Art. A POSA would be motivated to have the thrust-bearing plate, such as disclosed by Fiorido, bear on the surface of the seed disk to avoid wear. A POSA would have a reasonable expectation of success in combining the teachings of the Amazone Manual, Fiorido, and the Applicant Admitted Prior Art because the art recognized the need

and use for these basic structures (e.g., the thrust-bearing plate and seal)
and they would be used in the same way to achieve the same functional
result as they had in the past.



Claim 4

130. Claim 4 is anticipated by Fiorido ('543)⁸ as shown in the following
analysis.

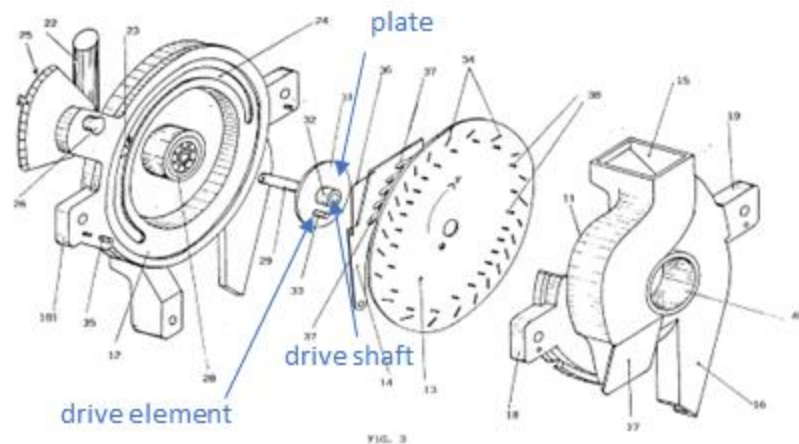
Fiorido ('543)

The seed distribution element according to claim 3, wherein the thrust-
bearing element comprises a drive element which is fixed for rotation with
the plate and can be coupled with the drive shaft of the disc when the fixed

⁸ All elements of Claim 4 are presented in Fiorido; however, whether Claim 4 is anticipated by Fiorido or obvious over Fiorido depends from Claim 1.

and movable portions are closed against one another.

131. Fiorido discloses a driving disc 31 (“plate”) that further includes a driving pin 33 and a center dowel 32 through which the driving disc 31 attaches to the seed disc (i.e., perforated disc 13) and rotatably drives the seed disc along with the driving disc 31 to which the driving pin and center dowel are affixed. (Ex. 1007, 5:49–55, FIGS. 2–3). The driving pin is a “drive element” which is fixed for rotation with the plate (i.e., through the driving disc 31) and is coupled with the drive shaft of the disc when the fixed and movable portions are closed against one another.



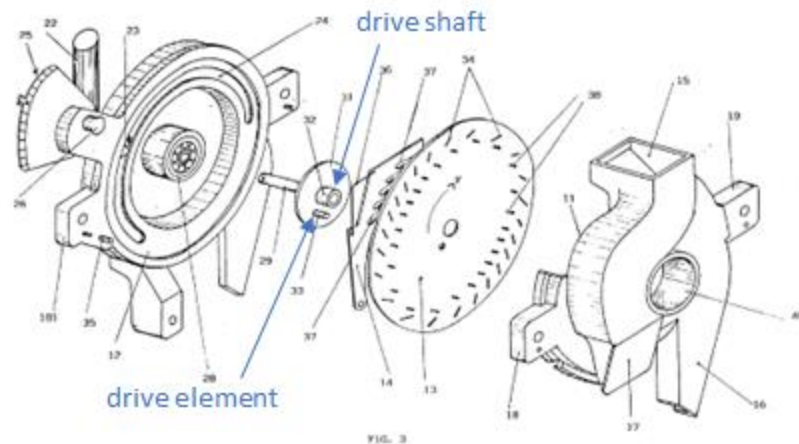
Claim 5

132. Claim 5 is anticipated by Fiorido ('543)⁹ as shown in the following analysis.

Fiorido ('543)

The seed distribution element according to claim 4, wherein the drive element is self-centering relative to the drive shaft.

133. The rotational center of the drive element (driving pin 33) disclosed in Fiorido is coaxial with the rotational axis of the drive shaft (centering dowel 32). (Ex. 1007, Figs. 2-3). Therefore, the drive element is self-centering relative to the drive shaft.



Claim 7

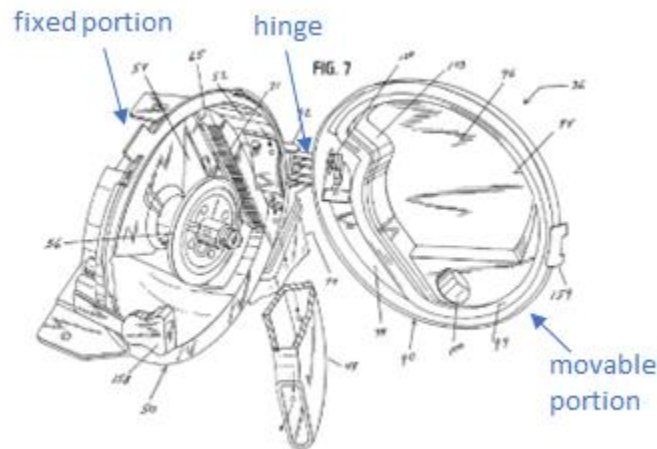
⁹ All elements of Claim 5 are presented in Fiorido; however, whether Claim 5 is anticipated by Fiorido or obvious over Fiorido depends from Claim 1.

134. Claim 7 is (a) anticipated by VenHuizen ('807); (b) obvious over Fiorido ('543) in view of VenHuizen ('807); and (c) obvious over the Amazone Manual in view of VenHuizen ('807) as shown in the following analysis.

VenHuizen ('807)

The seed distribution element according to claim 1, wherein the movable portion is hinged to the fixed portion.

135. VenHuizen discloses the second housing member (movable portion) being attached to the first housing member (fixed portion) via a pivot pin (hinge): “the metering unit 36 includes a second housing member 90 attached by a pivot pin 92 to the first housing member 50.” (Ex. 1006, 7:19–21).



Fiorido ('543) in view of VenHuizen ('807)

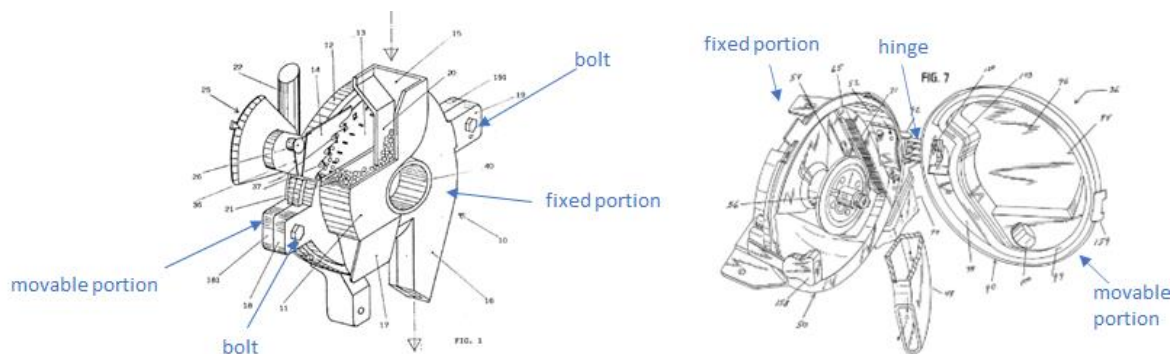
The seed distribution element according to claim 1, wherein the movable

portion is hinged to the fixed portion.

136. Fiorido discloses a box-like casing (housing) with two portions. The second portion is movable relative to the first and can be closed against the first by means of pins or bolts: “The single-seed distributor means 10 is essentially formed by a seed container 11 and a box-like casing 12, with a perforated disk 13, associated with selector element 14, arranged therebetween.” (Ex. 1007, 5:10–13) “Said seed container 11 is further provided with projections 18, 19 that are adapted to cooperate with respective projections 181 and 191 of the casing 12 to effect the connection and the closure (by means of holes, pins, and bolts) of the container 11 with casing 12.” (Ex. 1007, 5:22–27)
137. VenHuizen discloses the second housing member (movable portion) being attached to the first housing member (fixed portion) via a pivot pin (hinge): “the metering unit 36 includes a second housing member 90 attached by a pivot pin 92 to the first housing member 50.” (Ex. 1006, 7:19–21).
138. A POSA would be motivated to combine the seed meter disclosed in Fiorido with the hinge disclosed in VenHuizen for ease accessing the interior of the seed meter for maintenance purposes. Because both patents

disclose seed meters with two mating parts, the combination of the hinge of the VenHuizen with the seed meter disclosed in Fiorido would be a straightforward adaptation. Furthermore, replacing the pins and bolts of Fiorido with the hinge of VenHuizen is a simple substitution of one known element for another to obtain predictable results.

139. It would have been obvious to a POSA at the time of the invention claimed in the '121 patent to combine the teachings of Fiorido with the disclosures of VenHuizen and a POSA would have had a reasonable expectation of success in accomplishing the combination. Fiorido and VenHuizen are both directed at an apparatus for precise positioning of a seeds and disclose a vacuum seed meter with two mating portions and a seed disk with a plurality of apertures. Fiorido and VenHuizen both relate to the same field of endeavor as the '121 patent—precision planting and vacuum seed meters. (See Fig. 1 of Fiorido, Ex. 1007 on the right below, and Fig. 7 of VenHuizen, Ex. 1006 on the left below, both annotated).



The Amazone Manual in view of VenHuizen ('807)

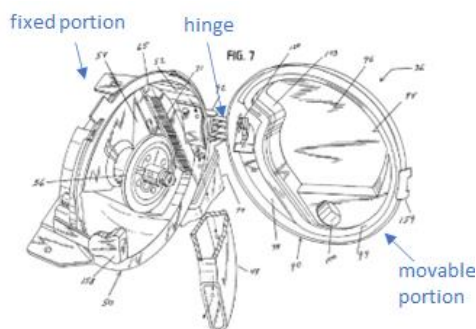
The seed distribution element according to claim 1, wherein the movable portion is hinged to the fixed portion.

140. The Amazone Manual shows a housing with two portions. (Ex. 1011, p. 166). The movable portion is movable relative to the fixed portion and can be closed against the fixed portion.

141. VenHuizen discloses the second housing member (movable portion) being attached to the first housing member (fixed portion) via a pivot pin (hinge): “the metering unit 36 includes a second housing member 90 attached by a pivot pin 92 to the first housing member 50.” (Ex. 1006, 7:19–21).

142. To the extent that it is unclear precisely how the movable portion of the Amazone housing is connected to the fixed portion of the housing, a POSA would be motivated to combine the seed meter disclosed in the Amazone

Manual with the hinge disclosed in VenHuizen for ease accessing the interior of the seed meter for maintenance purposes. It would have been obvious to a POSA at the time of the invention claimed in the '121 patent to combine the teachings of the Amazone Manual with the disclosures of VenHuizen and a POSA would have had a reasonable expectation of success in accomplishing the combination. The Amazone Manual and VenHuizen both relate to the same field of endeavor as the '121 patent—precision planting and vacuum seed meters. Because both disclose seed meters with two mating parts, the combination of the hinge of VenHuizen with the seed meter disclosed in the Amazone Manual would be a straightforward adaptation. Furthermore, replacing the connecting means of the Amazone movable portion with the hinge of VenHuizen is a simple substitution of one known element for another to obtain predictable results. (See Ex. 1006, Fig. 7, annotated below).



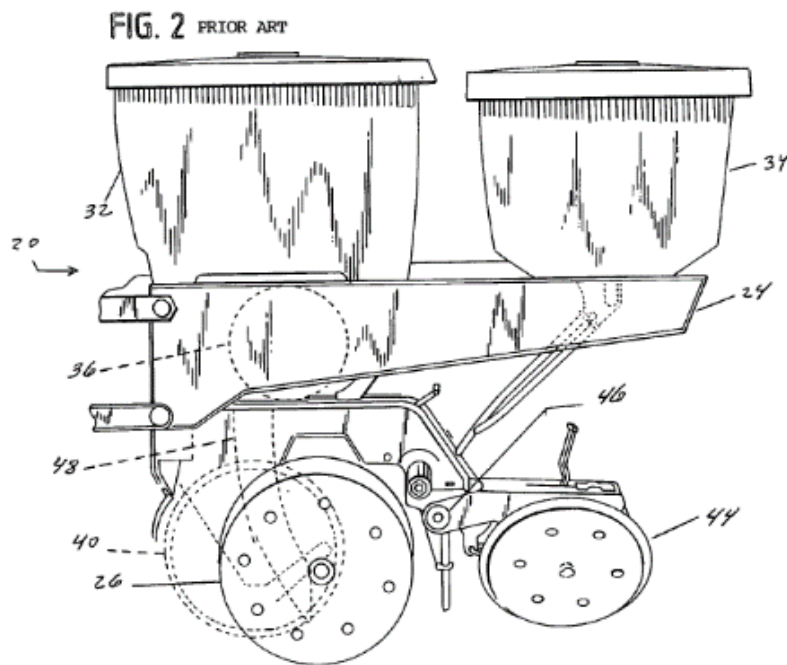
Claim 8

143. Claim 8 is (a) anticipated by VenHuizen ('807); (b) obvious over Fiorido ('543) in view of VenHuizen ('807) and Applicant Admitted Prior Art; and (c) obvious over the Amazone Manual as shown in the following analysis.

