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International application number:	PCT/NO2018/050193
International filing date:	17 July 2018 (17.07.2018)
Document type:	Certified copy of priority document
Document details:	Country/Office: EP
	Number: 17184708.0
	Filing date: 03 August 2017 (03.08.2017)
Date of receipt at the International Bureau:	26 September 2018 (26.09.2018)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a),(b) or (b-bis)

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Patentanmeldung Nr.

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17184708.0 / EP17184708

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p.o.



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Anmeldung Nr.
Application no.: 17184708.0
Demande no.:

Anmeldetag:
Date of filing: 03.08.17
Date de dépôt:

Anmelder / Applicant(s) / Demandeur(s).

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REMOTE SKIMMER ADJUSTMENT FOR A MOULDERBOARD PLOUGH

In Anspruch genommene Priorität(en) / Priority(Priorities) claimed / Priorité(s) revendiquée(s)

Staat/Tag/Aktenzeichen / State/Date/File no. / Pays/Date/Numéro de dépôt:

Am Anmeldetag benannte Vertragsstaaten / Contracting States designated at date of filing / Etats contractants désignés lors du dépôt:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO RS SE SI SK SM TR

REMOTE SKIMMER ADJUSTMENT FOR A MOULDBOARD PLOUGH

The invention is related to a reversible mouldboard plough, wherein a plough beam is provided with a pair of plough bodies, a skimmer arrangement being connected to the plough beam providing a first skimmer and a second skimmer proximate and in front of the respective plough bodies, where-
5 in each skimmer is attached to a skimmer shank which is arranged displaceable in a longitudinal direction of the skimmer shank, and wherein the first skimmer and the second skimmer are inter-connected with a synchronization mechanism arranged to provide equal displacement of the skimmers relative to the respective plough bodies. The invention is also related to a method of setting the working depth of skimmers of a reversible multi-furrow mouldboard plough

10 It is known to use a so-called plough skimmer in front of every plough body in a plough for soil preparation. The purpose of the plough skimmer is primarily to cut off a border portion of the edge of each furrow slice before it is turned over so that the ploughing gets a more even surface and the furrow slices are closed. Thereby there will be, among other things, reduced possibilities for plants to grow up from the downward-facing slice surface, which, in meadow-ploughing, is densely stud-
15 ded with old plant material. There is a need to be able to adjust the depth of each plough skimmer in order to adapt the vertical position of the plough bodies to the ploughing depth of the plough.

On a reversible plough, two opposite plough skimmers are attached to the same beam, i.e. the piece of frame onto which two opposing plough bodies are attached.

From EP3057393 a device for the depth adjustment of pair of plough skimmers on a reversible
20 plough is known, in which a mounting bracket for a pair of plough skimmers is provided with means for fixing the pair of plough skimmers in a preferred position on the plough beam. An actuator is attached to the mounting bracket and is connected to an end portion of shanks extending from the plough skimmer into a guide arrangement on the mounting bracket. In one embodiment, the actuator is a link-arm arrangement with a pivot arm pivotally supported in the mounting bracket around
25 the centre of the pivot arm, and with upper end portions of the shanks of the plough skimmers connected via link arms attached by pivot joints. The pivoting of the pivot arm moves the end portions of the link arms and pulls or pushes the shanks of the plough skimmer up or down in the mounting bracket. In another embodiment, the actuator is formed as a link-arm arrangement including a central adjustment bracket displaceable substantially transversely to the longitudinal direction of the
30 shank, along a horizontal portion of the plough beam. The displacement of the adjustment bracket

to the plough beam providing a first skimmer and a second skimmer proximate and in front of the respective plough bodies, wherein each skimmer is attached to a skimmer shank which is arranged displaceable in a longitudinal direction of the skimmer shank, and wherein the first skimmer and the second skimmer are interconnected with a synchronization mechanism arranged to provide equal displacement of the skimmers relative to the respective plough bodies, characterized in that the first skimmer and the second skimmer are further interconnected with a linear actuator arranged for displacing the skimmers in the longitudinal direction of the skimmer shanks.

