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(54) Title: INCLINED DISC KNIFE DRIVE FOR COMBINE HEADERS

(57) Abstract: According to an embodiment of the invention, an inclined disc knife drive system 102 for a cutter bar 104 of a crop harvester is disclosed. The system includes a rotatory shaft 118, an inclined disc 120 and an arm 122. The rotatory shaft 118 may be attached to a header 100 at one side and capable of receiving a rotatory motion from rotatory drive 112. The inclined disc 120 may be provided on the rotatory shaft 118. The arm 122 may be in contact with the inclined disc 120 at a first end and hinged to the cutter bar 104 at a second end. The arm 122 may further be pivoted to the header 100, such that the point of pivot is substantially midway between first end and second end. The arrangement being such that the rotatory motion QT the rotatory shaft 118 is converted into reciprocating motion of the cutter bar 104 through the arm 122.

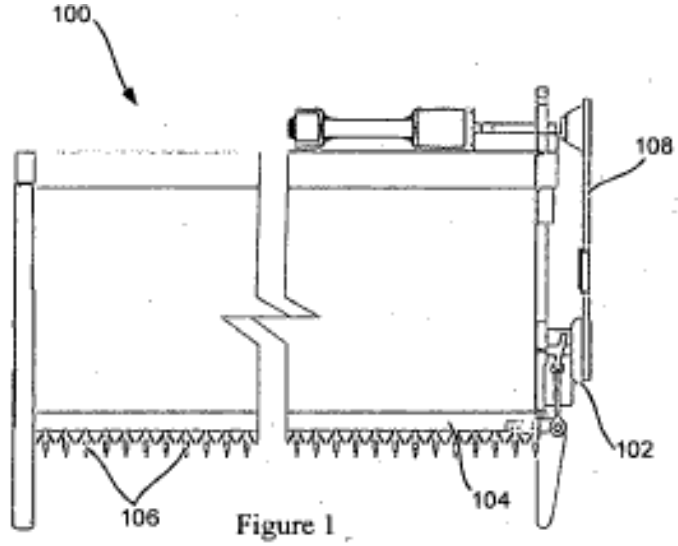

Figure 1

INCLINED DISC KNIFE DRIVE FOR COMBINE HEADERS

ABSTRACT

According to an embodiment of the invention, an inclined disc knife drive system 102 for a cutter bar 104 of a crop harvester is disclosed. The system includes a rotatory shaft 118, an inclined disc 120 and an arm 122. The rotatory shaft 118 may be attached to a header 100 at one side and capable of receiving a rotatory motion from a rotatory drive 112. The inclined disc 120 may be provided on the rotatory shaft 118. The arm 122 may be in contact with the inclined disc 120 at a first end and hinged to the cutter bar 104 at a second end. The arm 122 may further be pivoted to the header 100, such that the point of pivot is substantially midway between first end and second end. The arrangement being such that the rotatory motion of the rotatory shaft 118 is converted into reciprocating motion of the cutter bar 104 through the arm 122.

