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(12) **EX PARTE REEXAMINATION CERTIFICATE** (11629th)

United States Patent
Thomas et al.

(10) **Number: US 9,321,386 C2**
(45) **Certificate Issued: Jan. 24, 2020**

(54) **LOW PROFILE COMPACT TOOL CARRIERS**

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(73) Assignee: **VERMEER MANUFACTURING COMPANY**, Pella, IA (US)

Reexamination Request:
No. 90/014,109, Mar. 12, 2018
No. 90/014,124, Apr. 13, 2019

Reexamination Certificate for:
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Issued: **Apr. 26, 2016**
Appl. No.: **14/691,649**
Filed: **Apr. 21, 2015**

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Related U.S. Application Data

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(51) **Int. Cl.**

B66F 9/075	(2006.01)
B66F 9/22	(2006.01)
B66F 9/065	(2006.01)
B60P 1/48	(2006.01)
E02F 3/96	(2006.01)
E02F 3/34	(2006.01)

(52) **U.S. Cl.**
CPC ***B66F 9/065*** (2013.01); ***B60P 1/483*** (2013.01); ***B66F 9/0759*** (2013.01); ***B66F 9/07572*** (2013.01); ***B66F 9/22*** (2013.01); ***E02F 3/3405*** (2013.01); ***E02F 3/96*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

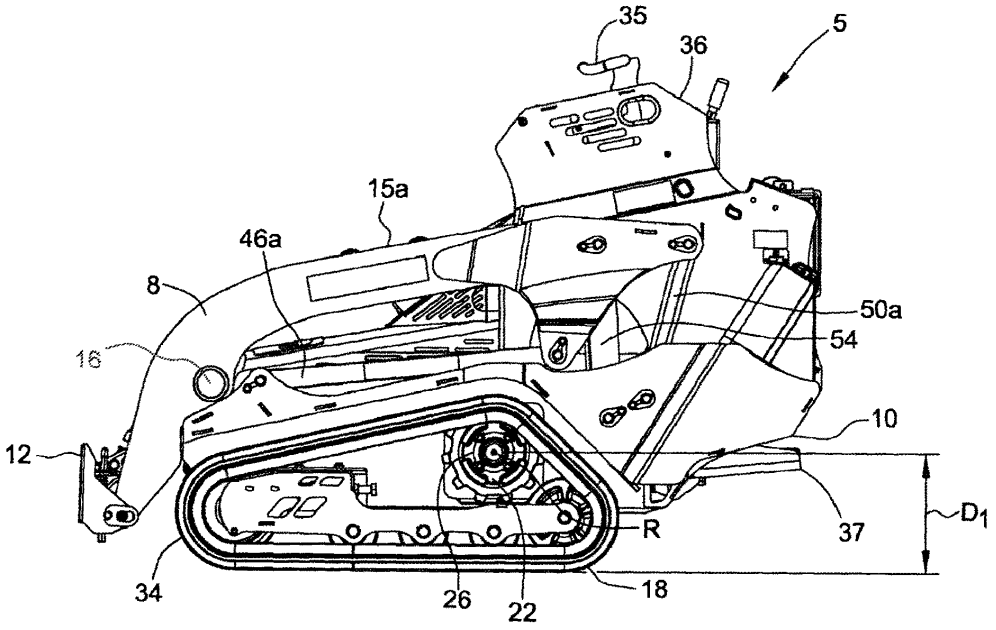
(56) **References Cited**

To view the complete listing of prior art documents cited during the proceesings for Reexamination Control Numbers 90/014,109 and 90/014,124, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

Primary Examiner — Russell D Stormer

(57) **ABSTRACT**

Compact tool carriers having a loader mounted to a low-profile mainframe are disclosed. In some embodiments, the pivot points of the mainframe about which the loader is pivoted are low relative to the mainframe to reduce the mainframe size and to lower the center of gravity to improve the stability of the compact tool carrier during use.



EX PARTE REEXAMINATION CERTIFICATE

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1-13**, **15**, **17**, **20**, **22-45** and **49-63** is confirmed.

Claims **16** and **18** were previously cancelled.

Claims **21** and **46** are determined to be patentable as amended.

Claims **47** and **48**, dependent on an amended claim, are determined to be patentable.

New claims **64-87** are added and determined to be patentable.

Claims **14** and **19** were not reexamined.

21. The compact tool carrier as set forth in claim **1** wherein the linkage is a first linkage, the first linkage being pivotally attached to the first side of the mainframe at a first pivot point and pivotally attached to the loader arm at a second pivot point, the actuator being attached to the mainframe at a third pivot point and pivotally attached to the loader arm at a fourth pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a fifth pivot point and pivotally attached to the loader arm at a sixth pivot point, wherein as the loader travels from a down position to a vertically raised position, the first, second, third, fourth, fifth, and sixth pivot points are (1) disposed between the operator controls and a bottom of the mainframe **[**and/or**]** *or* (2) disposed forward of the control station.

46. The compact tool carrier as set forth in claim **45** wherein the loader comprises:

a first arm;

a second arm; and

a cross-member that extends from the first arm to the second arm, the cross-member being *fully* disposed forward of the first linkage pivot point, the second linkage pivot point, and the actuator pivot point.

64. The compact tool carrier as set forth in claim 1 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform extending from the mainframe.

65. The compact tool carrier as set forth in claim 64 wherein least a portion of the operator platform is forward of the rear end of the mainframe.

66. The compact tool carrier as set forth in claim 15 wherein the pivot point at which the actuator is attached to the first side of the mainframe is above the rotational axis.

67. The compact tool carrier as set forth in claim 15 wherein the pivot point at which the linkage is attached to the first side of the mainframe is disposed above the tracks or wheels.

68. The compact tool carrier as set forth in claim 55 wherein the drive mechanism further comprises a drive sprocket, the drive sprocket rotating about the rotational axis, and the pivot point at which the actuator is attached to the first side of the mainframe being above the rotational axis.