The linear actuator may be electrically powered.

The linear actuator may be connected to a control unit arranged for remote control of the displacement of the first and second skimmers.

The linear actuator may be connected to a control unit arranged for simultaneous remote control of the displacement of the first and second skimmers of multiple skimmer arrangements.

The control unit may be arranged for individual remote control of the displacement of the skimmers of each of the skimmer arrangements of a multi-furrow reversible mouldboard plough.

The reversible mouldboard plough may further comprise a depth control device provided with a depth adjustment actuator controlled by the control unit, wherein the control unit may be arranged to allow a change of a vertical position of the depth wheel providing a correlated change of the vertical position of the skimmers.

The linear actuator may be connected to mid-portions of the shanks of the skimmer arrangement.

The skimmer arrangement may be connected to a horizontal portion of the plough beam with a bracket displaceable along said plough beam portion.

The synchronization mechanism may be formed as a link-arm arrangement including a pivot arm pivotal around a centre axis and connected to upper second end-portions via link arms.

A centre portion of the pivot arm may be provided with an engagement portion arranged for connecting a manually operated skimmer depth-adjusting tool to the pivot arm.

In a second aspect the invention relates more particularly to a method of setting the working depth of skimmers of a reversible multi-furrow mouldboard plough,

wherein a plough beam is provided with a pair of plough bodies, a skimmer arrangement being connected to the plough beam providing a first skimmer and a second skimmer proximate and in front of the respective plough bodies,

wherein each skimmer is attached to a skimmer shank which is arranged displaceable in a longitudinal direction of the skimmer shank,

wherein the first skimmer and the second skimmer are interconnected with a synchroniza-

mouldboard plough provided with several plough beams 12 connected to a main frame 10, each plough beam 12 carrying two opposing plough bodies 11, 11a. A ploughing depth control device, here shown as a depth wheel 13, comprises a remote controlled depth adjustment actuator 131 and is attached to a rear portion of the main frame 10. The depth wheel 13 is provided with a position indicator 132. The depth adjustment actuator 131 and the depth wheel position indicator 132 are connected to a control unit 16 provided at a front portion of the main frame 10 further connected to remote control panel (not shown) arranged close to a driver, for example in a tractor's cab (not shown). A skimmer arrangement 14 is attached to each of the plough beams 12, providing a first skimmer 141 and a second skimmer 141a arranged in front of the respective plough body 11, 11a.

It is now referred to figures 2 and 3. The skimmer arrangement 14 is provided with a skimmer bracket 143, which is attached to a horizontal portion 121 of the plough beam 12 (shown in figure 2 only). The skimmer bracket 143 is displaceable along the plough beam portion 121. The skimmers 141, 141a are attached to first end portions 1421 of respective skimmer shanks 142 which are extending in opposite directions from the skimmer bracket 143. Second end portions 1422 of the skimmer shanks 142 are in engagement with the skimmer bracket 143 slidable in the longitudinal direction of the skimmer shanks 142. A skimmer shank plate 142a is bolted onto each skimmer shank 142, extending outside the skimmer bracket 143. The two opposing skimmer shanks 142 are interconnected by means of a synchronization mechanism 144, in this embodiment shown as a link-arm arrangement 144a. The link-arm arrangement 144a comprises a pivot arm 1441 pivotal about a joint pin 1431 extending from the skimmer bracket 143. Co-axial to the joint pin 1431 an engagement portion 1442 is extending from a mid-portion of the pivot arm 1441 and arranged for engagement with a tool (not shown), e.g. a spanner, for manual operation of the link-arm arrangement 144a. Each end portion of the pivot arm 1441 is connected to a link arm 1443, each of which being connected to shank plate end-portions 1422 of the respective skimmer shank plates 142a. Thus, longitudinal displacement of one of the skimmer shanks 142 will cause the other skimmer shank 142 displace correspondingly in the opposite direction. For a person skilled in the art it is obvious that various forms of synchronization mechanisms are suitable, among others a gear system meshing with the skimmer shanks.