VenHuizen ('807)

A sowing element for precision seed drills comprising a frame on which a seed distribution element according to claim 1 is mounted.

144. VenHuizen discloses a frame 24 with row unit 20 thereon: “each row unit 20 has a frame 24 supported by a pair of spaced apart wheels” (Ex. 1006, 5:26–28).



Fiorido ('543) in view of VenHuizen ('807) and Applicant Admitted Prior Art

A sowing element for precision seed drills comprising a frame on which a seed distribution element according to claim 1 is mounted.

145. Fiorido relates to seed meters and discloses all of the elements of claim 1. Fiorido also discloses a seed container with a hopper on its upper portion for loading seed: “The seed container 11 is provided on its upper portion with a hopper 15 for loading the seeds, and on its lower portion with an unloading conduit 16 for depositing the seeds into the ground...” (Ex. 1007, 5:14–16). Fiorido explicitly states that the invention “can be applied

to any known type of planters (not shown) whatsoever.” (Ex. 1007, 5:7–9).

146. VenHuizen discloses a frame 24 with row unit 20 thereon: “each row unit 20 has a frame 24 supported by a pair of spaced apart wheels” (Ex. 1006, 5:26–28). The applicant’s admitted prior art discloses a framework of the sowing elements: “In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing, that is to say the portion which is fixed to the framework of the sowing elements.” (Ex. 1006, 1:55–59)

147. It would have been obvious to a POSA at the time of the invention claimed in the ’121 patent to combine the teachings of Fiorido with the disclosures of VenHuizen, or the Applicant Admitted Prior Art and a POSA would have had a reasonable expectation of success in accomplishing the combination. Fiorido and VenHuizen, are both directed at an apparatus for precise positioning of a seeds and disclose a vacuum seed meter with two mating portions and a seed disk with a plurality of apertures. Fiorido and VenHuizen, relate to the same field of endeavor as the ’121 patent—precision planting and vacuum seed meters. While Fiorido does not

disclose the planter or frame to which the seed meters is mounted, a POSA would have been motivated to combine the teachings found in Fiorido with the disclosures of VenHuizen because a POSA would understand that the purpose of the vacuum seed meters taught in Fiorido is to be mounted on a planter, such as the one disclosed in VenHuizen. Indeed, Fiorido states that the “single-seed distributor means 10 according to the invention can be applied to any known type of planters (not shown) whatsoever.” (Ex. 1007, 5:7–9).

The Amazone Manual

A sowing element for precision seed drills comprising a frame on which a seed distribution element according to claim 1 is mounted.

148. The Amazone Manual discloses a sowing element for precision seed drills comprising a frame on which the seed distribution element is mounted. (Ex. 1011, p. 52, Fig. 35, as depicted below).



Fig. 35

Claim 9

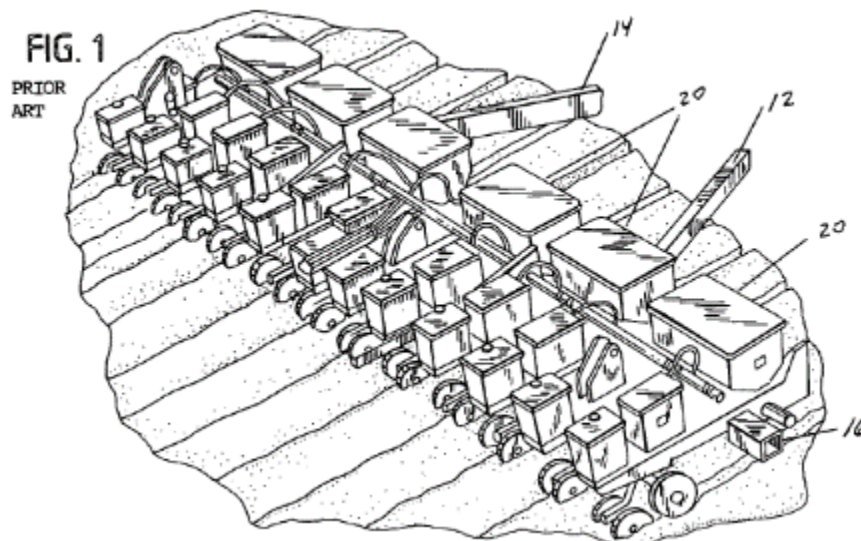
149. Claim 9 is (a) anticipated by VenHuizen ('807); (b) obvious over Fiorido ('543) in view of VenHuizen ('807) and Applicant Admitted Prior Art; and (c) obvious over the Amazone Manual as shown in the following analysis.

VenHuizen ('807)

A seed drill comprising a supporting structure on which a plurality of sowing elements according to claim 8 are mounted.

150. VenHuizen discloses a plurality of row units, stating that each row unit has a frame with a metering unit: "Extending along the length of the cross bar 14 are a plurality of row units 30-30" (Ex. 1006, 5:17-18); "each row unit

20 has a frame 24 supported by a pair of spaced apart wheels” (Ex. 1006, 5:26–28).



Fiorido ('543) in view of VenHuizen ('807) and Applicant Admitted Prior Art

A seed drill comprising a supporting structure on which a plurality of sowing elements according to claim 8 are mounted.

151. Fiorido discloses a metering element meeting all limitations of claim 1.

VenHuizen discloses a plurality of row units, stating that each row unit has a frame with a metering unit: “Extending along the length of the cross bar 14 are a plurality of row units 30–30” (Ex. 1006, 5:17–18); “each row unit 20 has a frame 24 supported by a pair of spaced apart wheels” (Ex. 1006,

5:26–28). The Applicant Admitted Prior Art also discloses a plurality of sowing elements mounted to a frame.

152. A POSA would have understood that the metering unit disclosed in Fiorido could be mounted to a supporting structure for a plurality of sowing elements, such as those disclosed in VenHuizen and the Applicant Admitted Prior Art, and that it would be mounted to such a structure with a plurality of sowing elements to perform its intended function. Indeed, Fiorido states that the “single-seed distributor means 10 according to the invention can be applied to any known type of planters (not shown) whatsoever.” (Ex. 1007, 5:7–9).

153. It would have been obvious to a POSA at the time of the invention claimed in the '121 patent to combine the teachings of Fiorido with the disclosures of VenHuizen or the Applicant Admitted Prior Art and a POSA would have had a reasonable expectation of success in accomplishing the combination. Fiorido and VenHuizen are both directed to an apparatus for precise positioning of a seeds and disclose a vacuum seed meter with two mating portions and a seed disk with a plurality of apertures. Fiorido and

VenHuizen relate to the same field of endeavor as the '121 patent—
precision planting and vacuum seed meters.

The Amazone Manual

*A seed drill comprising a supporting structure on which a plurality of sowing
elements according to claim 8 are mounted.*

154. The Amazone Manual discloses a seed drill supporting structure on which
a plurality of sowing elements are mounted: "Precision Airplanters place
the individual seed grains in evenly settable distances into the soil. In every
row one seeder unit with own seed hopper is operating". (Ex. 1011, p. 48,
translated to English). The manual shows a photograph of an airplanter
with 12 seed units. (Ex. 1011, p. 48, Fig. 27, as depicted below).



Claim 10

155. Claim 10 is: (a) anticipated by VenHuizen ('807); (b) is anticipated by Fiorido ('543); (c) is obvious over Fiorido ('543) in view of Applicant Admitted Prior Art; and (d) is obvious over the Amazone Manual in view of Fiorido ('543) and Applicant Admitted Prior Art, as shown in the following analysis.

VenHuizen ('807)

A kit for the retrofitting of seed distribution elements of precision pneumatic

seed drills wherein the distribution elements are of the type including:

156. VenHuizen discloses a device for improving the spacing between seeds planted by a John Deere vacuum planter. VenHuizen also discloses a metering unit (seed distribution element) that singulates seeds and drops them into a chute for planting: “The heart of the John Deere planter is a metering unit which retains a circular rotatable seed disk that separates the interior of the metering unit into two chambers, one on each side of the disk. The seed disks employed in the machine have a plurality of holes, with the centers thereof spaced to define a circle with its center at the center of the disk and having a radius a little less than the radius of the disk. A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the chamber on the opposite side of the disk. The diameter of the holes in the seed disks are sized such that, when operating properly, the vacuum will draw one seed against the aperture of each hole in the disk and retain the seed as the disk rotates to a position above a seed tube, at which point the disk moves away from the vacuum chamber and the seed falls away from the disk and into the seed tube to be planted.” (Ex. 1006, 1:14–29). Thus, VenHuizen discloses a seed distribution element

(metering unit) for precision pneumatic seed drills (the John Deere vacuum planter).

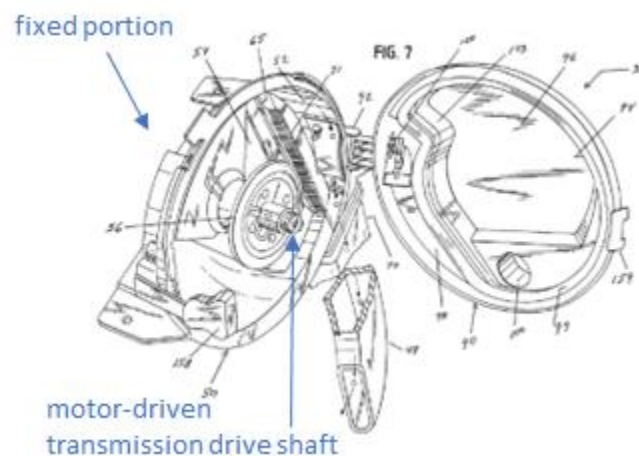
157. The elements of Claim 10 are nearly identical to the elements of Claim 1, except Claim 10 requires a retrofit kit and specifies that the elements in the movable portion come pre-assembled. The other minute differences in language between the claims do not appear to meaningfully change the scope of the claim. VenHuizen discloses “a kit that includes an improved seed disk for insertion into the metering unit of a John Deere planter” to improve efficiency of planting seeds and further describes machines “fitted with the parts described” in another patent application addressing reliable planting. (Ex. 1006, 2:32–40) VenHuizen’s express disclosure of a “kit” and machines “fitted with the parts” (in particular in reference to a pre-existing John Deere planter) is a quintessential mechanism by which farmers have used to improve their machinery for decades to employ advances in technology to update or repair the functionality of their pre-existing equipment. Using such “kits” or “fit[ing] machines with the parts described” constitutes a “retrofit,” that is, updating an existing machine with upgraded parts. Since VenHuizen expressly discloses “kits” and does

not describe whether the seed meter 36 of VenHuizen must be installed on a new or existing planter, a POSA would understand VenHuizen discloses the potential to use the *entire seed meter* described and shown in VenHuizen as a retrofit kit to use on existing planters. There is nothing about the seed distribution element disclosed in VenHuizen that would make it incompatible for retrofit applications.

a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed,

158. VenHuizen discloses a sowing disk: “The heart of the John Deere planter is a metering unit which retains a circular rotatable seed disk that separates the interior of the metering unit into two chambers, one on each side of the disk.” (Ex. 1006, 1:14–17). VenHuizen also discloses a gearing assembly connected to the wheels that rotates a drive member on the inner shaft of the metering unit. “A gearing assembly, not shown, connected to the wheels 26 rotates a drive member, also not shown, which rotates a shaft 42 that extends through the metering unit and drives the metering unit 36 such that the rate at which the metering unit discharges seeds is coordinated to the ground speed of the planter.” (Ex. 1006, 5:43–49). A motor in the

system causes the drive wheels of the tractor and precision planter to rotate. This, in turn, transmits torque to cause the shaft and singling discs to rotate. Therefore, the VenHuizen discloses a motor-driven transmission. Figure 7 of VenHuizen shows that the driveshaft is on the fixed portion of the housing and it is centered relative to the sowing disc; this therefore constitutes a transmission drive shaft. (See Fig. 1006, Fig. 7 annotated below). The sowing disc is rotated at a controlled speed which is coordinated to the ground speed of the planter. (Ex. 1006, 5:43–49).