69. The compact tool carrier as set forth in claim 55 wherein the pivot point at which the linkage is attached to the first side of the mainframe is above the tracks or wheels.

70. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface, at least a portion of the tracks angling downward from the drive sprocket toward the front end of the mainframe, the linkage pivot point being disposed above the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

71. The compact tool carrier as set forth in claim 70 wherein the linkage is a first linkage and the linkage pivot point is a first linkage pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a second linkage pivot point and pivotally attached to the loader arm, the first linkage being forward of the second linkage.

72. The compact tool carrier as set forth in claim 70 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform extending from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

73. The compact tool carrier as set forth in claim 70 wherein the mainframe incorporates a single weldment.

74. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being

spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a first linkage pivotally attached to the first side of the mainframe at a first linkage pivot point and pivotally attached to the loader arm;

a second linkage pivotally attached to the first side of the mainframe at an second linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface, the tracks being spaced from the rear end of the mainframe, at least a portion of the tracks angling downward from the drive sprocket toward the front end of the mainframe, each of the first linkage pivot point, second linkage pivot point, and actuator pivot point being (1) disposed above at least part of the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe or (2) disposed between the tracks and the rear end of the mainframe; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation; and

an operator platform for standing operation of the operator controls of the control station.

75. The compact tool carrier as set forth in claim 74 wherein the first linkage is forward of the second linkage, the first linkage being disposed above the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe.

76. The compact tool carrier as set forth in claim 74 wherein the operator platform extends from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

77. The compact tool carrier as set forth in claim 74 wherein the mainframe incorporates a single weldment.

78. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface, the tracks being spaced from the rear end of the mainframe; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation; and

an operator platform for standing operation of the operator controls of the control station that extends from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

79. The compact tool carrier as set forth in claim 78 wherein the mainframe incorporates a single weldment.

80. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

a drive mechanism comprising tracks for propelling the compact tool carrier over a supporting surface, the drive mechanism having a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4, both D2 and D4 being less than 2.0 D5, the pivot point at which the linkage is attached to the mainframe being disposed above the tracks; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

81. The compact tool carrier as set forth in claim 80 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform extending from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

82. The compact tool carrier as set forth in claim 81 wherein the mainframe incorporates a single weldment.

83. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

a drive mechanism comprising tracks for propelling the compact tool carrier over a supporting surface, the drive mechanism having a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4, both D2 and D4 being less than 2.0 D5, the pivot point at which the actuator is attached to the mainframe being above the rotational axis; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

84. The compact tool carrier as set forth in claim 83 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform extending from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

85. The compact tool carrier as set forth in claim 83 wherein the mainframe incorporates a single weldment.

86. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool, the loader being moveable between a down position and a vertically raised position;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a first linkage pivotally attached to the first side of the mainframe at a first linkage pivot point and pivotally attached to the loader arm;

a second linkage pivotally attached to the first side of the mainframe at a second linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising tracks or wheels, the drive mechanism having a rotational axis, the pivot point at which the actuator is attached to the mainframe being above the rotational axis;

an attachment plate for removably attaching a tool to the compact tool carrier, at least a portion of the attachment plate being forward of the drive mechanism when the loader is in the vertically raised position;

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation; and

an operator platform for standing operation of the operator controls of the control station.

87. The compact tool carrier as set forth in claim 86 wherein the mainframe incorporates a single weldment.

* * * * *

Notice of Pre-AIA or AIA Status

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,109 & 90/014,124	03/12/2018	9321386	Vermeer-386Reex-2	8108

76656 7590 11/26/2019

Patent Docket Department
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EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
11/26/2019	PAPER

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

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

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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

JAMES W. MILLER, ATTORNEY
120 S. 6TH ST.
SUITE 2310
MINNEAPOLIS, MN 55402-1829

Date: November 26, 2019

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90014109 & 90014124
PATENT NO. : 9321386
ART UNIT : 3993

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

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Notice of Intent to Issue Ex Parte Reexamination Certificate	**Control No.** 90/014,109 & 90/014,124	**Patent Under Reexamination** 9321386	
	Examiner RUSSELL D STORMER	**Art Unit** 3993	**AIA Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☑ Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. *Cf.* 37 CFR 1.313(a). A Certificate will be issued in view of
   (a) ☑ Patent owner's communication(s) filed: 12/6/2018 and 10/25/2019.
   (b) ☐ Patent owner's failure to file an appropriate timely response to the Office action mailed: _____.
   (c) ☐ Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
   (d) ☐ The decision on appeal by the ☐ Board of Patent Appeals and Interferences ☐ Court dated _____
   (e) ☐ Other: _____.
2. The Reexamination Certificate will indicate the following:
   (a) Change in the Specification: ☐ Yes ☑ No
   (b) Change in the Drawing(s): ☐ Yes ☑ No
   (c) Status of the Claim(s):
      (1) Patent claim(s) confirmed: 1-13,15,17,20,22-45 and 49-63.
      (2) Patent claim(s) amended (including dependent on amended claim(s)): 21 and 46-48
      (3) Patent claim(s) canceled: 16 and 18.
      (4) Newly presented claim(s) patentable: 64-87.
      (5) Newly presented canceled claims: _____.
      (6) Patent claim(s) ☐ previously ☐ currently disclaimed: _____
      (7) Patent claim(s) not subject to reexamination: 14 and 19.
3. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
4. ☑ Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."
5. ☐ Note attached NOTICE OF REFERENCES CITED (PTO-892).
6. ☐ Note attached LIST OF REFERENCES CITED (PTO/SB/08 or PTO/SB/08 substitute).
7. ☐ The drawing correction request filed on _____ is: ☐approved ☐disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐None of the certified copies have
      ☐been received.
      ☐not been received.
      ☐been filed in Application No. _____.
      ☐been filed in reexamination Control No. _____.
      ☐been received by the International Bureau in PCT Application No. _____.