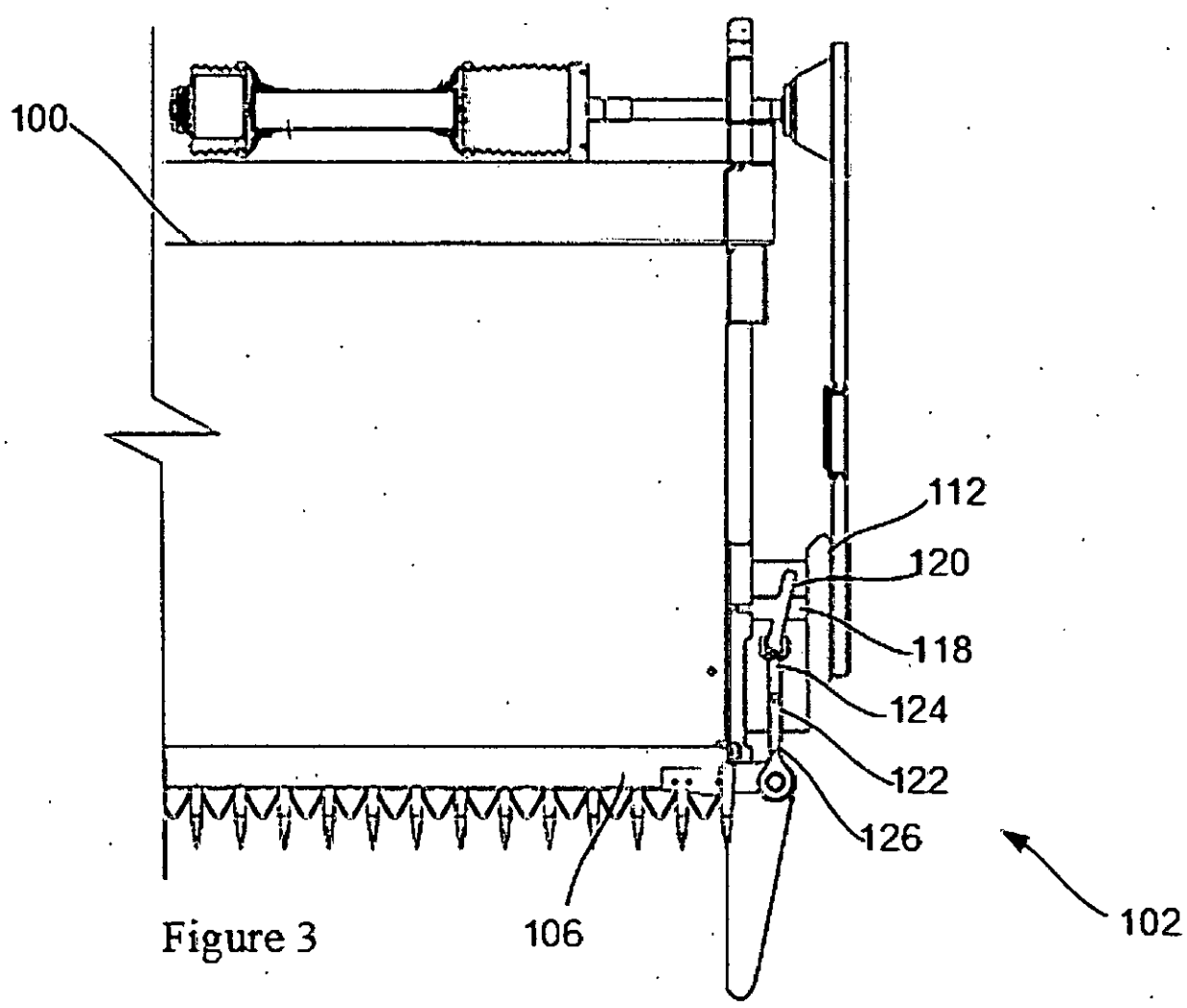

Figure 3

We claim:

1. An inclined disc knife drive system 102 for a cutter bar 104 of a crop harvester, the system comprising:

a rotatory shaft 118 attached to a header 100 of the crop harvester at one side and capable of receiving a rotatory motion from a rotatory drive 112;

an inclined disc 120 provided on the rotatory shaft 118; and

an arm 122 in contact with the inclined disc 120 at a first end and hinged to the cutter bar 104 at a second end, the arm 122 being pivoted to the header 100, such that the point of pivot is substantially midway between both the ends and wherein the rotatory motion of the rotatory shaft 118 is converted into reciprocating motion of the cutter bar 104 through the arm 122.

2. The inclined disc knife drive arrangement 102 as claimed in claim 1, wherein the inclined disc 120 is at an angle of substantially 10 degrees to 30 degrees to the rotatory shaft 118.

3. The inclined disc knife drive arrangement 102 as claimed in claim 1, wherein the contact between the arm 122 and the inclined disc 120 is a point contact.

4. The inclined disc knife drive arrangement 102 as claimed in claim 3, wherein the arm 122 is provided with two spherical connections at the first end, such that the motion between the arm 122 and the inclined disc 120 is a rolling motion.

5. The inclined disc knife drive arrangement 102 as claimed in claim 1, wherein the rotatory drive 112 is driven in a rotatory motion by a driver pulley 110.

6. The inclined disc knife drive arrangement 102 as claimed in claim 5, wherein the rotatory drive 112 is in communication with the driving pulley 110 by a belt drive arrangement.