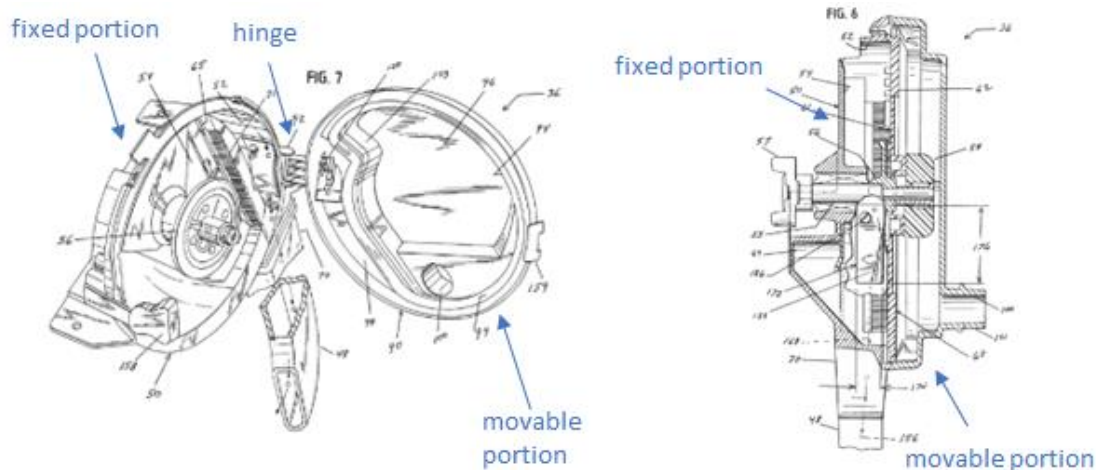
a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion,

159. VenHuizen discloses a housing with a first member (fixed portion) and a second housing member (movable portion) attached by a pivot pin to the

first housing member: “the metering unit 36 includes a first housing member 50, having a generally cylindrical outer wall 52 and a planar rear wall 54 thereby forming a cavity” (Ex. 1006, 5:59–62), “...the metering unit 36 includes a second housing member 90 attached by a pivot pin 92 to the first housing member 50.” (Ex. 1006, 7:19–21). The disclosure of the second housing member joined to the first housing member via a pivot pin indicates that the second housing member is the movable portion. VenHuizen further discloses that the movable portion is closed against the fixed portion : “...the housing members 50, 90 are assembled against each other...” (Ex. 1006, 7:28-29).

160. The first member of VenHuizen is the fixed portion because it communicates with the seed hopper containing seeds to be planted. Further, the John Deere manual for the seed meter disclosed in VenHuizen shows and describes the first member as the fixed portion of the seed meter housing: “Assemble the vacuum meter assembly onto hopper and secure meter with nuts” (Ex. 1016, 125-16), “replace hopper on unit and secure with latch” (Ex. 1016, 35-10). Attached as Exhibit 1016 is the manual for the John Deere 7200 Max Emerge Flex-Fold planter which is referred to

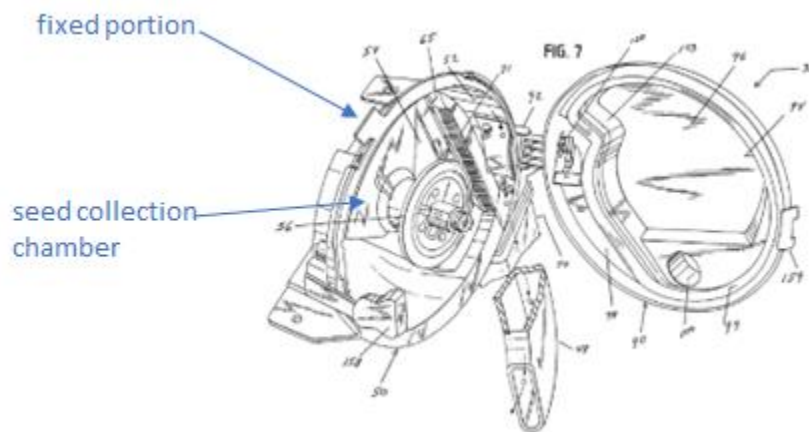
in VenHuizen as the product the seed meter of VenHuizen will be used with. (Ex. 1006, 3:10-21). Accordingly, a POSA would understand which side of VenHuizen is fixed and which side is movable. (See Ex. 1006, Figs. 6-7 annotated below).



a seed collection chamber being defined in the fixed portion,

161. VenHuizen discloses a seed collection chamber in the fixed portion of the housing: “the first housing 50 includes an upwardly opening access port 69 in the rear wall 52 into which the lower end of the chute from the hopper 32 extends, allowing seeds to enter the first housing member 50.” (Ex. 1006, 6:37–41). “A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the chamber on the opposite side

of the disk.” (Ex. 1006, 1:20–22). “...wherein seed is introduced into a first cavity in the metering unit defined by a first surface of the seed disk and a vacuum is drawn in a second cavity defined by the second surface of the seed disk.” (Ex. 1006, 3:14–16, and Fig. 7 annotated below).

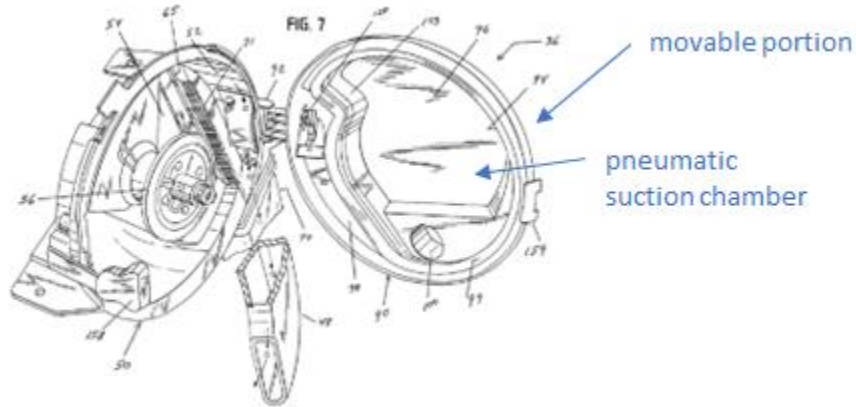


a pneumatic suction chamber being defined in the movable portion,

162. VenHuizen discloses a vacuum chamber in the movable portion of the housing: “The second housing member 90 further has an aperture 100 in the rear wall 96 and the outer surface of the second housing member has a tubular protrusion 101 the inner opening of which communicates with the aperture 100 and is adapted to receive a vacuum hose, not shown, leading from a vacuum pump.” (Ex. 1006, 7:31–36) “A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the

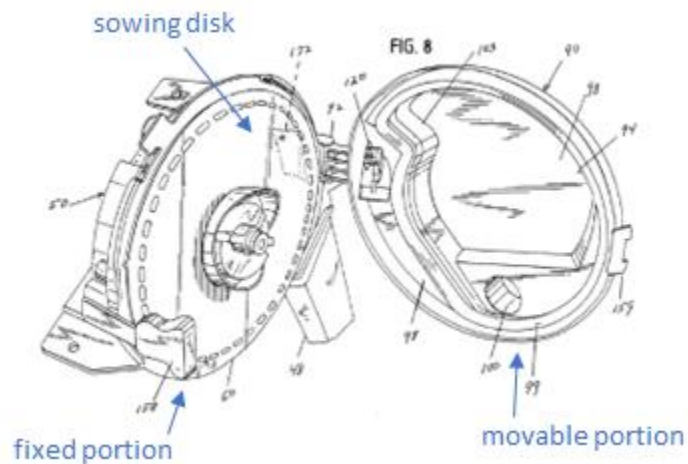
chamber formed on the opposite side of the disk.” (Ex. 1006, 1:20–22).

(See also Ex. 1006, Fig. 7 annotated below).



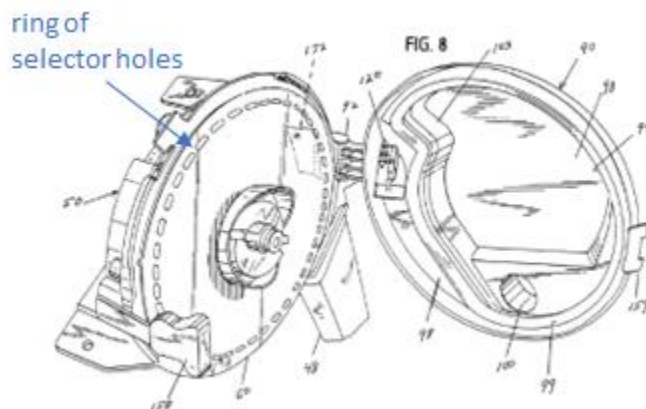
the sowing disc being interposed between the fixed and movable portions and
having opposed surfaces delimiting the chambers,

163. VenHuizen discloses a seed disk (sowing disc) interposed between the fixed and movable portions: “A vacuum is drawn in the chamber formed on one side of the disk and seeds are introduced into the chamber formed on the opposite side of the disk.” (Ex. 1006, 1:20–22).

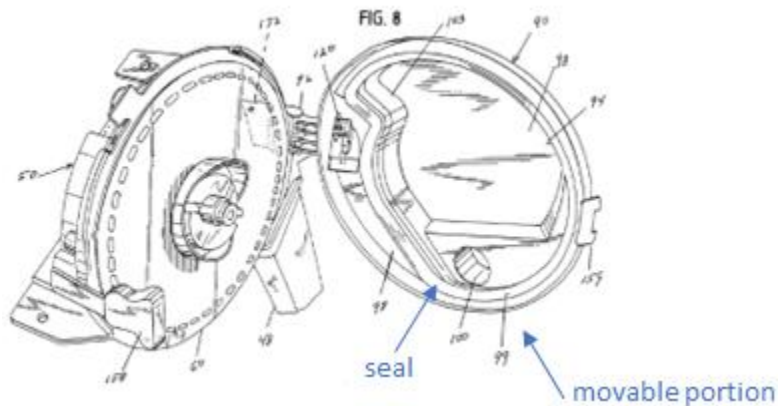


the sowing disc having at least one ring of selector holes extending between the opposed surfaces,

164. VenHuizen discloses a seed disk (sowing disc) with a ring of selector holes: “the seed disks employed in the machine have a plurality of holes, with the centers thereof spaced to define a circle having a radius a little less than the radius of the disk.” (Ex. 1006, 1:17–20); “Extending around a circle which is spaced a short distance within the outer circumference of the seed disk 60 are a plurality of spaced transverse holes 67–67.” (Ex. 1006, 6:27–31 and Fig. 8 annotated below).

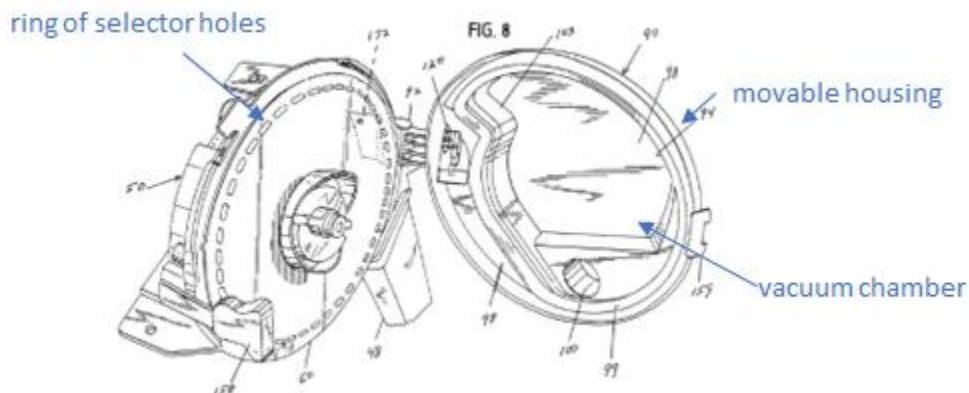


seal contacts the surface of the seed disk; therefore, the seal must be in sliding contact with the disk as the disk rotates. (See also Ex. 1006, Fig. 8 annotated below).



wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes,

166. VenHuizen discloses a vacuum (pressure differential) on one side of the seed disk such that the vacuum is drawn through the ring of holes on the seed disk: When the metering unit 36 is operating properly, the vacuum in the second chamber is drawn through the plurality of holes 67–67 of the seed disk 60 except for those holes 67–67 positioned beyond the sealing member 99 (defined by the intrusion portion 98).” (Ex. 1006, 7:64–8:1).

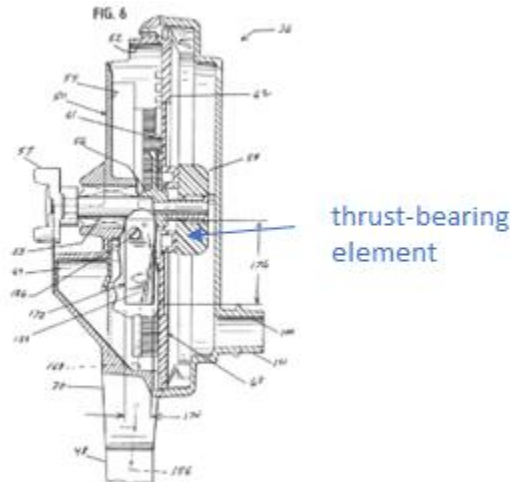


wherein the kit comprises: the movable portion pre-assembled with: a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.