   * Certified copies not received: _____.
9. ☑ Note attached Examiner's Amendment.
10. ☐ Note attached Interview Summary (PTO-474).
11. ☐ Other: _____.

All correspondence relating to this reexamination proceeding should be directed to the **Central Reexamination Unit** at the mail, FAX, or hand-carry addresses given at the end of this Office action.

/RUSSELL D STORMER/ Primary Examiner, Art Unit 3993	/Eileen Lillis/ /Sara Clarke/ SPRS, CRU-3991 Patent Reexamination Specialist, CRU

cc: Requester (if third party requester)

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Notice of Intent to Issue Reexamination Certificate

Brief Summary of the Prosecution History

On March 12, 2018, a second reexamination was requested by a third party requester for claims 1-13, 15-18, and 20 of United States Patent Number 9,321,386 to Thomas et al. ("the '386 patent") and assigned Control Number 90/014,109 ("the '109 proceeding").

On April 13, 2018, a third reexamination was requested by a third party requester for claims 1, 15, 17, and 20-63 of the same '386 patent and assigned Control Number 90/014,124 ("the '124 proceeding").

On May 18, 2018 an Order was mailed in the '109 proceeding, granting reexamination of claims 1-13, 15, 17, and 20 (claims 16 and 18 were cancelled in the first (now concluded) reexamination proceeding 90/013,915 after the '109 Request was filed).

On May 30, 2018 an Order was mailed in the '124 proceeding, granting reexamination of claims 1, 15, 17, and 20-63.

On July 30, 2018, a Decision to Merge the proceedings of the '109 and '124 reexaminations was mailed in each of the proceedings.

On September 6, 2018, a non-final Office action was mailed rejecting claims 1-13, 15, 17, and 20-63.

A Response was filed December 6, 2018 amending claims 21 and 46, and adding new claims 64-87.

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A Supplemental Response was filed October 25, 2019 (the "Supplemental Response") to submit documents related to the ongoing litigation between the Requester Toro and Patent Owner Vermeer.

Scope of Reexamination

With the amendment filed December 6, 2018, claims 1-13, 15, 17, and 20-87 are within the scope of this merged proceeding. Reexamination of claims 14 and 19 was not requested and not ordered.

STATEMENT OF REASONS FOR PATENTABILITY AND/OR CONFIRMATION

The following is an Examiner's statement of reasons for patentability and/or confirmation of the claims found patentable in this reexamination proceeding.

It would not have been obvious to combine the teachings of Dingo® 322 Operator's Manual and Dingo® 322 Parts Catalog (referred to collectively as "Dingo"), and Japanese Patent Application JP 11-140900 to Komatsu Ltd. ("Komatsu") to arrive at the invention set forth in claims 1 and 15, and in particular:

Claim 1. A compact tool carrier configured for standing or walk-behind operator control and having a mass of less than about 1500 kg, and comprising:

a loader having an arm adapted to carry a tool;

a mainframe for supporting the loader;

the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm; and

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an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm.

Claim 15. A compact tool carrier comprising:

a loader adapted to carry a tool;

a mainframe for supporting the loader;

the loader not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

an actuator pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

a drive mechanism attached to the mainframe about a rotational axis; and

the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1, the rotational axis and each pivot point being separated by a vertical distance, each vertical distance between the rotational axis and a pivot point being less than 1.5 times D1; and a control station having operator controls for propelling the compact tool carrier forward and for raising and/or lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

Dingo teaches a compact tool carrier having many of the claimed features, but the loader arm is directly attached to the mainframe and the structure lacks a linkage.

Komatsu teaches an arrangement in which a loader arm is indirectly attached to a mainframe through a pair of linkages 11, 12. Komatsu shows various arrangements of the linkages and described advantages of using linkages as opposed to direct attachment. Komatsu applies these teachings to a skid-steer loader, a vehicle/machine somewhat larger than the claimed compact tool carrier and not designed for standing or walk-behind operation since the operator is seated within a cab.

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Nevertheless, it would appear that one of ordinary skill in the art would have found it obvious that Komatsu's teachings of using linkages to indirectly attach the loader arms to the mainframe could be applied to a compact tool carrier ("CUL").[1]

The Request filed March 12, 2018 in the '109 proceeding proposed that claims 1 and 15 are obvious in view of Dingo and Komatsu.[2] See pages 34-43. The Request states that the advantages (of Komatsu's vertical lift arrangement) "unquestionably establish the motivation" for one of ordinary skill in the art to replace Dingo's radial lift arrangement with Komatsu's vertical lift linkage; and "[t]he obviousness of the substitution cannot be denied."

The rejection proposed in the Request was set forth more or less unchanged in the Office action mailed September 6, 2018.

The documents submitted with the Supplemental Response show that Toro itself (the Requester) did not find it obvious to replace the radial lift of a Dingo-type machine with a vertical lift such as that taught by Komatsu.

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[1] During this proceeding, the terms "mini skid-steer loader," "compact tool carrier," and "compact utility loader" have been used (by the Requester, the Patent Owner, the Examiner, and the prior art and non-patent literature) to refer to a standing or walk-behind machine such as that claimed. CUL is now used in place of the other terms.

[2] The Requests in the '109 and '124 proceedings (filed March 12, 2018 and April 13, 2018, respectively) are substantially the same with respect to the combination of Dingo and Komatsu as applied to claims 1 and 15. The '109 Request is referred to here for simplicity.

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Both vertical lift and radial lift loader arm arrangements are old and well-known in the loader art, as are the advantages and disadvantages of each. Examples of vertical lift arms are shown in U.S. patents to Yamada et al. and Layko et al., both cited in the subject '386 patent. Examples of radial lift arrangements are found in U.S. patent to Bares et al cited in the subject '386 patent, and in Dingo. Komatsu provides multiple examples of vertical lift arrangements in figures 1, 5-8, 11, and 12, and a radial lift in figure 13.

