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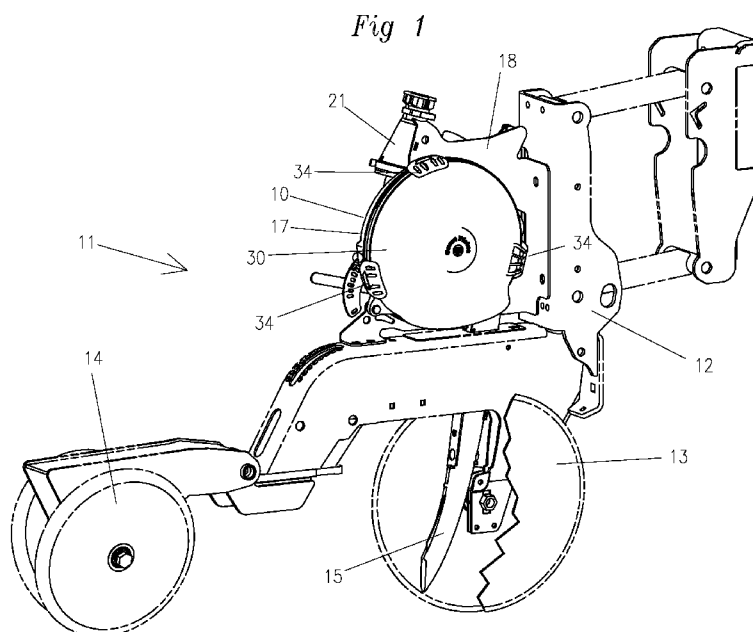
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[Continued on next page]

(54) Title: SEED METERING DEVICE FOR AGRICULTURAL SEEDER



(57) Abstract: A seed metering device (10) for agricultural seeders has a meter housing (17), a seed disk (22) covering an open side of the meter housing (17), and a brush assembly (27) mounted within the meter housing (17) and contacting the seed disk (22). The meter housing (17) has a seed delivery opening (19) for delivering a supply of seed into a seed pool area (20), an air inlet (26) provided above the seed pool (20) area for receiving a supply of positive pressure air into the meter housing (17), and a seed exit area (31) where seed can be dropped into a seed tube (15). The seed disk (22) has seed pockets (23) spaced around its outer circumference that pass through the seed pool (20) and pick up individual seeds as the seed disk (22) rotates. The device (10) includes several features that help singulate and drop seeds in a way that provides a desired number of seeds per acre and a uniform spacing between the seeds in the furrow.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. A01C7/04				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) A01C				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	EP 0 140 701 A2 (DEERE & CO [US]) 8 May 1985 (1985-05-08) abstract page 13, line 29 - line 38 page 14, line 1 - line 9 page 16, line 3 - line 35 page 17, line 11 - line 15 claims; figures	1-12, 14, 17, 21, 22, 26-28		
X	US 2007/039529 A1 (SAUDER GREGG A [US] ET AL) 22 February 2007 (2007-02-22) abstract page 3, paragraph 39-41 page 4, paragraph 50-51 page 6, paragraphs 62, 63 claims; figures	1-12, 14, 17-22, 25-28		
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<input checked="" type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents :</p> <table style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width:50%; vertical-align: top;"> <p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*Z* document member of the same patent family</p> </td> </tr> </table>			<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>	<p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*Z* document member of the same patent family</p>
<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>	<p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*Z* document member of the same patent family</p>			
Date of the actual completion of the international search 30 September 2010		Date of mailing of the international search report 28/12/2010		
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Oltra García, R		

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/037123

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/111001 A1 (HAGEN MATTHEW BRIAN [US] ET AL) 19 June 2003 (2003-06-19) abstract page 1, paragraphs 17,18 page 2, paragraph 18-21 claims; figures -----	1-12,14, 17-22, 26-28
A	US 6 109 193 A (CRABB RICHARD J [US] ET AL) 29 August 2000 (2000-08-29) abstract column 12, line 9 - line 14 claims; figures -----	1,21,22

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2010/037123
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
EP 0140701	A2	08-05-1985	AR 246654 A1	30-09-1994
			AU 3369284 A	09-05-1985
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			CA 1305367 C	21-07-1992
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			BR 0205247 A	20-07-2004
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			HU 0204367 A2	28-08-2003
US 6109193	A	29-08-2000	US 6332413 B1	25-12-2001

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-28

A seed metering device for an agricultural seeder, comprising: a meter housing; a seed disk covering an open side of said meter housing, said seed disk having a series of pockets spaced around an outer circumference thereof; a center shaft that provides a driving force to rotate the seed disk; a seed exit area where seed dropped from the seed disk can exit the metering device and fall into a seed tube; an air inlet provided in said meter housing above said seed pool area to receive a supply of positive pressure air into the meter housing for holding individual seeds in the pockets of the seed disk; and a brush assembly provided within the meter housing to separate the housing into a pressurized zone where the seed is loaded and held in the pockets of the seed disk and a non-pressurized zone where the seed can be dropped from the seed disk into the seed exit area.

2. claims: 29-34

A seed metering device for an agricultural seeder, comprising: a seed disk having a series of seed pockets spaced around an outer circumference; and a center shaft that provides a driving force to rotate the seed disk; a multi lobe disk seat mounted on the center shaft, said disk seat comprising a substantially flat surface, a raised center protruding axially from the flat surface, and at least three tapered lobes that extend outwardly from the raised center; and said seed disk has a flat face that abuts the flat surface of the disk seat, an open center that receives the raised center of the disk seat, and a plurality of lobe sockets that receive the tapered lobes of said disk seat.

3. claims: 35, 36

A seed disk for a seed metering device, comprising: a substantially circular disk having a series of seed pockets spaced around an outer circumference thereof; said pockets of said seed disk each have a leading lip that provides a final surface of the seed disk to contact the seed before the seed is dropped, and said leading lip is parallel to said center axis and perpendicular to a centerline of the seed tube.

4. claim: 37

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

A seed disk for a seed metering device, comprising: a substantially circular disk having a series of pockets spaced around an outer circumference thereof; a wiping rib formed on a surface of the seed disk, said wiping rib comprising a raised structure formed on a surface of the seed disk facing the seed pool, said wiping rib extends radially outwardly from a center portion of the seed disk and is arranged to perform at least one of the functions of agitating seed in the seed pool and wiping and dislodging residue from a brush assembly as the seed disk rotates.

5. claim: 38

A seed metering device for an agricultural seeder, comprising: a meter housing having a seed pool area and a seed delivery opening that allows a supply of seed to be delivered into the seed pool area; a seed disk covering an open side of said meter housing, said seed disk having a series of pockets spaced around an outer circumference thereof; said seed meter housing having a sloping back wall in the seed pool area, said sloping back wall being arranged so that a gap between the seed disk and the back wall increases in a direction of disk rotation within the seed pool area to ensure that no binding or pinching of seeds will occur between the seed disk and the back wall.

6. claims: 39, 40

A seed metering device for an agricultural seeder, comprising: a meter housing having a seed pool area and a seed delivery opening that allows a supply of seed to be delivered into the seed pool area; a seed disk covering an open side of said meter housing, said seed disk having a series of pockets spaced around an outer circumference thereof; and said meter housing comprising a seed ramp formed by a bottom of the meter housing in the seed pool area being sloped toward the seed disk to nudge seeds toward the seed disk.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/037123

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-28

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.