167. VenHuizen teaches a hub handle for locking the seed disk on the hub:

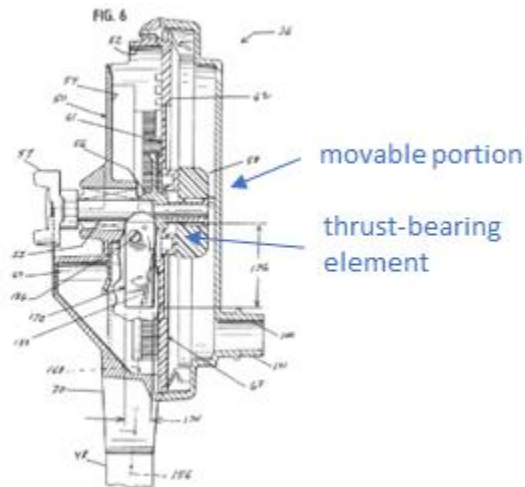
“...the seed disk 60 has a generally circular body with first and second planar surfaces 61, 62, and having a wing shaped central opening 53. The opening 53 is shaped to receive the winged hub handle 58, not shown, at the distal end of the retaining hub 56 of first housing member 50. Surrounding the central opening 53 on the second side 62 are two arcuately shaped opposing ramped surfaces 63, 64 and opposing locking notches 65, 66 for locking the seed disk 60 to the hub 56” (Ex. 1006, 6:20–28 and Fig. 6 annotated below). This hub handle, which constrains the movement of

the seed disk when a vacuum is applied, constitutes a thrust-bearing element.



168. As shown in Figure 6 of VenHuizen, when the movable portion of the housing is closed onto the fixed portion, the hub-mounted handle (i.e., thrust-bearing element) is positioned within the movable portion of the housing. Furthermore, VenHuizen discloses that the hub is threaded onto the cylindrical drive shaft and the handle is at the distal end of the retaining hub: “Extending from the rear wall 54, axially with respect to the cylindrical outer wall 52, is a tubular retaining hub 56 at the distal end of which is a handle” (Ex. 1006, 5:62–64), “...the retaining hub 56 is threaded on a cylindrical drive shaft 55 at the distal end of which are a pair of flanges 57 for drivingly engaging a drive member” (Ex. 1006, 6:1–4 and Fig. 6

annotated below). The hub handle, which is locked to the hub, is therefore rotatably mounted.



169. VenHuizen expressly discloses “kits” and does not describe whether the seed meter 36 of VenHuizen must be installed on a new or existing planter. A POSA would understand VenHuizen discloses the potential to use the *entire seed meter* described and shown in VenHuizen as a retrofit kit to use on existing planters. When the entire seed distribution element of VenHuizen is pre-assembled, as is shown in various figures thereof, the movable portion would also be pre-assembled with the thrust-bearing element and mountable with available bolt-holes found on the fixed side of the unit. For example, Figure 8 of VenHuizen constitutes the pre-assembled unit shown in an open state that when closed (as shown in Ex.

1006, Figs. 6 or 9), constitutes the claimed movable portion of the housing being a pre-assembled kit with the thrust-bearing element.

170. As demonstrated by the preceding analysis, VenHuizen expressly discloses every element of claim 10 and therefore anticipates claim 10.

Fiorido ('543)

A kit for the retrofitting of seed distribution elements of precision pneumatic seed drills wherein the distribution elements are of the type including:

171. Fiorido is directed at a precision-type single seed drilling planter: “The present invention relates to precision-type single-seed drilling planters...” (Ex. 1007, 1:1–2). Fiorido also discusses the employment of air suction across perforations (Ex. 1007, Abstract). A POSA would understand that Fiorido is directed at a seed distribution element for precision pneumatic seed drills.

172. Fiorido discloses its “single-seed distributor means 10 according to the invention can be applied to any known type of planters (not shown) whatsoever.” (Ex. 1007, 5:7–9). Thus, Fiorido discloses that its single-seed distributor means 10, the seed meter itself, is a kit for retrofitting

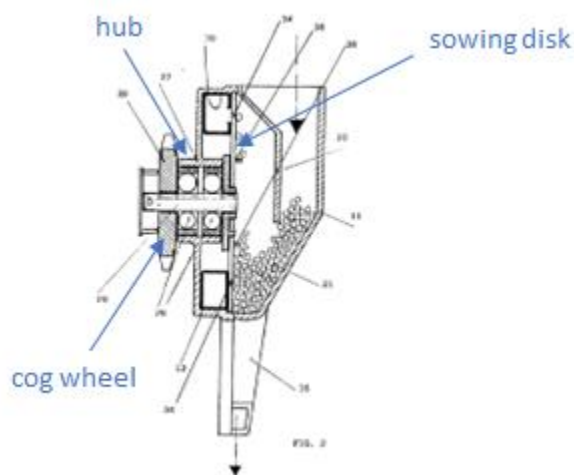
planters. For decades, utilizing kits has been a quintessential mechanism by which farmers have been able to improve their pre-existing equipment and benefit from advances in technology. Using such kits constitutes a “retrofit,” that is, using upgraded parts on an existing machine. Since Fiorido expressly discloses its distributor can be applied to any known type of planter and does not describe whether the distributor of Fiorido must be installed on a new or existing planter, a POSA would understand Fiorido discloses the potential to use the entire seed meter described and shown in Fiorido as a retrofit kit to use on existing planters. There is nothing about the seed distribution element disclosed in Fiorido that would make it incompatible for use for retrofit applications.

a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed,

173. Fiorido discloses a perforated disk (sowing disk) to which seeds adhere via air suction: “The seeds 21, owing to the air suction through the conduit 22, the hole 23, the slit 24 and the perforations 34, are caused to adhere to the disk 13 and are lifted off the same disk, and get progressively separated, as they proceed in front of the slots 37 of the selector element 14.” (Ex.

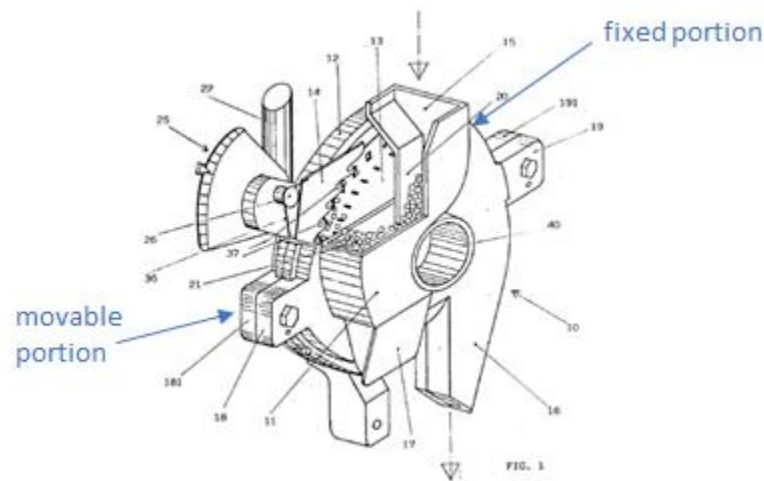
1007, 7:29–34). The perforated disk is supported by a shaft and is rotatably driven: “The casing 12 is also provided with a perforated hub 27 (Figure 2) through which passes, as supported by bearings 28, a shaft 29 that may for instance be driven through a cog-wheel 30 to rotatably drive the disk 13, to which it is connected by means of a driving disk 31, a centering dowel 32 and a driving pin 33.” (Ex. 1007, 5:49–55). The driveshaft is on the fixed portion of the housing and centered relative to the sowing disc, and therefore constitutes a transmission drive shaft.

174. Fiorido discloses a cog-wheel as an example of a means to rotate the perforated disk. (Ex. 1007, 5:49-55 and Fig. 2 annotated below). A POSA would understand that the cog wheel could be part of the motor-driven transmission as a means to rotate the perforated disk.



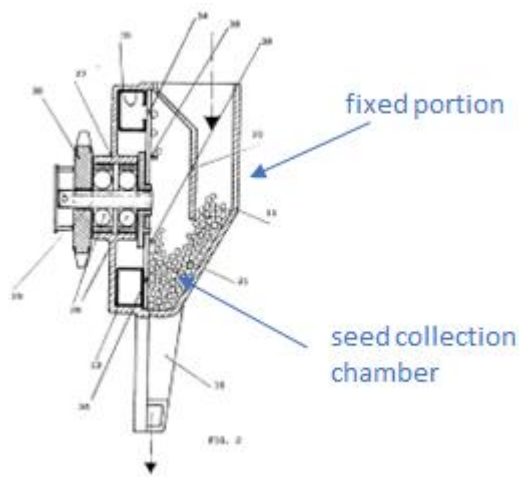
a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion,

175. Fiorido discloses a box-like casing (housing) with two portions. The second portion is movable relative to the first and can be closed against the first by means of pins or bolts: “The single-seed distributor means 10 is essentially formed by a seed container 11 and a box-like casing 12, with a perforated disk 13, associated with selector element 14, arranged therebetween.” (Ex. 1007, 5:10–13). “Said seed container 11 is further provided with projections 18, 19 that are adapted to cooperate with respective projections 181 and 191 of the casing 12 to effect the connection and the closure (by means of holes, pins, and bolts) of the container 11 with casing 12.” (Ex. 1007, 5:22–27). While Fiorido is agnostic as to which side is fixed, Fiorido expressly states that its seed container 11 can be modified “to possibly introduce the support and driving elements for the disk 13 from the opposite side of the device.” (Ex. 1007, 8:1–6 and Fig. 1 annotated below).



a seed collection chamber being defined in the fixed portion,

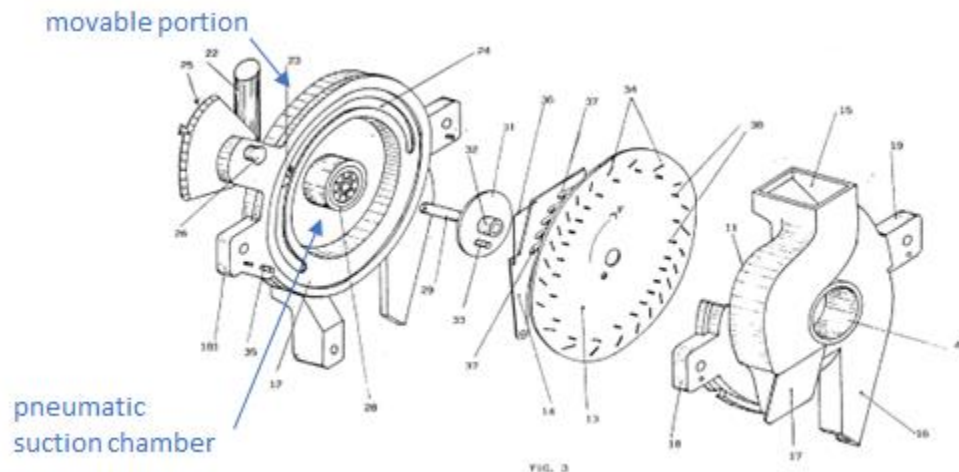
176. Fiorido discloses a seed container in the fixed portion connected to the hopper for loading seeds: “The seed container 11 is provided on its upper portion with a hopper 15 for loading the seeds, and on its lower portion with an unloading conduit 16 for depositing the seeds into the ground...” (Ex. 1007, 5:14–16). Again, Fiorido is agnostic as to which side is fixed but expressly states that its seed container 11 can be modified “to possibly introduce the support and driving elements for the disk 13 from the opposite side of the device.” (Ex. 1007, 8:1–6 and Fig. 2 annotated below). Therefore, a POSA would understand that Fiorido’s design teaches that the seed collection chamber can be in the fixed portion.



a pneumatic suction chamber being defined in the movable portion,

177. Fiorido discloses a box-like casing connected with an air suction device which is in the opposite portion of the housing: “The box-like casing 12 is connected with an air suction device (for instance, a motor-driven fan of known type, not shown in the Figure) through a suction conduit 22 which terminates in a hole 23 (Figure 3) in correspondence of a suction slit 24 that is provided along a circumferential arc in the body of the casing 12.” (Ex. 1007, 5:33–39). If it is argued that the seed collection chamber is not defined in the fixed portion and the vacuum chamber is not defined in the movable portion, Fiorido discloses that the fixed and movable sides may be swapped because the motor-driven transmission drive shaft can be introduced on either side. A POSA would have known that the vacuum

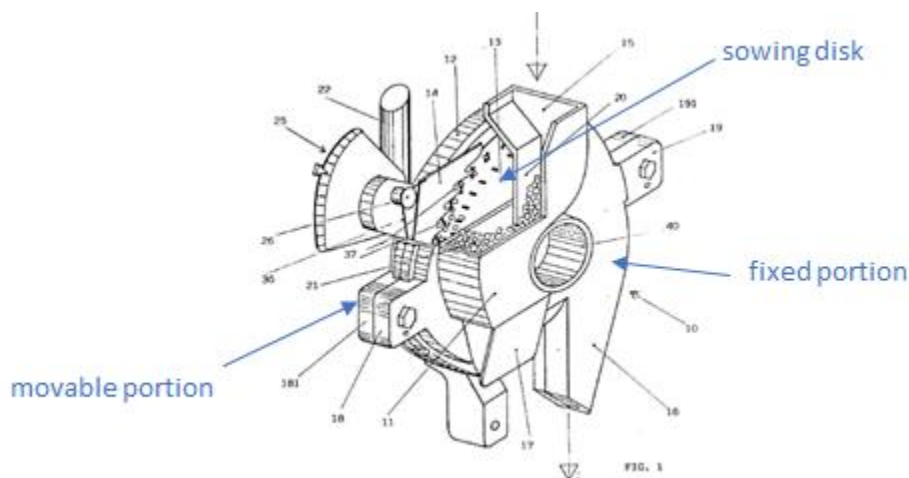
chamber must be on the opposite side from the seed chamber. Further, as admitted in the '121 patent, a POSA would have known the seal's thrust-bearing element must be on the vacuum side to alleviate axial load on the seal. (Ex.1001, 1:53-55, 63-65 and Fig. 3 annotated below). Consequently, Fiorido discloses either the seed or suction chamber may be on the fixed side and the function of the thrust-bearing element dictates it be on the vacuum side. Thus, while Fiorido is agnostic as to which side is movable, a POSA would understand that Fiorido's design teaches that the pneumatic suction chamber can be in the movable portion.