Vertical lift arrangements use linkages to attach the loader arms to the frame, while the arms in a radial lift are generally directly pivotally attached to the frame. The use of a pair of linkages to create a so-called four-bar linkage appears to be the most common arrangement for a vertical lift, although other arrangements are known. See the references cited in the '386 patent.

Ulinkski (U.S. Patent 3,074,572; cited during the first reexamination proceeding 90/013,915) is the only reference of record which uses linkages to indirectly attach loader arms to a standing or walk-behind machine to achieve a vertical lift. However, Ulinski uses a single linkage 27, a crank arm 24, and a bell crank 32 to raise the tool 16, 20 in a vertical lift path. Further, neither actuator 29, 36 is pivotally attached to the levers 17, 19 which are used in place of a loader arm. Claims 1 and 15 define over Ulinski for at least these reasons.

A substantial number of the documents submitted in the Supplemental Response show that for years Toro worked to increase the pin height of the loader arms as one of a number of improvements on their Dingo and other machines. For example, see

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pages 26-29 (Toro-0000787-790) of the "W298: Next Gen TX" document included with the Supplemental Response. Many more documents are discussed on pages 3-26 of the Remarks submitted by Patent Owner. These documents show that for years Toro directed these efforts to the radial lift arms used on Dingo machines (as opposed to substituting a vertical lift arrangement for the radial lift).

Other documents filed with the Supplemental Response show that those involved at Toro knew of vertical lift arrangements as a possible solution to increasing pin height and/or lift capacity. For example, see the transcript of the video deposition of James A. Kuemper ("Kuemper;" Exhibit 1 at page 179):

> A. We want -- we wanted to be able to make higher lift capacity with more reach and a higher height than any other machine that we had before this.
>
> Q. You said anyone can put vertical lift on a machine. What is that opinion based on?
>
> A. Well, if you're talking about a simple four-bar linkage. I mean four-bar linkage has been around for ages. I mean I learned about four-bar linkage when I went to school out in Willmar drafting design technology.

The transcript of the video deposition of Neil B. Borenstein ("Borenstein;" Exhibit 2 at pp. 147-148) also discusses vertical lift:

> A. I think at this point was the point we -- where -- this document here is where we started talking about vertical lift.[3]
>
> Q. So before that document, you're not aware of any instance in which any Toro engineer thought of putting vertical lift on a compact utility loader, right?
>
> A. No, I can't -- I can't say that. Um, I think -- I think because the vertical lift concept is known on skid-steer loaders and compact track loaders and numerous models are marketed in both designs, we were all aware of

[3] Pages 144-146 were not included in Exhibit 2, and the document in question does not appear to be identified in the submitted pages of the video transcript.

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that, and we all had thought that wouldn't it be -- you know, we'd like to -- someday that concept may be appropriate for a CUL.

As pointed out on pages 13-15 of the Supplemental Response to Office Action ("Response"), it was not until the development of the TX-1000 that Toro employed a vertical lift in a CUL. See, for example, Kuemper at page 88 where Mr. Kuemper states his belief that the concept of a vertical lift was not pursued by Toro until the TX-1000.

When Toro eventually decided to develop a CUL with a vertical lift, they did not employ a four-bar linkage in the TX-1000. As asserted in the last paragraph of page 6 of Response, "Toro's engineers followed a completely different design path" than proposed as obvious in the Request, and that this resulted in the "design of an entirely new mainframe and vertical lift loader mechanism" as shown in U.S. Patent 9,970,176.

Similar assertions are made by Toro on pages 2-4 of Toro's Opening Claim Construction Brief submitted with the Supplemental Response.

Indeed, a review of Toro's 9,970,176 patent (the '176 patent) shows an upper loader arm 20 indirectly attached to the machine through a pair of lower arms 22, 24, which are pivotally attached at one end to the rear portion of arm 20 at pivot points 26, 28, respectively. While the arms 24 are pivotally connected to a support beam 34 at their second ends, the second ends of arms 22 are welded to a cross beam 46. The support beam 34 is part of a support assembly 33 which is mounted on the mainframe, and as such, the loader arms 22, 24 are not pivotally attached directly to the mainframe.

Even if the arms 22, 24 are considered to be analogous to linkages, the structural arrangement of the arms 20, 22, and 24 is very different than a four-bar linkage assembly such as taught by Komatsu.

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Therefore, the documents submitted in the Supplemental Response provide *substantial and direct evidence* that those of ordinary skill in the art (the engineers, developers, managers, etc. at Toro), over the course of several years and through multiple modifications of the Dingo series of CULs, did not find it obvious to employ a vertical lift loader arm arrangement on a CUL. In addition, when those of ordinary skill in the art at Toro did design a vertical lift arrangement for a CUL, they did not find it obvious to look to larger machines for known vertical lifts (such as the four-bar linkage of Komatsu) and adapt those teachings to an existing CUL. Instead, the evidence shows that they chose to design an entirely new mainframe and vertical lift loader mechanism.

Additional evidence submitted by Patent Owner in the response filed December 6, 2018, has also been fully considered.

In particular, the Declaration of Lois Hartke is persuasive to show that designing a vertical lift having a four-bar linkage requires considerable experimentation and a combination such as of Dingo and Komatsu would not have been obvious at least because it would require undue experimentation. See pages 5-16.

Therefore, based on consideration of the entire record of this proceeding, the preponderance of evidence is persuasive to show that it would ***not*** have been obvious to those of ordinary skill in the art, at the time of the invention, to modify Dingo in view of the teachings of Komatsu to arrive at the invention as recited in independent claims 1 and 15.

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Independent claims 31, 38, 45, 50, and 55 recite at least the same limitations of claim 1 and/or 15 noted on pages 3-4 above, and are found to be allowable/patentable for the same reasons as claim 1.