7. The inclined disc knife drive arrangement 102 as claimed in claim 6, further comprising an idler pulley 116.

Dated this 6th day of March 2015

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FIELD OF INVENTION

The invention generally relates to header for a harvesting machine, and particularly to a knife drive of a harvesting machine.

BACKGROUND

Crop harvesting machines typically consist a header mounted on the front side of the harvesting machine. Header of a combine harvester cut the crop, collects it to the centre and then feed to the combine harvester for further processing. The header may have a cutter bar assembly that includes a plurality of knife mounted on a bar across a forward end of the header frame for cutting the standing crop. The sickle knife is typically a row of sickle blades that are movable in a reciprocating action relative to a row of sickle guards. A knife drive mechanism/assembly provides a driving action to the cutter bar for causing the reciprocating movement of the blades. The harvesting machine may further have a crop transfer assembly for transporting the cut crop from the knife along the frame to a discharge opening of the frame.

Usually knife drive assembly consists of a wobble drive, which converts rotating action of power input from drive shaft into reciprocating action. The wobble drive is a complex assembly and typically has a number of complex components including eccentric shaft, yoke, bearings, bearing housings, arm, bushings, gearbox, cover, etc.

Hence, there is a need to have a simple arrangement for providing a reciprocating motion to the knife drive assembly.

SUMMARY OF THE INVENTION

The present disclosure is directed to overcome one or more of the problems as set forth above.

According to an embodiment of the invention, an inclined disc knife drive system for a cutter bar of a crop harvester is disclosed. The system includes a rotatory shaft, an inclined disc and an arm. The rotatory shaft may be attached to a header of the crop harvester at one side and capable of receiving a rotatory motion from a rotatory drive. The inclined disc may be provided on the rotatory shaft, such that the disc may have a rotatory motion. The arm may be in contact with the inclined disc at a first end and hinged to the cutter bar at a second end. The arm may further be pivoted to the header, such that the point of pivot is substantially midway between first end and second end. The arrangement being such that the rotatory motion of the rotatory shaft is converted into reciprocating motion of the cutter bar through the arm.

BRIEF DESCRIPTION OF DRAWINGS

Other objects, features, and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

Figure 1 is a top partial view of an inclined disc knife drive system mounted on header of a crop harvester according to an embodiment of the invention;

Figure 2 is a side view of a drive system for the inclined disc knife drive of the cutter bar according to an embodiment of the invention;

Figure 3 is a top partial view of the inclined disc knife drive system according to an embodiment of the invention; and

Figure 4 is a top partial view of the inclined disc knife drive system according to an embodiment of the invention.

DETAILED DESCRIPTION OF DRAWINGS

The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of exemplary embodiments of the invention as defined by the claims and their equivalents. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the invention. In addition, descriptions of well-known functions and constructions are omitted for clarity and conciseness.

Figure 1 illustrates a top partial view of an inclined disc knife drive system 102 mounted on a header 100 of a crop harvester according to an embodiment of the invention. The header 100 may have a cutter bar 104 having plurality of sickle blades 106 arranged substantially parallel to each other. The cutter bar 104 is in communication with the inclined disc knife drive system 102. The inclined disc knife drive system 102 is configured to provide a reciprocating motion to the cutter bar 104 that in turn provide reciprocating motion to the sickle blades 106. The inclined disc knife drive system 102 may further be connected to a driving arrangement 108.

Figure 2 illustrates a side view of the exemplary driving arrangement 108 for the inclined disc knife drive system 102 according to an embodiment of the invention. As illustrated, the driving arrangement 108 may have a driver pulley 110 that may be in communication with a rotatory driver device (not shown in figure) such as, but not limited to, motor, PTO shaft etc. that in turn provide rotating motion to the driver pulley 110. The driver pulley 110 is in mechanical communication with a rotatory drive 112. The driver pulley 110 and the rotatory drive 112 may be in communication through a suitable linkage 114 such as, but not limited to, a belt drive, a gear arrangement etc. According to an embodiment, an idler pulley 116 may be provided for supporting transfer of rotatory motion from the driver pulley 110 to the rotatory drive 112.