the sowing disc being interposed between the fixed and movable portions and

having opposed surfaces delimiting the chambers,

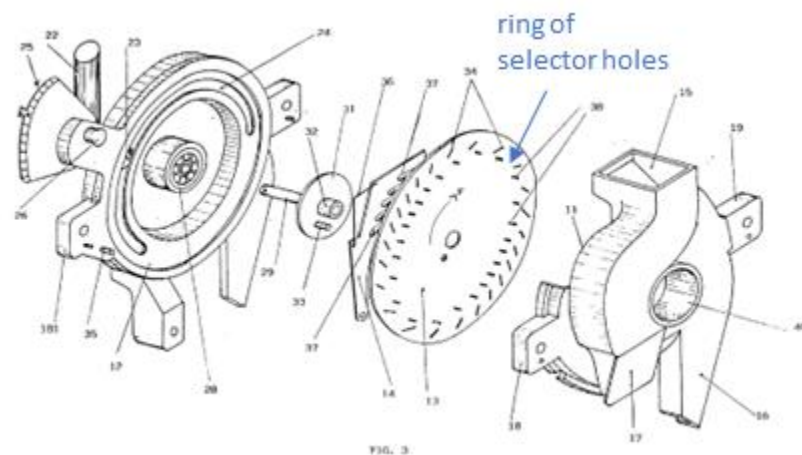
178. Fiorido discloses a perforated disk (sowing disk) being located between the fixed seed container and movable box-like casing: “The single-seed distributor means 10 is essentially formed by a seed container 11 and a box-like casing 12, with a perforated disk 13, associated with selector element 14, arranged therebetween.” (Ex. 1007, 5:10–13 and Fig. 1 depicted below).



the sowing disk having at least one ring of selector holes extending between the opposed surfaces,

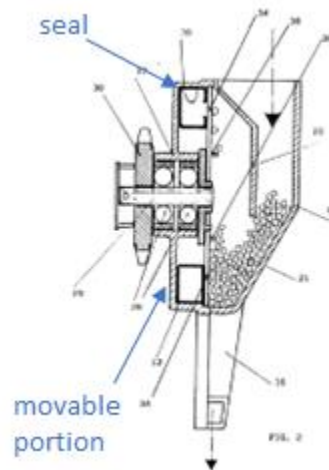
179. Fiorido discloses the perforated disk (sowing disk) having one or more sequences of concentric circular perforations (at least one ring of selector holes). Fiorido states that a suction blower creates a negative pressure

through the perforations to keep seeds adhered to the disk, indicating the holes extend through opposite surfaces of the perforated disk. "[T]he withdrawal of the seeds from the loading container, their separation and their distribution according to a one-by-one pattern are performed by means of a rotating perforated disk having one or more sequences of concentric circular perforations, and co-operating on one side with a suction blower, which creates a negative pressure of the air through the perforations of the disk and thereby keeps the seeds adhering to the disk until the unloading zone is reached, and on the other side with a mechanical separator which enables the seeds to be selected one by one and causes excess seeds to fall back into the container." (Ex. 1007, 1:25–37 and Fig. 3 annotated below).



and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the portions are closed against one another,

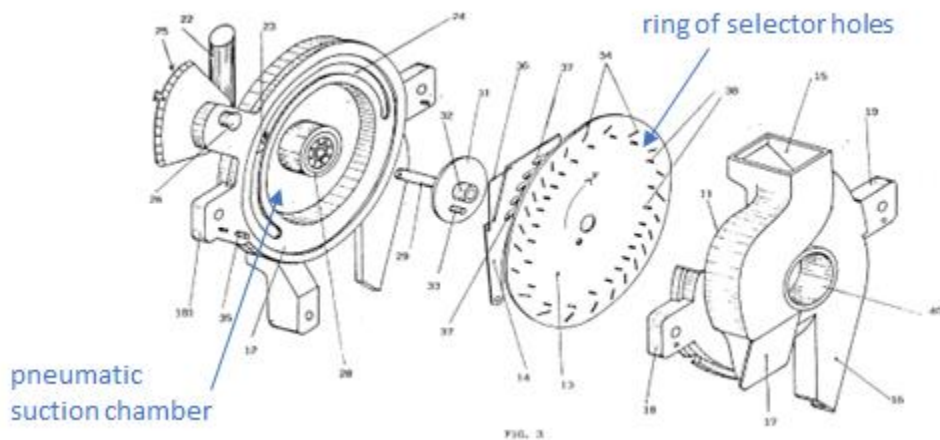
180. Fiorido discloses a hollow sealing ring (seal) between the casing (movable portion) and the disk (disc). Fiorido shows suction slit 24 as only extends along a portion of the circumference of the casing and states “there will be only one seed for each perforation 34 that keeps adhering to the disk 13 and that will then come off the same disk when it reaches the unloading area in correspondence of the unloading conduit 16, where the seed is no longer subjected to the air suction effect, since the suction slit 24 is in fact terminated.” (Ex. 1007, 7:38–45 and Fig. 2 annotated below). Thus, it would not make sense to mount the seal on the rotating disc because seal would not cease in the unloading area. Therefore, a POSA would understand that Fiorido discloses the seal on the movable portion of the housing. When mounted to the movable portion, the seal would necessarily be in sliding contact with the rotating disk to maintain the seal when the two portions of the housing were closed together.



wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes,

181. Fiorido discloses a pressure differential between the opposed surfaces of the perforated disk through the perforations which keeps the seeds adhered to the disk: “the withdrawal of the seeds from the loading container, their separation and their distribution according to a one-by-one pattern are performed by means of a rotating perforated disk having one or more sequences of concentric circular perforations, and co-operating on one side with a suction blower, which creates a negative pressure of the air through the perforations of the disk and thereby keeps the seeds adhering to the disk until the unloading zone is reached, and on the other side with a mechanical separator which enables the seeds to be selected one by one

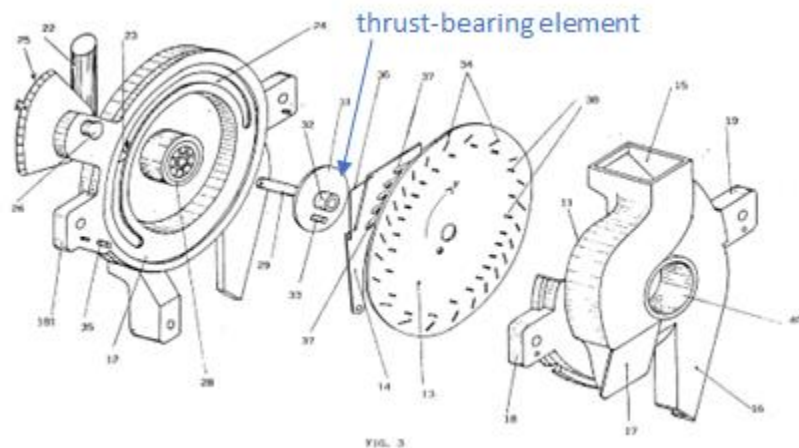
and causes excess seeds to fall back into the container.” (Ex. 1007, 1:25–37). As shown in Figure 3 of Ex. 1007 (annotated below), the pressure differential is established along a circumferential segment of the ring of holes adjacent to the opening in the seal. *See also* Ex. 1007, 7:40–45 discussing how the seeds unload when no longer subjected to air suction.



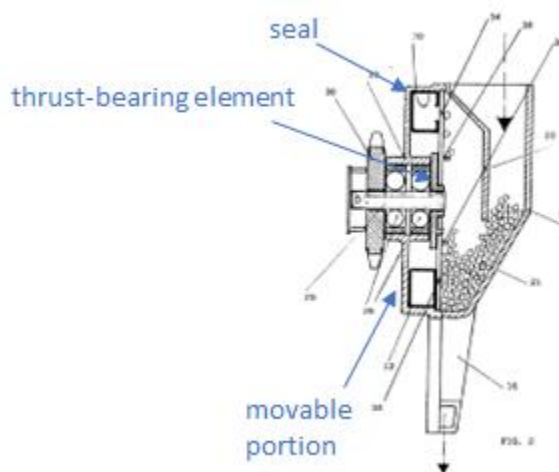
wherein the kit comprises: the movable portion pre-assembled with: a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal.

182. Fiorido teaches a shaft supported by bearings that is connected to a driving disk, a centering dowel, and a pin: “The casing 12 is also provided with a perforated hub 27 (Figure 2) through which passes, as supported by

bearings 28, a shaft 29 that may for instance be driven through a cog-wheel 30 to rotatably drive the disk 13, to which it is connected by means of a driving disk 31, a centering dowel 32 and a driving pin 33.” (Ex. 1007, 5:49–55 and Fig. 3 below). The driving disk mounts against the perforated disk constraining the movement of the disk in the axial direction and withstanding some of the load applied to the seal by the disk when a vacuum is applied. This constitutes a thrust-bearing element.



183. The shaft, bearings, and driving disk are rotatably supported by bearings in the casing (movable portion of the housing). The driving disk mounts against the perforated disk constraining the movement of the disk in the axial direction and withstanding some of the load applied to the seal by the disk when a vacuum is applied.



184. Fiorido expressly discloses its distributor can be applied to any known type of planter and does not describe whether the distributor of Fiorido must be installed on a new or existing planter; thus, a POSA would understand Fiorido discloses the potential to use the entire seed meter described and shown in Fiorido as a retrofit kit to use on existing planters. There is nothing about the seed distribution element disclosed in Fiorido that would make it incompatible for use for retrofit applications. Since Fiorido discloses the thrust-bearing element fully within, and supported by, the movable portion, the movable portion could be pre-assembled as a retrofit kit. Moreover, when the distributor of Fiorido is pre-assembled, as is shown in Figures 1 and 2 of Fiorido (Ex. 1007, Figs. 1-2), the movable portion would also be pre-assembled with the thrust-bearing element and

mountable on a planter. This would constitute the pre-assembled unit with the claimed movable portion of the housing being a pre-assembled kit with the thrust-bearing element.

185. As demonstrated by the preceding analysis, Fiorido anticipates Claim 10.

Fiorido ('543) in view of Applicant Admitted Prior Art

186. If the patent holder were to argue that Fiorido does not disclose all the elements of claim 10 as arranged in the claim, the analysis above demonstrates that claim 10 is obvious in view of Fiorido and Applicant Admitted Prior Art. Fiorido discloses each of the elements. If the patent holder argues that Fiorido does not disclose the combination of “a pneumatic suction chamber being defined in the movable portion” and “[a] thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal” as arranged in the claim 10, Ex. 1001, Fiorido’s disclosure teaches to modify Fiorido to arrive at this arrangement. As described above, Fiorido discloses that the drive element may be introduced into either side of the seed distributor housing. Further, a POSA would know that the vacuum chamber must be on the opposite side from the seed chamber. Additionally, Applicant Admitted Prior Art teaches that the thrust-bearing element must rotate with the disc and is

mounted to the fixed portion of the housing: “In all cases, however, the thrust-bearing element, which must be rotated with the disc, is mounted on the fixed portion of the housing.” (Ex. 1001, 1:53-57).

187. Therefore, if Fiorido’s drive element is moved from one side to the other, a POSA would know Fiorido’s thrust-bearing element must still be provided on the vacuum side to relieve axial load on the seal. A POSA would have a reasonable expectation of success as one could modify Fiorido to provide the rotatable thrust-bearing element in the same side as the vacuum chamber to relieve load on the seal, regardless of which side the drive shaft enters. Thus, a POSA would be using the structures of Fiorido for the purpose disclosed by Fiorido.

Amazone Manual in view of Fiorido (’543) and Applicant Admitted Prior Art

A kit for the retrofitting of seed distribution elements of precision pneumatic seed drills wherein the distribution elements are of the type including:

188. The Amazone Manual discloses a precision pneumatic seed drill that contains a seed distribution element which distributes seeds to the furrow: “On the deepest point (Fig. 40/2) of the singling disc the vacuum stops and the seed drops into the seed furrow formed by the sowing coulter.” (Ex. 1011, p. 53).

189. Fiorido discloses a kit for the reasons discussed above. In view of Fiorido's teaching that a seed distribution element may be a kit, a POSA would understand that Amazone's seed distribution element could also be applied as a retrofit because all of the elements of the seed distribution element are self-contained. Indeed, there is nothing about the seed distribution element disclosed in the Amazone manual that would make it incompatible as a retrofit. (See Ex. 1011, p. 48, Fig. 27 and p. 52, Fig. 35 depicted below).