New independent claims 70, 74, 78, 80, 83, and 86 recite at least the same limitations of claim 1 and are found to be allowable for at least the same reasons.

Dependent claims 2-13, 17, 20-30, 32-37, 39-44, 46-49, 51-54, 56-69, 71-73, 75-77, 79, 81, 82, 84, 85, and 87 are found allowable/patentable at least for their dependency to their respective independent claims.

Any comments considered necessary by PATENT OWNER regarding the above statement must be submitted promptly to avoid processing delays. Such submission by the patent owner should be labeled: "Comments on Statement of Reasons for Patentability and/or Confirmation" and will be placed in the reexamination file.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The amendment to claim 21, filed December 6, 2018, does not comply with 37 C.F.R. 1.530 because of the use of double brackets. Claim 21 is amended as follows:

21. (Amended) The compact tool carrier as set forth in claim 1 wherein the linkage is a first linkage, the first linkage being pivotally attached to the first side of

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the mainframe at a first pivot point and pivotally attached to the loader arm at a second pivot point, the actuator being attached to the mainframe at a third pivot point and pivotally attached to the loader arm at a fourth pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a fifth pivot point and pivotally attached to the loader arm at a sixth pivot point, wherein as the loader travels from a down position to a vertically raised position, the first, second, third, fourth, fifth, and sixth pivot points are (1) disposed between the operator controls and a bottom of the mainframe [and/] or (2) disposed forward of the control station.

Correspondence

All correspondence relating to this *ex parte* reexamination proceeding should be directed:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

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For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication or earlier communications from the Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

/RUSSELL D STORMER/
Primary Examiner, Art Unit 3993

Russell D. Stormer
Patent Reexamination Specialist
Central Reexamination Unit
Art Unit 3993
(571) 272-6687

Conferee: /SC/

Conferee: /E.D.L/
SPRS, Art Unit 3993

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Kubota North America Corporation et al

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Reexamination	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,109 & 90/014,124	9321386
	Certificate Date	Certificate Number
		C2

Requester Correspondence Address: ☐ Patent Owner ☑ Third Party
JAMES W. MILLER, ATTORNEY 527 MARQUETTE AVENUE SUITE 1960, RAND TOWER MINNEAPOLIS, MN 55402

LITIGATION REVIEW ☑	/rds/ (examiner initials)	07 November 2019 (date)
Case Name		Director Initials
Vermeer Manufacturing Company v. The Toro Company; 4:17cv76; US District Court for the Southern District of Iowa OPEN		SJS for JC

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**
Reexamination	90/013,915 (concluded)
Reexamination	90/014,124 (merged with instant '109)

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UNITED STATES PATENT AND TRADEMARK OFFICE

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

BIB DATA SHEET

CONFIRMATION NO. 8217

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/014,124	04/13/2018 RULE	414	3993	Vermeer-386Reex-3

APPLICANTS

INVENTORS

9321386, Residence Not Provided;
VERMEER MANUFACTURING COMPANY (ASSIGNEE), PELLA, IA;
THE TORO COMPANY (3RD PTY REQ.), BLOOMINGTON, MN;
JAMES W. MILLER, ATTORNEY, MINNEAPOLIS,, MN

**** CONTINUING DATA ***************************

This application is a REX of 14/691,649 04/21/2015 PAT 9321386
which claims benefit of 62/118,860 02/20/2015

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
❑ Yes ☑ No	❑ Yes ☑ No	/Russell Stormer/ Examiner's Signature	❑ Initials			20	3

ADDRESS

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105
UNITED STATES

TITLE

LOW PROFILE COMPACT TOOL CARRIERS

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
12000	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	❑ All Fees ❑ 1.16 Fees (Filing) ❑ 1.17 Fees (Processing Ext. of time) ❑ 1.18 Fees (Issue) ❑ Other _____ ❑ Credit

BIB (Rev. 05/07).

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Bibliographic Data

Application No: 90/014,109

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /RUSSELL D STORMER/ (Examiner's Signature) (Initials)

Title: LOW PROFILE COMPACT TOOL CARRIERS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
03/12/2018	414	3993	Vermeer-386Reex-2
RULE			

APPLICANTS

INVENTORS

9321386

VERMEER MANUFACTURING COMPANY PELLA, IA, UNITED STATES

THE TORO COMPANY (3RD PTY REQ.) BLOOMINGTON, MN, UNITED STATES

CONTINUING DATA

This application is a REX of 14691649 04/21/2015 PAT 9321386

14691649 has PRO of 62118860 02/20/2015

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

STATE OR COUNTRY

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Armstrong Teasdale LLP
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,109 & 90/014,124	03/12/2018	9321386	Vermeer-386Reex-2	8108

76656 7590 11/26/2019

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
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EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
11/26/2019	PAPER

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

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

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UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

JAMES W. MILLER, ATTORNEY
120 S. 6TH ST.
SUITE 2310
MINNEAPOLIS, MN 55402-1829

Date: November 26, 2019

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90014109 & 90014124
PATENT NO. : 9321386
ART UNIT : 3993

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

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United States Patent and Trademark Office

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Patent Docket Department
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(For Patent Owner)

JAMES W. MILLER, ATTORNEY
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Minneapolis, MN 55402

(For Requester)

In re Thomas *et al.*
Ex Parte Reexamination Proceeding
Control No. 90/014,109
Filed: March 12, 2018
For: U.S. Patent No.: 9,321,386

DECISION DISMISSING PETITION

In re Thomas *et al.*
Control No. 90/014,124
Filed: April 13, 2018
For: U.S. Patent No.: 9,321,386

This decision addresses patent owner's October 25, 2019 petition in merged *ex parte* reexamination proceeding **90/014,019 & 90/014,124**, entitled "PETITION TO SUSPEND RULE 37 C.F.R. § 1.111 PERSUANT TO 37 CFR §1.183".