Figure 3 and Figure 4 are top partial view of the inclined disc knife drive system 102 according to an embodiment of the invention. The inclined disc knife drive system 102 may include a rotatory shaft 118. The rotatory shaft 118 may be attached to the header 100 at one side and capable of receiving a rotatory motion from the rotatory drive 112. The rotatory shaft 118 may have an inclined disc 120, such that the disc 120 may have a rotatory motion along with the shaft 118. The inclined disc 120 may be at an angle of substantially 10 degrees to 30 degrees to the rotatory shaft 118. According to an embodiment of the invention, the inclined disc 120 may be at an angle of 15 degrees to the rotatory shaft 118. The system 102 further includes an arm 122. The arm 122 may be in contact with the inclined disc 120 at a first end 124 and hinged to the cutter bar 106 at a second end 126. According to an embodiment, the first end of the arm 122 may be divided into two parts, such that one part is configured on each side of the inclined disc 120. According to yet another embodiment, each part may have a suitable groove for holding at least one ball such that the first end 124 of the arm 122 may have a spherical connection with the inclined disc 120. The first end 124 of the arm 122 and the inclined disc 120 may be arranged in such a way that the contact between each part of the first end 124 of

the arm 122 and the inclined disc 120 may be a point contact. According to an embodiment, the arrangement between first end 124 of the arm 122 and the inclined disc 120 may be such that the motion between each part of the first end 124 of the arm 122 and the inclined disc 120 may be a rolling motion.

The arm 122 may further be pivoted to the header 100, such that the point of pivot is substantially midway between the first end 124 and the second end 126 of the arm 122. The arrangement being such that the rotatory motion of the rotatory shaft 118 is converted into reciprocating motion of the cutter bar 106 through the arm.

In the drawings and specification there has been set forth preferred embodiments of the invention, and although specific terms are employed, these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in the form and the proportion of parts, as well as in the substitution of equivalents, are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of the invention.

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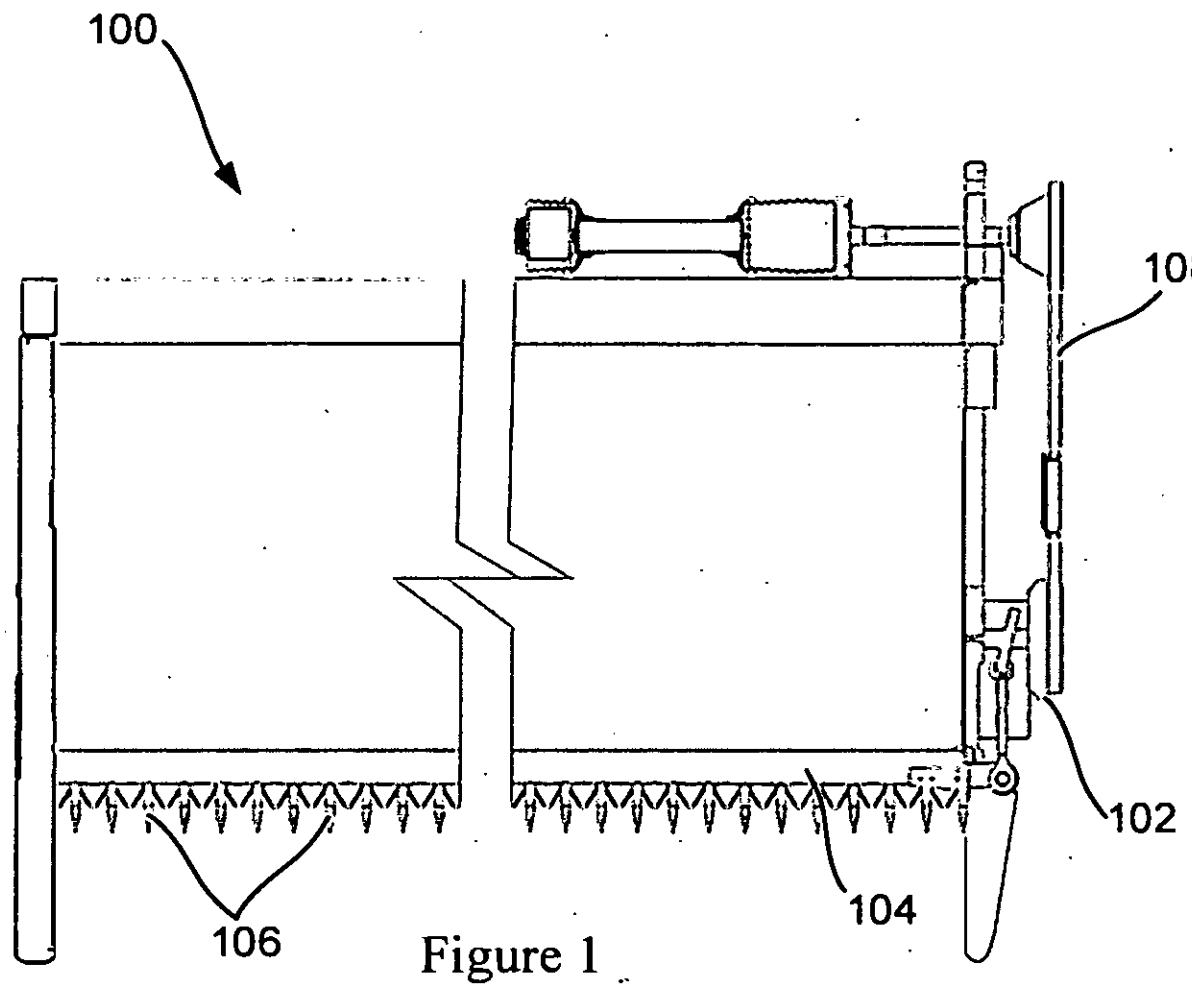