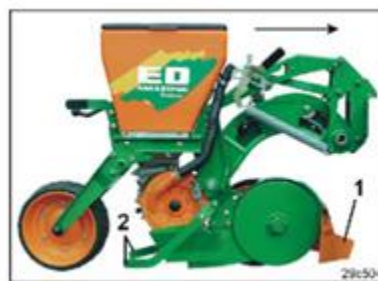


Fig. 35

a sowing disc which is rotated by a motor-driven transmission drive shaft at controlled speed,

190. A motor in the system causes the drive wheels of the tractor and precision airplanter to turn. This, in turn, transmits torque to cause the singling discs to rotate: "The drive wheels of the precision airplanter drive the singling discs" (Ex. 1011, p. 48). Therefore, the Amazone Manual discloses a motor-driven transmission.

191. The mechanism that directly drives the disc is a gear offset to the outer portion of the housing and is directly mounted to the frame. Given the proposed construction provided above, there is no drive shaft mounted on the fixed portion of the housing that is centered relative to the sowing disc. Therefore, the Amazone precision airplanter manual does not disclose a “transmission drive shaft,” as argued by Gaspardo in the European File History.

192. But if an argument is made that it is unnecessary for a drive shaft to be mounted to the fixed portion and centered relative to the sowing disk, the shaft supporting the gear that drives the sowing disk would meet the claim limitation.

193. Moreover, it would have been obvious to a POSA to use the centrally located, center-driven motor-driven transmission drive shaft of Fiorido on the fixed side of Amazone’s seed disk to rotate the disk. It would be a simple substitution of the peripherally located gearing of Amazone with the centrally located mechanism of Fiorido on the fixed side, a substitution well within the capabilities of those of skill in the art. A POSA would have an expectation of success using the centrally located motor-driven transmission shaft of Fiorido because centrally located drive shafts on the fixed side of the seed disk were well known standard driving mechanisms in seed disks for decades before the priority date of the ’121 patent, as

is shown above by Fiorido and VenHuizen. The speed of the sowing discs is adjusted (controlled) via gearbox settings: “The rev. speed of the singling discs is adjusted on the setting gearbox and on the secondary gearbox. Gearbox rev. speed changes result in a change of grain spacing in the soil.” (Ex. 1011, p. 48).



Fig. 39

a housing with a fixed portion and a portion which is movable relative to the fixed portion and can be closed against the fixed portion,

194. The Amazone Manual discloses a seed meter. As shown in the figures of the manual, the seed meter has a housing with a portion that is fixed and a portion that is movable relative to the fixed portion and can be closed against the fixed portion. (See Ex. 1011, p. 52-53, Figs. 39 and 35 annotated below).



Fig. 39

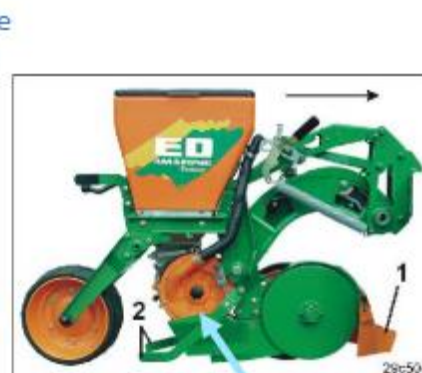


Fig. 35

closed

a seed collection chamber being defined in the fixed portion,

195. The Amazone Manual discloses a seed collection chamber in the fixed portion: “The seed slips out of the seed hopper through the opening (Fig. 39/1) into the seed store area (Fig. 39/2) of the singling disc.” (See Ex. 1011, p. 53, wherein Fig. 39 illustrates the seed collection chamber in the fixed portion, as annotated below).

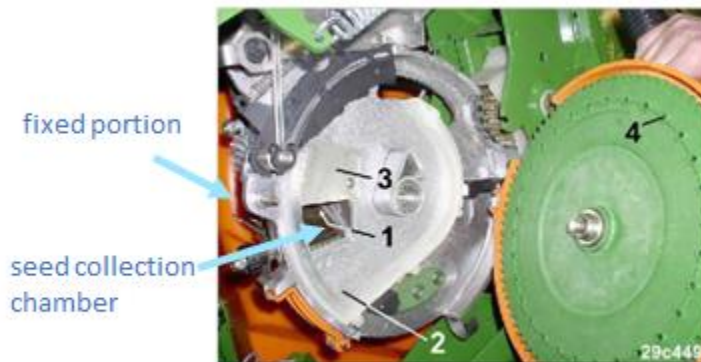


Fig. 39

a pneumatic suction chamber being defined in the movable portion,

196. The Amazone Manual discloses a pneumatic suction chamber in the movable portion: “The impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc. The seeds are drawn by vacuum off the seed store area on to the holes (Fig. 39/4). The air leaves the seed housing via the slits (Fig. 40/1) of the suction kidney.” (Ex. 1011, p. 53, Fig. 40). Figure 40 illustrates the vacuum chamber in the movable portion, as annotated below.

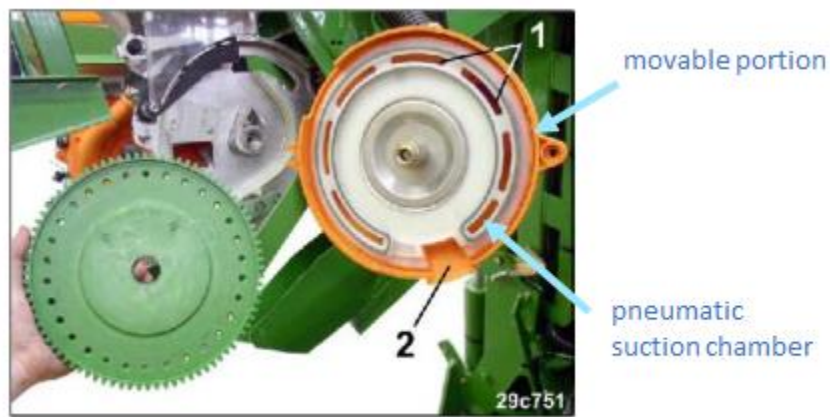


Fig. 40

the sowing disc being interposed between the fixed and movable portions and having opposed surfaces delimiting the chambers,

197. The Amazone Manual discloses a singling disc (sowing disc) interposed between the seed store area of the fixed portion and the vacuum chamber of the movable portion: “The seed slips out of the seed hopper through the

opening (Fig. 39/1) into the seed store area (Fig. 39/2) of the singling disc. The impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc. The seeds are drawn by vacuum off the seed store area on to the holes (Fig. 39/4). The air leaves the seed housing via the slits (Fig. 40/1) of the suction kidney.” (Ex. 1011, p. 53, Fig. 39 annotated below). The singling discs have opposing sides that constitute the surfaces that cooperatively define the respective seed collection and pneumatic suction chambers.



Fig. 39

the sowing disc having at least one ring of selector holes extending between the opposed surfaces,

198. The Amazone Manual discloses singling discs (sowing discs) depicted with a ring of selector holes that extend between opposed surfaces. Further,

the manual describes that “the impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc” (Ex. 1011, p. 53), indicating the holes extend between the opposed surfaces. (See also Ex. 1011, p. 54, Fig. 44 annotated below).



and a seal which is arranged on the movable portion and is capable of sliding contact with the facing surface of the disc when the portions are closed against one another.

199. The Amazone Manual discloses a PE-foam profile seal and the figures show this seal on the movable portion. The seal is affixed to the suction kidney which has an opening at the deepest point of the singling disc. (See Ex. 1011, p. 166, Fig. 227 annotated below). This opening is aligned with the area where the suction stops and the seed is dropped into the furrow.

Based on the description in the manual of the vacuuming stopping at the deepest point, the suction kidney does not rotate, and therefore, the affixed seal does not rotate (Ex. 1011, p. 53). Thus, a POSA would understand that the seal makes sliding contact with the facing surface of the disc when the fixed and movable portions are closed against one another.



Fig. 227

wherein a pressure differential is provided between the opposed surfaces in the region of a circumferential segment of the ring of holes,

200. The Amazone Manual discloses a pressure differential across the singling disc such that the seeds are drawn by vacuum onto the holes: “The seed is drawn by vacuum on to the holes of the rotating singling discs. The vacuum impeller (Fig. 27/2) provides the necessary vacuum. On the lower most point of the singling disc the vacuum stops and the seed grain drops into

the seed furrow created by the sowing coulter (Fig. 27/3).” (Ex. 1011, p. 48). “The impeller provides the vacuum behind the holes (Fig. 39/4) of the rotating singling disc. The seeds are drawn by vacuum off the seed store area on to the holes (Fig. 39/4).” (Ex. 1011, p. 53 and Fig. 39 annotated below). As indicated, the vacuum is applied only to a region of a circumferential segment of the ring of holes, and the seeds drop off the singling disc in the region where the vacuum stops.

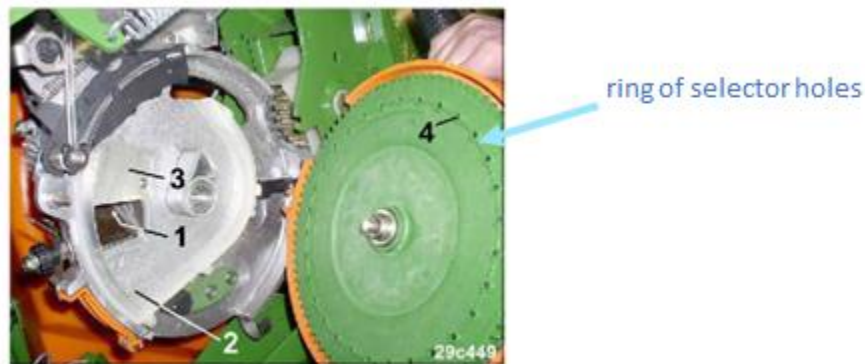


Fig. 39

wherein the kit comprises: the movable portion pre-assembled with: a thrust-bearing element of the sowing disc, which thrust-bearing element is supported rotatably in the movable portion in order to withstand at least some of the axial load produced by the disc on the seal

201. The Amazone Manual discloses a circular element. (Ex. 1011, p. 166, Fig. 227 as annotated below). The manual does not state whether the circular

element contacts the singling disk. However, in view of the Applicant Admitted Prior Art, a POSA would be motivated to modify the circular element with the disclosure of Fiorido such that the circular element would contact the seed disk.

202. This modification would result in a thrust-bearing element that would withstand at least some of the axial load produced by the disk on the seal, and would reduce the wear on the Amazone seal, consistent with the teachings in the Applicant Admitted Prior Art.



Fig. 227

203. A POSA would have reason to combine the teachings of the Amazone Manual with the disclosure of Fiorido. The Amazone Manual and Fiorido are both directed at an apparatus for precise positioning of a seed disk in a

seed meter and disclose a seed disk with a plurality of apertures. Both relate to the same field of endeavor as the '121 patent—precision planting and vacuum seed meters. Both also disclose a seed meter with two portions that close against one another.

204. A POSA would understand that Fiorido's driving disk structure could be adapted for use in Amazone's disclosed structure to provide a rotating thrust-bearing element. This thrust-bearing element would ensure that excessive load is not placed upon the seal disclosed in Amazone, reducing the wear on the seal. The Applicant admitted the wear problem and solution of a rotating thrust-bearing element were known (Ex.1001, 1:53-57). Fiorido teaches that the driving disk 31 (thrust-bearing element) is connected to the disk 13 (sowing disc) (Ex. 1007, 5:49-55). Moreover, the Applicant Admitted Prior Art states that "the disc must be attached to the thrust-bearing element" (Ex. 1001, 1:59-60). Based upon the Applicant Admitted Prior Art, a POSA would understand that the thrust-bearing element, which must rotate with the disc, can be used to reduce wear on the seal. (Ex. 1001, 1:53-65). A POSA would have a reasonable expectation of success in combining the teachings of the Amazone Manual,

Fiorido, and the Applicant Admitted Prior Art because the art recognized the need to use these basic structures (e.g., the thrust-bearing element and seal) in combination and the substituted parts would continue to work in the same manner to achieve the same function.



Fig. 227

205. Fiorido discloses a kit for the reasons discussed above. In view of Fiorido's teaching that a seed distribution element may be a kit, a POSA would understand that Amazone's seed distribution element could also be applied as a retrofit because all of the elements of the seed distribution element are self-contained. Indeed, there is nothing about the seed distribution element disclosed in the Amazone manual that would make it incompatible as a retrofit. Amazone as modified by Fiorido's axial bearing element as

described above with respect to claim 1 could also be pre-assembled as a retrofit kit.

Claim 11

206. Claim 11 is (a) anticipated by VenHuizen ('807); (b) anticipated by Fiorido ('543)¹⁰; and (c) obvious over the Amazone Manual in view of Fiorido ('543) as shown in the following analysis.

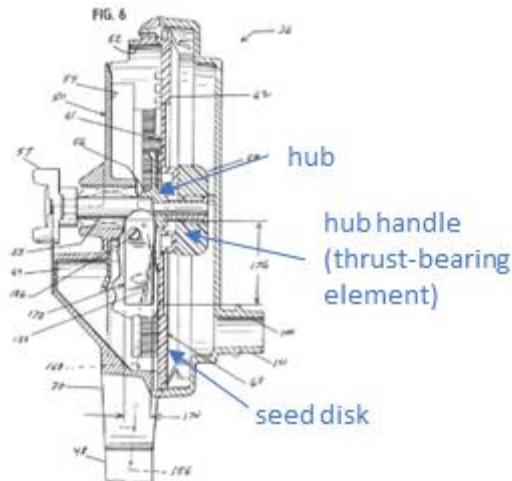
VenHuizen ('807)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 2.