Patent owner's October 25, 2019 petition under 37 CFR 1.183, and the record as a whole, are before the Director of the Central Reexamination Unit.

SUMMARY

Patent owner's October 25, 2019 petition under 37 CFR 1.183 is dismissed as **Moot.**

DECISION

The patent owner requests, in their October 25, 2019 petition that the provisions of 37 CFR 1.111(a)(2) be waived to permit entry and consideration of the supplemental reply filed October 25, 2019 concurrently with the instant petition as a matter of right.

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A review of the record indicates that the Examiner issued a Notice of Intent to Issue an *Ex Parte* Reexamination Certificate (NIRC) even date with the mailing of this decision. The NIRC entered Patent Owner's October 25, 2019 supplemental reply pursuant to 37 CFR 1.111(a)(2), and further indicated that that all pending claims in the merged Rexamination proceeding were confirmed/allowed.

Accordingly, the relief requested by Patent Owner in their October 25, 2019 petition was granted by the Examiner in the NIRC mailed even date with this decision and the petition is thus moot.

- Patent owner's October 25, 2019 petition under 37 CFR 1.183 is dismissed as **Moot.**
- The present ex parte reexamination proceeding will be forwarded to the Office of Publications for issuance of a reexamination certificate
- Any inquiry concerning this communication should be directed Stephen J. Stein at (571) 272-7724.

John Cottingham
Director, Central Reexamination Unit

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

October 25, 2019

PETITION TO SUSPEND RULE 37 C.F.R. § 1.111 PURSUANT TO 37 C.F.R. § 1.183

TO THE COMMISSIONER FOR PATENTS,
SIR:

Patent Owner respectfully petitions the Director under the provisions of 37 C.F.R. § 1.183 to suspend the requirements set forth in 37 C.F.R. § 1.111(a)(2) that a reply that is supplemental to a reply in compliance with 37 C.F.R. §111(b) will not normally be entered by the Office. Specifically, 37 C.F.R. § 1.111(a)(2)(i) provides that the Office *may* enter a supplemental reply if one of the conditions of 37 C.F.R. § 1.111(a)(2)(i)(A)-1.111(a)(2)(i)(F) are met. 37 C.F.R. § 1.111(a)(2)(ii) provides that a supplemental reply will only be entered *as a matter of right* if it is filed within the period during which action by the Office is suspended. However, 37 C.F.R. §1.183 provides that the requirements of 37 C.F.R. § 1.111(a)(2) may be suspended by the Director in extraordinary situations, when justice requires, on petition. For the reasons set forth below, Patent Owner submits that an extraordinary situation has arisen in the above-referenced Reexamination proceeding and requests that the Supplemental Reply filed concurrently with this petition be entered by the Office.

The patent subject to this reexamination proceeding, U.S. Patent No. 9,321,386, and U.S. Patent No. 9,975,750 which is a continuation thereof, are involved in the following litigation proceeding between the Patent Owner and Toro, the Requestor of this Ex Parte Reexamination:

- *Vermeer Corporation v. The Toro Company*, Case No. 4:17-cv-00076-CRW-HCA (S.D. IA. filed February 28, 2017).

U.S. Patent No. 10,202,266, which is a continuation of U.S. Patent Nos. 9,975,750 and 9,321,386, is involved in the following proceeding:

- *Vermeer Manufacturing Company v. The Toro Company*, Case No. 4:19-cv-00050-CRW-HCA (S.D. IA. filed February 12, 2019)

During the course of discovery in the above-referenced litigation proceedings, Patent Owner obtained materials from Toro that **fundamentally contradict the obviousness positions** that Toro's attorneys manufactured for this proceeding. Moreover, the materials obtained from Toro during the related litigation support the patentability of the claims at issue in these *ex parte* reexamination proceedings. The obtained materials were originally designated as confidential material subject to the Court's Protective Order in the co-pending litigation. These materials, however, were de-designated on July 26, 2019 so that Patent Owner may submit this information to the Office.

After extension, the due date for Patent Owner's period for reply to the September 6, 2018 Office action was December 6, 2018. Because Patent Owner was **not authorized to provide these materials to the Office until July 26, 2019**, Patent Owner could not provide these materials in its Reply to the Office Action. Because these materials which contradict Toro's obviousness positons set forth in their Request for Reexamination were recently uncovered as part of the litigation and could not be shared with the Office until after the period for reply to the Office action expired, in the interest of justice, Patent Owner requests that the Office grant this Petition and enter the Supplemental Reply submitted herewith to allow these materials to be considered by the Office.

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Kubota North America Corporation et al

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The Patent Owner authorizes the Commissioner to charge any fees which may be due in connection with this Petition to Deposit Account No. 012384 in the name of Armstrong Teasdale LLP.

Respectfully submitted,

/Michael J. Vander Molen/

Michael J. Vander Molen
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Kubota North America Corporation et al

Ex. 2035
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

October 25, 2019

SUPPLEMENTAL RESPONSE TO OFFICE ACTION

TO THE COMMISSIONER FOR PATENTS,

SIR:

Please consider the following remarks in the above-identified *ex parte* reexamination of U.S. Patent No. 9,321,386.