Figure 1

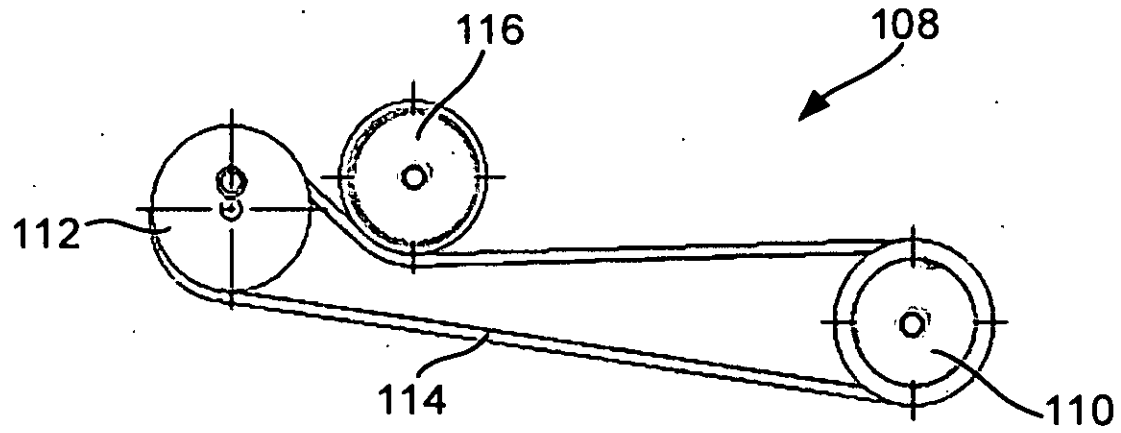

Figure 2

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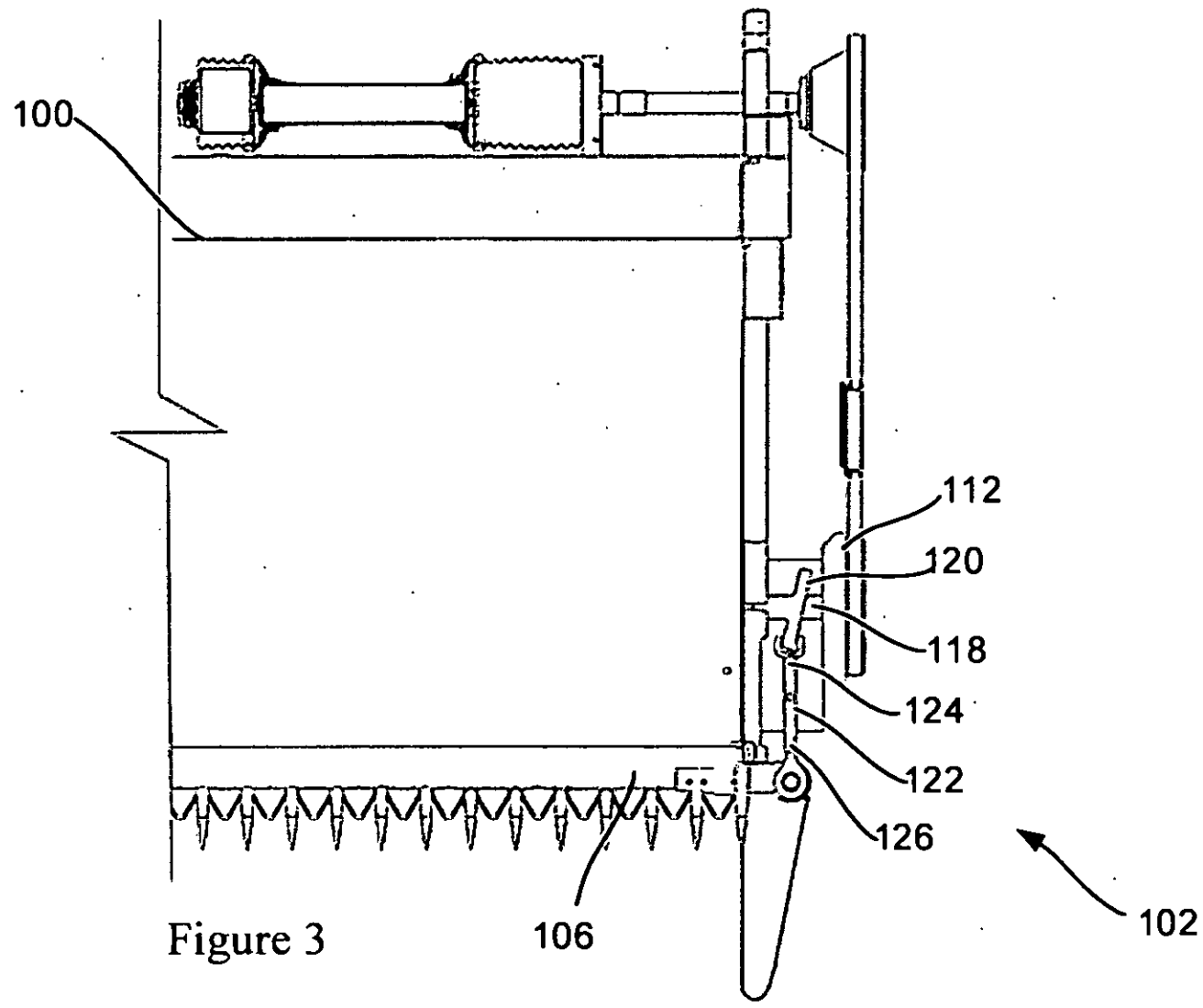