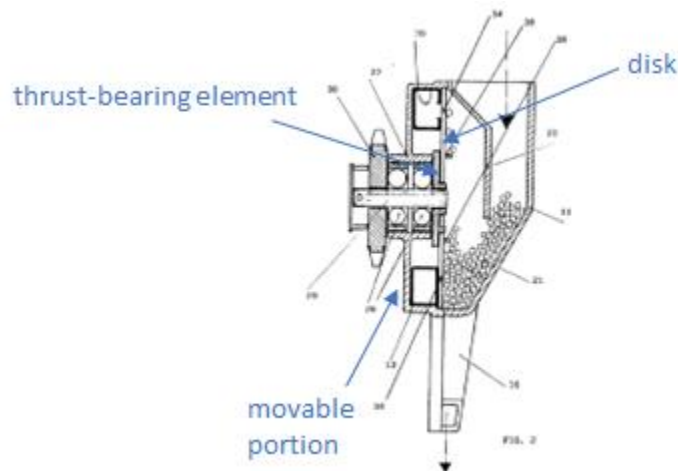
207. Claim 2 requires the thrust-bearing element to rotate with the disc when the fixed and movable portions are closed against one another. The seed disk of VenHuizen is locked in place on the hub via the hub handle. Together, the hub, hub handle (thrust-bearing element) and seed disk rotate when the fixed and movable portions are closed together. A POSA would

¹⁰ All elements of Claim 11 are presented in Fiorido; however, whether Claim 11 is anticipated by Fiorido or obvious over Fiorido depends from Claim 10.

understand that since the hub handle is attached to the retaining hub, rotation of the hub rotates the disc, which will rotate the hub handle 58. (See, Ex. 1006, Fig. 6 annotated below).



passes, as supported by bearings 28, a shaft 29 that may for instance be driven through a cog-wheel 30 to rotatably drive the disk 13, to which it is connected by means of a driving disk 31, a centering dowel 32 and a driving pin 33.” (Ex. 1007, 5:49–55 and Fig. 2 annotated below). The pin couples the driving disk in rotation with the seed disk. Thus, the thrust-bearing element is rotated with the disk when the fixed and movable portions are closed against one another.



Amazone Manual in view of Fiorido ('543) and Applicant Admitted Prior Art

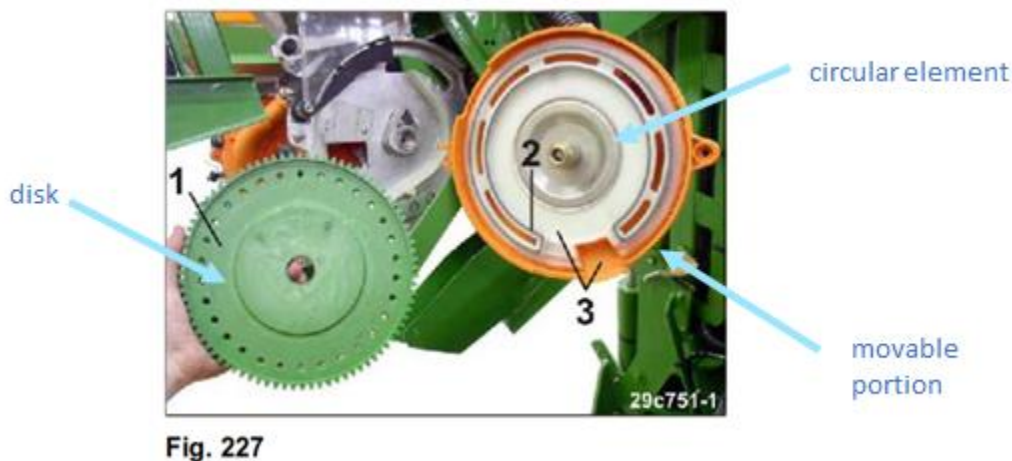
The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 2.

209. Claim 2 requires the thrust-bearing element to rotate with the disc when the fixed and movable portions are closed against one another. As discussed previously, the circular element of the Amazone manual, when modified per the disclosure of Fiorido and the teachings of the Applicant Admitted Prior Art, is a thrust-bearing element. A POSA would understand that the thrust-bearing element must be rotated with the disc. (Ex. 1001, 1:53–65). As disclosed in the '121 patent, it was known in the prior art that the thrust-bearing element rotated with the disk (*see* Ex. 1001 at 1:55–57, “In all cases, however, the thrust-bearing element, which must be rotated with the disk, is mounted on the fixed portion of the housing...”).

210. Fiorido discloses that the driving disk (thrust-bearing element) is connected to the seed disk by means of a shaft, centering dowel, and pin. (Ex. 1007, 5:49–55). The pin couples the driving disk in rotation with the seed disk, and therefore Fiorido teaches that the thrust-bearing element rotates with the sowing disk.

211. As discussed previously, a POSA would have reason to combine the teachings of the Amazone Manual with the teachings of Fiorido and Applicant Admitted Prior Art. A POSA would be motivated to have the

thrust-bearing element rotate with the seed disk to avoid wear. A POSA would have a reasonable expectation of success in combining the teachings of the Amazone Manual, Fiorido, and the Applicant Admitted Prior Art because the art recognized the need and use for these basic structures (e.g., the thrust-bearing element and seal) and they would be used in the same way to achieve the same functional result as they had in the past. (See Ex. 1011, p. 166, Fig. 227 annotated below).



Claim 12

212. Claim 12 is: (a) anticipated by VenHuizen ('807); (b) anticipated by Fiorido ('543)¹¹; and (c) is obvious over the Amazone Manual in view of

¹¹ All elements of Claim 12 are presented in Fiorido; however, whether Claim 12 is anticipated by Fiorido or obvious over Fiorido depends from Claim 10.

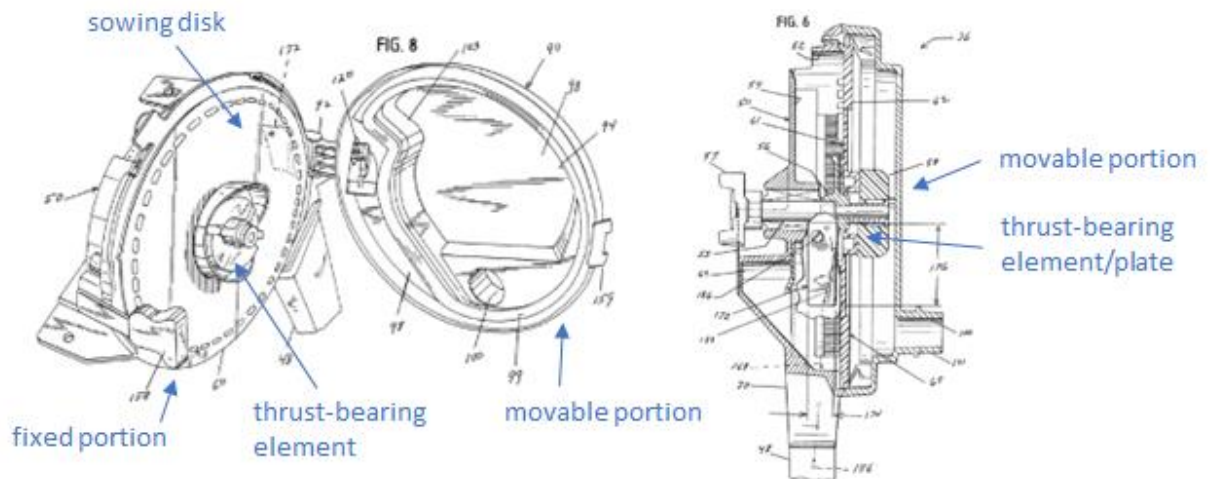
Fiorido ('543) and Applicant Admitted Prior Art as shown in the following analysis.

VenHuizen ('807)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 3.

213. Claim 3 requires that the thrust-bearing element comprises a thrust-bearing plate which can bear on that surface of the sowing disc which faces the seal, in a zone radially inside the ring of holes. The thrust-bearing element of VenHuizen includes a plate (i.e., a generally flat surface) which bears on the surface of the sowing disc facing the seal. Notably, as shown in the figure below, the hub handle 58 includes a surface on the left side that contacts the sowing disc 60 to constrain its axial movement. (Ex. 1006, 6:1–18, 22–27, Fig. 6 annotated below). That surface 62 of the sowing disc contacted by the handle 58, is located on the same side of the sowing disc as the seal. Furthermore, as seen in Figure 8 (Ex. 1006, Fig. 8 annotated below), the hub handle 58 contacts the surface 61 of the disc radially inside the ring of selector holes. The generally flat surface of the thrust-bearing that contacts the sowing disc is a plate. The plate contacts the portion of

the seed disk in a zone radially inside of the ring of holes when the disk is installed and the fixed and movable portions are closed.

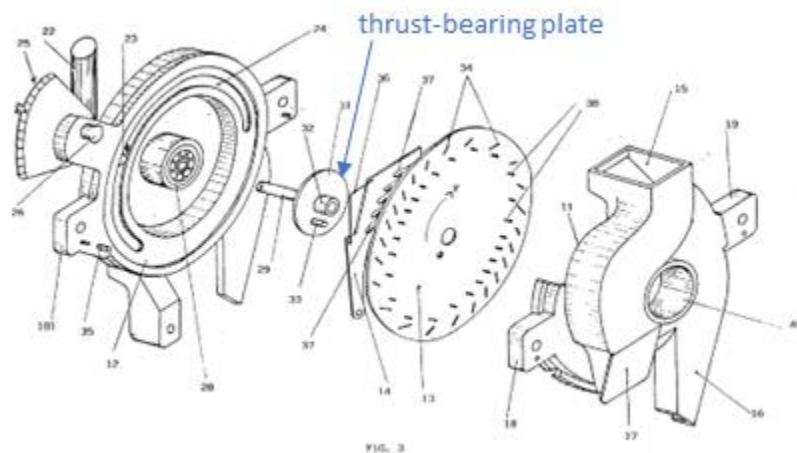


Fiorido ('543)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 3.

214. Claim 3 requires that the thrust-bearing element comprises a thrust-bearing plate which can bear on that surface of the sowing disk which faces the seal, in a zone radially inside the ring of holes. Fiorido discloses a driving disk 31 supported rotatably in the casing 12. (Ex. 1007, 5:49–55 and Fig. 2-3). The driving disk 31 is equivalent to the thrust-bearing plate. Because the driving disk 31 is located between the disk 13 and the casing 12, the

suction in suction slit 24 would at least partially pull the disk 13 toward the driving disk 31 such that the driving disk withstands at least some of the axial load produced by the disk 13 on the seal 39. (Ex. 1007, FIG. 3). Fiorido, FIG. 2, shows the driving disk 31 bearing on the surface of the perforated disk 13 on a surface that faces the seal 39, and the driving disk 31 is in a zone that is radially inside of the holes or perforations formed through the perforated disk 13. (Ex. 1007, FIGS. 2–3).



Amazon Manual in view of Fiorido ('543) and Applicant Admitted Prior Art

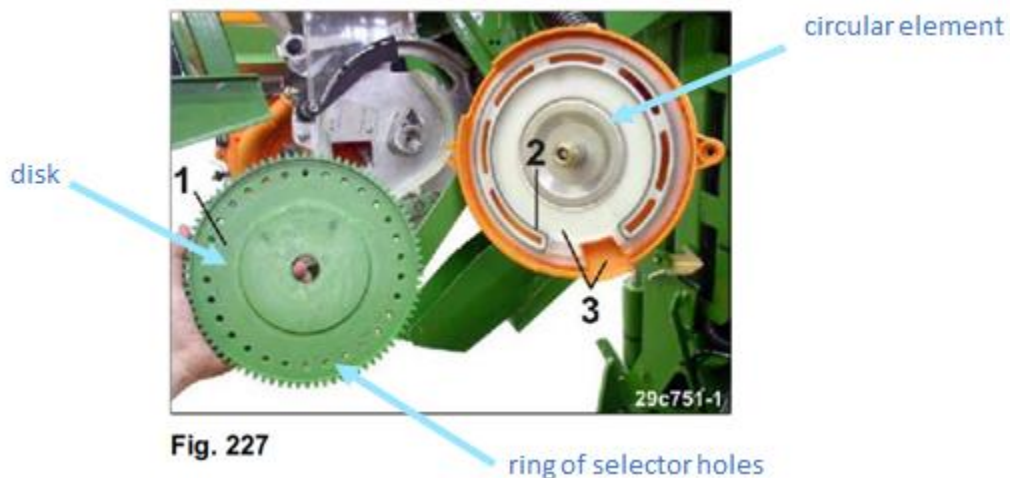
The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 3.

215. Claim 3 requires that the thrust-bearing element comprises a thrust-bearing plate which can bear on that surface of the sowing disc which faces the

seal, in a zone radially inside the ring of holes. The thrust-bearing element of the Amazone manual as modified by Fiorido and Applicant Admitted Prior Art meets this limitation. When modified, the circular element of the Amazone manual would be a generally flat surface, constituting a thrust-bearing plate. As shown in Fig. 40 of the Amazone manual, the diameter of the circular element is less than the diameter of the ring of holes. Therefore, the thrust-bearing plate would bear on the surface of the sowing disk in a zone radially inside the ring of holes.