I. REMARKS **3**

A. THE OBVIOUSNESS POSITION PRESENTED BY REQUESTER TORO AND ADOPTED BY THE OFFICE CONTRADICTS THE ACTUAL EXPERIENCES OF THOSE WORKING IN THE FIELD TO DEVELOP COMPACT UTILITY LOADERS—INCLUDING BOTH PATENT OWNER AND TORO. **4**

1. Background **4**

2. Documents Obtained by Patent Owner in the Co-Pending Litigation Directly Contradict Toro's Obviousness Arguments. **5**

a. Toro's Engineers Grappled with the Problem of Lift Capacity for Over a Decade Without Pursuing Vertical Lift. **8**

b. Toro's Attempts to Solve the Problem of Lift Capacity Resulted in Failed Prototypes. **17**

c. Toro's History of TX-1000 Development Contradicts its Obviousness Arguments. **19**

d. Toro's Internal Documents Reflect Its Recognition that Developing a Compact Utility Loader with Vertical Lift was Innovative. **23**

III. CONCLUSION **27**

I. REMARKS

As noted in the accompanying Petition to Suspend Rule 37 C.F.R. §1.111 Pursuant to 37 C.F.R. §1.183, the materials discussed herein and the accompanying exhibits were obtained in discovery as part of litigation with Toro, the Requestor of this Ex Parte Reexamination. Because a Protective Order prevented Patent Owner from sharing these materials with the Patent Office until July 26, 2019 these materials could not have been submitted in Patent Owner's Amendment and Response to Office Action dated December 6, 2018 and are now be presented in this Supplemental Response to Office Action. Accordingly, the Office should enter and consider this Supplemental Response.

Materials that Patent Owner obtained in discovery regarding Toro's history of compact tool carrier development fundamentally contradict the obviousness positions that Toro's attorneys manufactured for this proceeding. For over a decade, Toro recognized that it desperately needed to improve the lift capacity of its products. Yet, Toro's engineers never pursued vertical lift as a solution, despite the existence of references like Komatsu. Toro would not have struggled with the lift capacity of its own machines—including the continued release of machines with anemic performance and resultant loss of market share—if vertical lift was a "simply apparent" solution to the problem of lift capacity as Toro now contends. And, if Toro's litigation position that combining a skid-steer vertical lift mechanism with an existing compact utility loader chassis was truly "simple," Toro would have developed that machine instead of investing years of engineering effort and millions of dollars into the risky development of an entirely new vertical lift mechanism and chassis design. When viewed through the lens of Toro's actual development history, the arguments Toro's attorneys advance in their series of reexamination filings defy credulity and should be rejected.

These revelations regarding Toro's actual design history directly corroborate Toro's admission that combining the vertical lift mechanism from a skid steer machine with a compact utility loader chassis was "difficult" or "impossible" to achieve. *See* U.S. Patent No. 9,970,176 at col. 2, lines 21-26. Toro made this explicit admission in its own

patent application before the need to downplay vertical lift as an invention became necessary due to Patent Owner's lawsuit.

A. THE OBVIOUSNESS POSITION PRESENTED BY REQUESTER TORO AND ADOPTED BY THE OFFICE CONTRADICTS THE ACTUAL EXPERIENCES OF THOSE WORKING IN THE FIELD TO DEVELOP COMPACT UTILITY LOADERS—INCLUDING BOTH PATENT OWNER AND TORO.

1. Background

Competitors in the market for compact utility loaders are under constant pressure to maximize the amount of weight that their machines can lift without adversely affecting the stability of the machine. The industry commonly refers to this lifting capability as "operating capacity" or "lift capacity."

Since their first introduction to the United States in 1998, equipment manufacturers have devoted significant resources to maximizing the lift capacity of their compact utility loader machines ("CULs"). Tackling these challenges is necessary to meaningfully compete because customers are motivated to buy machines that deliver the highest lift capacity for their size, weight, and footprint. These improvements were difficult to achieve because customers also place significant emphasis on competing machine characteristics including small size, light weight, and high maneuverability. Traditionally, increasing lift capacity required compromising one or more of these other qualities of the machine.

For years, companies relied on traditional methods for improving the lift capacity of their machines. These methods involved increasing the overall weight of the machine, increasing its length, decreasing the reach of the machine's arms, or moving the center of mass as far back as possible by shifting heavier elements to the rear of the machine. Manufacturers also resorted to selling "weight packages" consisting of chunks of metal that could be hung or welded to the back or underside of a machine to change its balance characteristics. These efforts yielded only incremental improvements in lift capacity and came at the significant expense of undesirable added machine weight

and/or loss of ground clearance and maneuverability. Owing to the significant engineering challenges presented by improving lift capacity without compromising these other important machine characteristics, lift capacity for machines of a given weight and size changed very little prior to the invention disclosed in the patent now at issue.

The obviousness arguments that Requester Toro has presented in its numerous requests for reexamination[1] disregard all this history. Instead, Toro crafts a fictional narrative in which the problem of lift capacity only recently surfaced and could be simply addressed by browsing a menu of existing full-size skid steer machines, plucking the vertical lift mechanism from that machine, scaling it down, and bolting it to an existing compact utility loader chassis. Patent Owner has already presented evidence that undermines these litigation-motivated arguments. The history of the industry's evolution and the timeline and manner of Patent Owner's development efforts demonstrate that Toro's obviousness story is fictional. For these reasons alone, Toro's invalidity arguments should be rejected.

Recently, however, Patent Owner acquired additional documents and deposition testimony from Toro that further demonstrate the fallacy of Toro's obviousness position. This new evidence sheds light on Toro's own decade-long pursuit of a solution to the problem of lift capacity—a history that directly contradicts the story Toro presented to the Patent Office. Based on this additional evidence, Patent Owner respectfully requests that the Examiner reject Toro's arguments and reaffirm the patentability of Patent Owner's claims.

2. Documents Obtained by Patent Owner in the Co-Pending Litigation Directly Contradict Toro's Obviousness Arguments.

In its reexamination papers, Toro asserts that Patent Owner's invention "simply involves" adapting a vertical lift armature onto a compact tool carrier to solve the problem of lift capacity. *See* Request for Ex Parte Reexamination of U.S. Patent No. 9,321,386 (Control No. 90/014,109) at 57. Toro's most recent iteration of this argument

[1] *See* 90/013,915; 90/014,148; and 90/014,269.