Figure 3

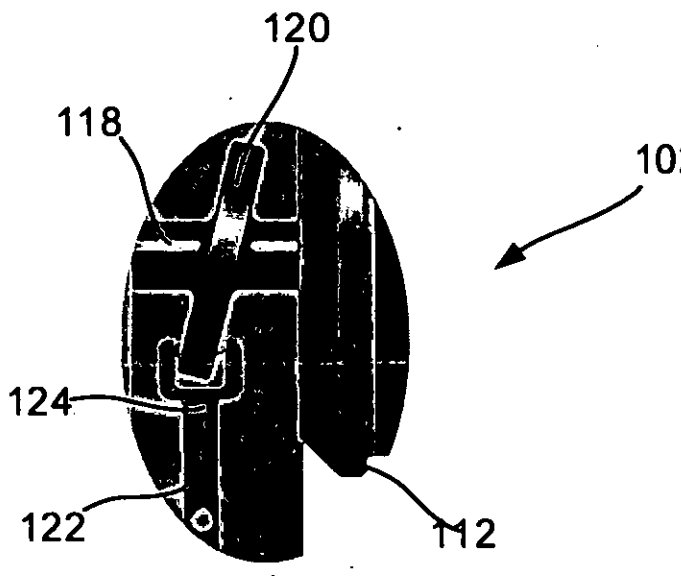

Figure 4

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