216. As discussed previously, a POSA would have reason to combine the teachings of the Amazone Manual with the teachings of Fiorido and Applicant Admitted Prior Art. A POSA would be motivated to have the thrust-bearing plate, such as disclosed by Fiorido, bear on the surface of the seed disk to avoid wear. A POSA would have a reasonable expectation of success in combining the teachings of the Amazone Manual, Fiorido, and the Applicant Admitted Prior Art because the art recognized the need and use for these basic structures (e.g., the thrust-bearing plate and seal) and they would be used in the same way to achieve the same functional

result as they had in the past. (See Ex. 1011, p. 166, Fig. 227 annotated below).



Claim 13

217. Claim 13 is anticipated by Fiorido ('543)¹² as shown in the following analysis.

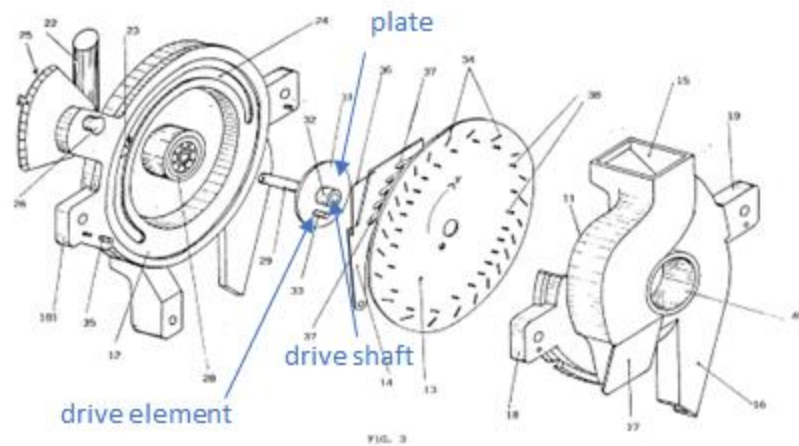
Fiorido ('543)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 4.

218. Claim 4 requires that the thrust-bearing element comprises a drive element which is fixed for rotation with the plate and can be coupled with the drive shaft of the disc when the fixed and movable portions are closed against

¹² All elements of Claim 13 are presented in Fiorido; however, whether Claim 13 is anticipated by Fiorido or obvious over Fiorido depends from Claim 10.

one another. Fiorido discloses a driving disc 31 (“plate”) that further includes a driving pin 33 and a center dowel 32 through which the driving disc 31 attaches to the seed disc (i.e., perforated disc 13) and rotatably drives the seed disc along with the driving disc 31 to which the driving pin and center dowel are affixed. (Ex. 1007, 5:49–55, FIGS. 2–3). The driving pin is a “drive element” which is fixed for rotation with the plate (i.e., through the driving disc 31) and is coupled with the drive shaft of the disc when the fixed and movable portions are closed against one another. (See Ex. 1007, Fig. 3 annotated below).



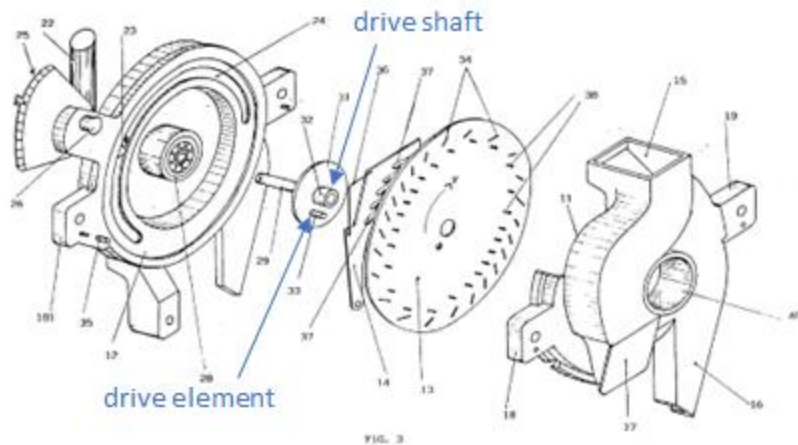
Claim 14

219. Claim 14 is anticipated by Fiorido ('543)¹³ as shown in the following analysis.

Fiorido ('543)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 5.

220. Claim 5 requires the drive element to be self-centering relative to the drive shaft. The rotational center of the drive element (driving pin 33) disclosed in Fiorido is coaxial with the rotational axis of the drive shaft (centering dowel 32). (Ex. 1007, 5:49–55 and Fig. 3 annotated below). Therefore, the drive element is self-centering relative to the drive shaft.



¹³ All elements of Claim 14 are presented in Fiorido; however, whether Claim 14 is anticipated by Fiorido or obvious over Fiorido depends from Claim 10.

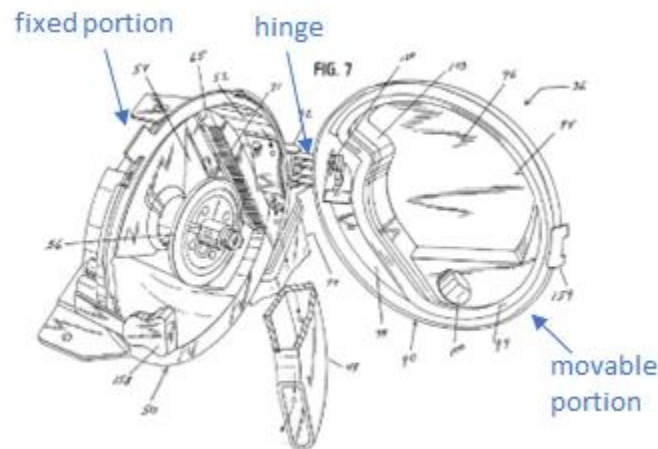
Claim 16

221. Claim 16 is (a) anticipated by VenHuizen ('807); (b) obvious over Fiorido ('543) in view of VenHuizen ('807); and (c) obvious over the Amazone Manual in view of VenHuizen ('807) as shown in the following analysis.

VenHuizen ('807)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 7.

222. Claim 7 requires the movable portion to be hinged to the fixed portion. VenHuizen discloses the second housing member (movable portion) being attached to the first housing member (fixed portion) via a pivot pin (hinge): “the metering unit 36 includes a second housing member 90 attached by a pivot pin 92 to the first housing member 50.” (Ex. 1006, 7:19–21 and Fig. 7 annotated below).



Fiorido ('543) in view of VenHuizen ('807)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 7.

223. Claim 7 requires the movable portion to be hinged to the fixed portion.

Fiorido discloses a box-like casing (housing) with two portions. The second portion is movable relative to the first and can be closed against the first by means of pins or bolts: “The single-seed distributor means 10 is essentially formed by a seed container 11 and a box-like casing 12, with a perforated disk 13, associated with selector element 14, arranged therebetween.” (Ex. 1007, 5:10–13) “Said seed container 11 is further provided with projections 18, 19 that are adapted to cooperate with respective projections 181 and 191 of the casing 12 to effect the connection

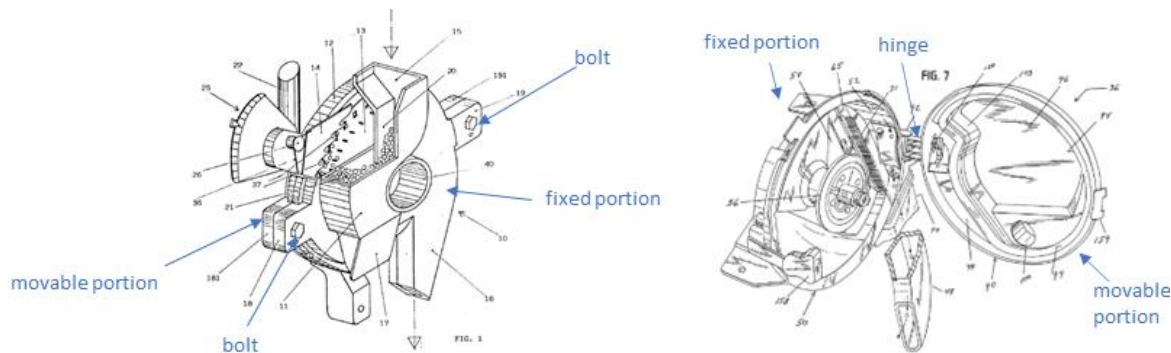
and the closure (by means of holes, pins, and bolts) of the container 11 with casing 12.” (Ex. 1007, 5:22–27).

224. VenHuizen discloses the second housing member (movable portion) being attached to the first housing member (fixed portion) via a pivot pin (hinge): “the metering unit 36 includes a second housing member 90 attached by a pivot pin 92 to the first housing member 50.” (Ex. 1006, 7:19–21).

225. A POSA would be motivated to combine the seed meter disclosed in Fiorido with the hinge disclosed in VenHuizen for ease accessing the interior of the seed meter for maintenance purposes. Because both patents disclose seed meters with two mating parts, the combination of the hinge of the VenHuizen with the seed meter disclosed in Fiorido would be a straightforward adaptation. Furthermore, replacing the pins and bolts of Fiorido with the hinge of VenHuizen is a simple substitution of one known element for another to obtain predictable results.

226. It would have been obvious to a POSA at the time of the invention claimed in the ’121 patent to combine the teachings of Fiorido with the disclosures of VenHuizen and a POSA would have had a reasonable expectation of

success in accomplishing the combination. Fiorido and VenHuizen and are both directed at an apparatus for precise positioning of a seeds and disclose a vacuum seed meter with two mating portions and a seed disk with a plurality of apertures. Fiorido (Ex. 1007, Fig. 1 annotated on the left below) and VenHuizen (Ex. 1006, Fig. 7 annotated on the right below) both relate to the same field of endeavor as the '121 patent—precision planting and vacuum seed meters.



The Amazone Manual in view of VenHuizen ('807)

The kit according to claim 10 wherein the movable portion and the thrust-bearing element comprise at least one feature according to claim 7.

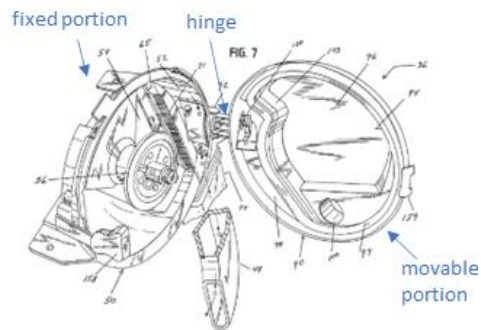
227. Claim 7 requires the movable portion to be hinged to the fixed portion. The Amazone Manual (e.g., Ex. 1011, p. 166) shows a housing with two

portions. The movable portion is movable relative to the fixed portion and can be closed against the fixed portion.

228. VenHuizen discloses the second housing member (movable portion) being attached to the first housing member (fixed portion) via a pivot pin (hinge): “the metering unit 36 includes a second housing member 90 attached by a pivot pin 92 to the first housing member 50.” (Ex. 1006, 7:19–21).

229. To the extent that it is unclear precisely how the movable portion of the Amazone housing is connected to the fixed portion of the housing, a POSA would be motivated to combine the seed meter disclosed in the Amazone Manual with the hinge disclosed in VenHuizen for ease accessing the interior of the seed meter for maintenance purposes. It would have been obvious to a POSA at the time of the invention claimed in the ’121 patent to combine the teachings of the Amazone Manual with the disclosures of VenHuizen and a POSA would have had a reasonable expectation of success in accomplishing the combination. The Amazone Manual and VenHuizen both relate to the same field of endeavor as the ’121 patent—precision planting and vacuum seed meters. Because both disclose seed meters with two mating parts, the combination of the hinge of VenHuizen

with the seed meter disclosed in the Amazone Manual would be a straightforward adaptation. Furthermore, replacing the connecting means of the Amazone movable portion with the hinge of VenHuizen is a simple substitution of one known element for another to obtain predictable results. (See Ex. 1006, Fig. 7 annotated below).



Summary of Opinions

230. My evaluation of the '121 patent, along with its prosecution history and related prior art discussed above, leads me to conclude that the purported invention claimed in the '121 patent would have been anticipated and/or obvious to a person of skill in the art as of the earliest possible priority date of November 12, 2010. The subject matter claimed in the '121 patent was well known as of that date. The benefits of using a thrust-bearing element to solve the problem recognized in, and purportedly solved by, the claims of the '121 patent were well known as of the priority date of the '121 patent. Accordingly, the prior art reveals that the claimed invention of the '121 patent was not novel and further that combining the prior art disclosures to arrive at the claimed invention would have yielded unsurprising and predictable results to a POSA and a POSA could arrive at the claimed invention by combining the prior art's teachings as described above with an expectation of success.

231. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false

Declaration of Dr. Mark Fleming
Re: U.S. Patent No. 8,770,121

statements and the like so made are punishable by fine or imprisonment,
or both, under Section 1001 of Title 18 of the United States Code.


Mark Fleming, Ph.D., P.E.

Date: 10-4-2023