A remote controlled actuator 15 is interconnecting the pair of skimmer shanks 142, in this embodiment shown as a linear, electric operated actuator 15 connected to mid-portions 1423 of the skimmer shank plates 142a, more precisely to lugs 1424 provided on the shank plates 142a. The actuator 15 is connected to a control unit 16 (see fig. 1) and is provided with position monitoring means 151 to allow feedback of the level of extension of the actuator 15 to the control unit 16.

The control unit 16 is arranged for individual and collective control of the actuator 15 of each skimmer arrangement 14. Thus, a pair of skimmers 141, 141a can be set differently from the setting of the remaining pair of skimmers 141, 141a.

C l a i m s

1. A reversible mouldboard plough (1), wherein a plough beam (12) is provided with a pair of plough bodies (11), a skimmer arrangement (14) being connected to the plough beam (12) providing a first skimmer (141) and a second skimmer (141a) proximate and in front
5 of the respective plough bodies (11), wherein each skimmer (141, 141a) is attached to a skimmer shank (142) which is arranged displaceable in a longitudinal direction of the skimmer shank (142), and wherein the first skimmer (141) and the second skimmer (141a) are interconnected with a synchronization mechanism (144) arranged to provide equal displacement of the skimmers (141, 141a) relative to the respective plough bodies
10 (11), c h a r a c t e r i s e d i n that the first skimmer (141) and the second skimmer (141a) are further interconnected with a linear actuator (15) arranged for displacing the skimmers (141, 141a) in the longitudinal direction of the skimmer shanks (142).
2. The reversible mouldboard plough (1) according to claim 1, wherein the linear actuator
15 (15) is electrically powered.
3. The reversible mouldboard plough (1) according to claim 1, wherein the linear actuator (15) is connected to a control unit (16) arranged for remote control of the displacement of the first and second skimmers (141, 141a).
4. The reversible mouldboard plough (1) according to claim 1, wherein the linear actuator
20 (15) is connected to a control unit (16) arranged for simultaneous remote control of the displacement of the first and second skimmers (141, 141a) of multiple skimmer arrangements (14).
5. The reversible mouldboard plough (1) according to claim 4, wherein the control unit (16)
25 is arranged for individual remote control of the displacement of the skimmers (141, 141a) of each of the skimmer arrangements (14) of a multi-furrow reversible mouldboard plough (1).
6. The reversible mouldboard plough (1) according to claim 1, further comprising a depth
30 wheel (13) provided with a depth adjustment actuator (131) controlled by the control unit (16), and wherein the control unit (16) is arranged to allow a change of a vertical position of the depth wheel (13) providing a correlated change of the vertical position of the skimmers (141, 141a).
7. The reversible mouldboard plough (1) according to claim 1, wherein the linear actuator
(15) is connected to mid-portions (1423) of the shanks (142) of the skimmer arrangement (14).

A b s t r a c t

A reversible mouldboard plough (1), wherein each a plough beam (12) is provided with a pair of plough bodies (11), a skimmer arrangement (14) being connected to the plough beam (12) providing a first skimmer (141) and a second skimmer (141a) proximate and in front of the respective
5 plough bodies (11), wherein each skimmer (141, 141a) is attached to a skimmer shank (142) which is arranged displaceable in a longitudinal direction of the skimmer shank (142), and wherein the first skimmer (141) and the second skimmer (141a) are interconnected with a synchronization mechanism (144) arranged to provide equal displacement of the skimmers (141, 141a) relative to the respective plough bodies (11), wherein the first skimmer (141) and the second skimmer (141a)
10 are further interconnected with a linear actuator (15) arranged for displacing the skimmers (141, 141a) in the longitudinal direction of the skimmer shanks (142).

A method of setting the working depth of skimmers (141, 141a) of a reversible multi-furrow mouldboard plough (1) is also disclosed

(Fig. 2)

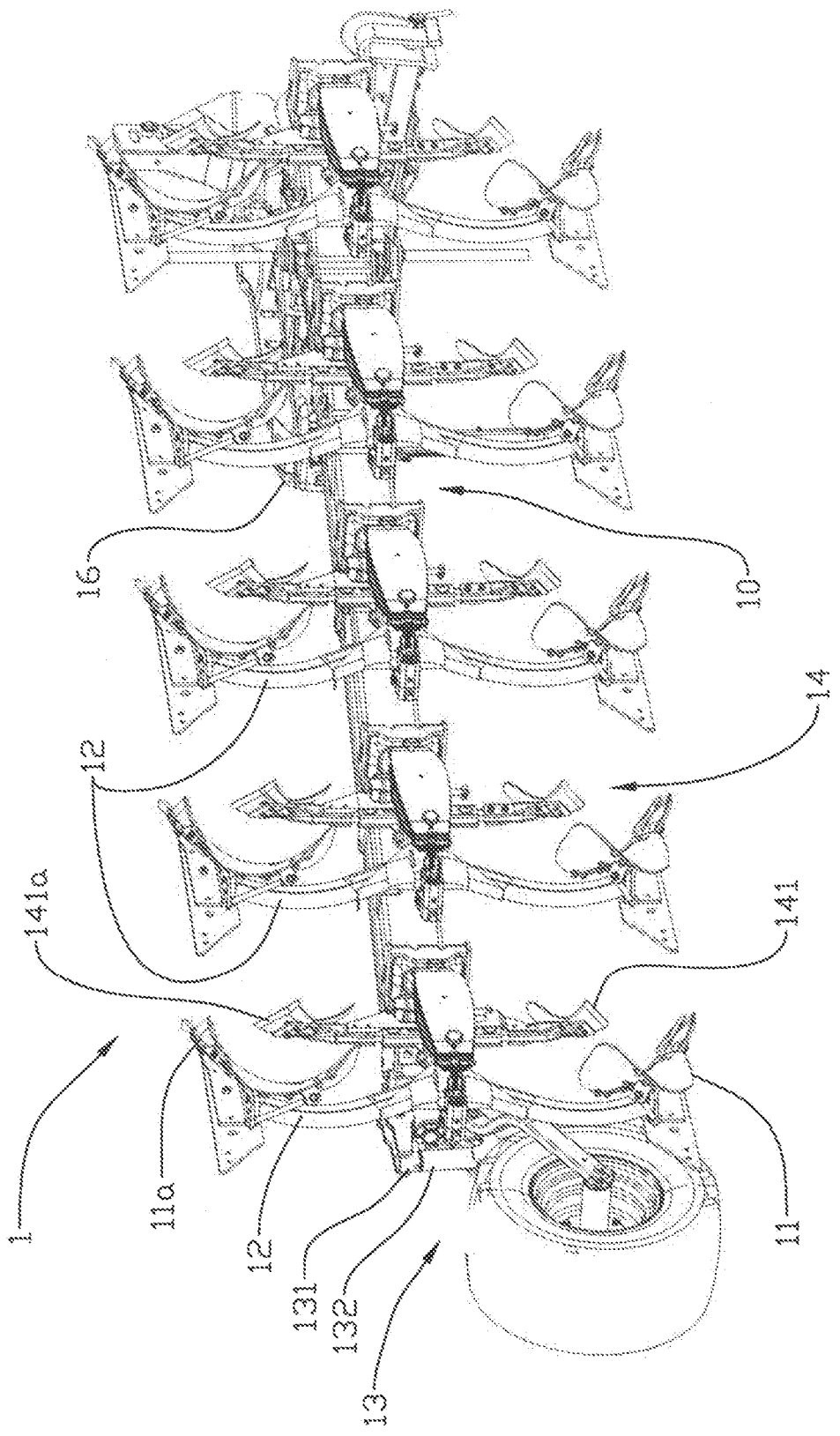


Fig. 1

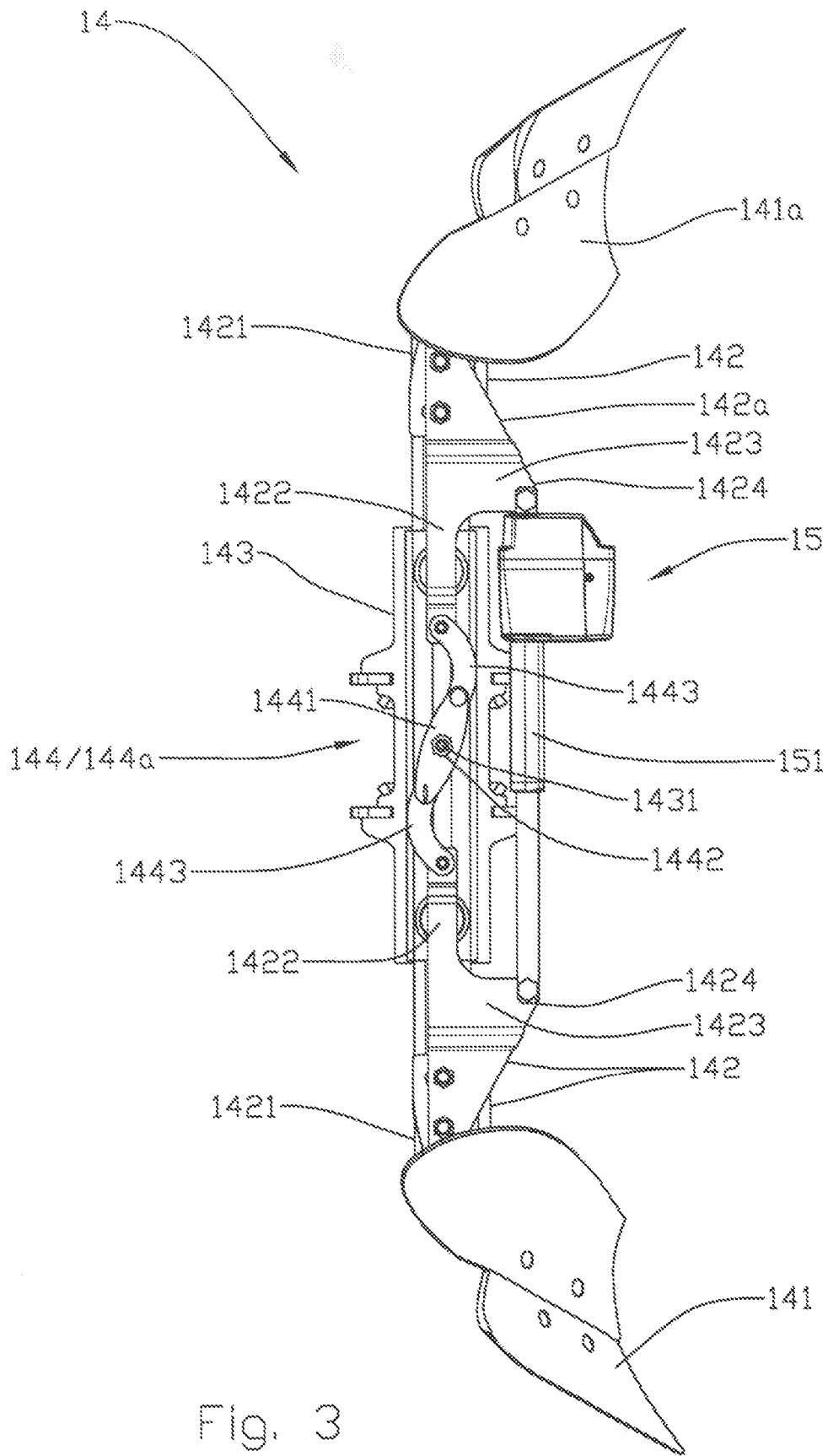


Fig. 3