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posits that a skilled artisan knew a vertical lift mechanism like that taught in 1999 by Komatsu would be "simply apparent" for use on a compact utility loader chassis—thereby motivating a skilled artisan to combine those two structures to enjoy the benefit of increased lift capacity. *See* Request for Ex Parte Reexamination of U.S. Patent No. 9,321,386 (Control No. 90/014,109) at 58.

Through discovery in its co-pending litigation against Toro, Patent Owner recently obtained a wealth of evidence that paints a vastly different picture than the one Toro's attorneys present in their requests for reexamination. Contrary to Toro's position that solving the problem of lift capacity was "simple," Toro's internal documents and witness testimony show that Toro's engineers tried for years—and repeatedly failed—to address that very problem. During this period, Toro only thought to increase lift capacity by developing new radial-arm prototypes, but it found those designs lacking and abandoned them. As a result, Toro was forced to rely on traditional methods of increasing lift capacity for years. By its own admission, this caused Toro to release products with inferior performance, to fall behind the competition, and to suffer significant lost market share.

New evidence also shows that once Toro finally conceived of a vertical lift machine that offered increased lift capacity, Toro's engineers followed a completely different design path than the one Toro's attorneys now propose as the "simply apparent" solution. Instead of following the allegedly "simple" path of repurposing prior art components, Toro's engineers explicitly rejected that path and instead pursued a course that culminated in *the design of an entirely new mainframe and vertical lift loader mechanism* (see U.S. Patent No. 9,970,176). In recent depositions, Toro's witnesses admitted that—despite Toro's lengthy development history—they are unaware of a single document supporting Toro's argument in reexamination that skilled artisans would be motivated to combine the prior art in the manner it suggests. *See, e.g.*,

Kuemper Dep. Tr. (Ex. 1) at 305:23-307:3 ("Q: So you've not heard of anyone basing the TX 1000 on any full-size skid-steer machines? A: No, I have not.").[2]

These revelations regarding Toro's actual design history also directly corroborate Toro's admission that combining the vertical lift mechanism from a skid steer machine with a compact utility loader chassis was "difficult" or "impossible" to achieve. *See* U.S. Patent No. 9,970,176 at col. 2, lines 21-26. Toro made this explicit admission in its own patent application before the need to downplay vertical lift as an invention became necessary due to Vermeer's lawsuit. Toro's internal documents show that Toro's engineers appreciated the truth of that sentiment, which is why they never turned to the teachings of vertical lift skid steer machines to address their own struggles with lift capacity in compact utility loaders.

In summary, the materials that Vermeer obtained in discovery regarding Toro's history of compact tool carrier development fundamentally contradict the obviousness positions that Toro's attorneys manufactured for this reexamination. For over a decade, Toro recognized that it desperately needed to improve the lift capacity of its products. Yet, Toro's engineers never pursued vertical lift as a solution, despite the existence of references like Komatsu. Toro would not have struggled with the lift capacity of its own machines—including the continued release of machines with anemic performance and resultant loss of market share—if vertical lift was a "simply apparent" solution to the problem of lift capacity as Toro now contends. And, if Toro's litigation position that combining a skid-steer vertical lift mechanism with an existing compact utility loader chassis was truly "simple", Toro would have developed that machine instead of investing years of engineering effort and millions of dollars into the risky development of an entirely new vertical lift mechanism and chassis design. When viewed through the

[2] The exhibits being submitted herewith include information that was originally designated as confidential material subject to the Court's Protective Order in the co-pending litigation. The material addressed herein has been de-designated so that Patent Owner may submit this information to the Office. But because some of the material remains protected by the Protective Order, some of the exhibits have been redacted to obscure the protected information. A more extensive submission of litigation materials that have been de-designated is being submitted in an Information Disclosure Statement.

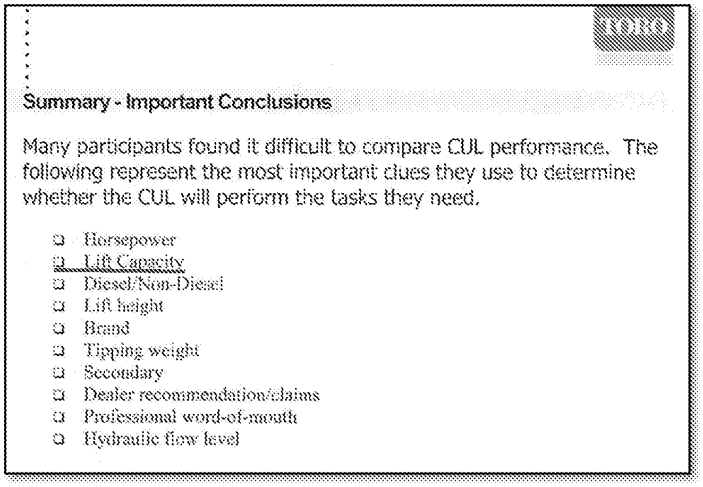
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lens of Toro's actual development history, the arguments Toro's attorneys advance in their series of reexamination filings defy credulity and should be rejected.

a. Toro's Engineers Grappled with the Problem of Lift Capacity for Over a Decade Without Pursuing Vertical Lift.

Every company that designs and manufactures compact utility loaders knows that lift capacity drives sales. Neil Borenstein, Director of Marketing for Toro's Siteworks division[3], admitted in deposition that he has been aware of the importance of lift capacity throughout his fifteen-year tenure with the company. Borenstein Dep. Tr. (Ex. 2) at 32:23-33:13 (recognizing that "consumers always demand more capacity"). Toro's internal documents also reflect this fact. For example, Toro periodically conducted consumer surveys that routinely identified lift capacity as a key driver of demand:


TORO

Summary - Important Conclusions

Many participants found it difficult to compare CUL performance. The following represent the most important clues they use to determine whether the CUL will perform the tasks they need.

- Horsepower
- Lift Capacity
- Diesel/Non-Diesel
- Lift height
- Brand
- Tipping weight
- Secondary
- Dealer recommendation/claims
- Professional word-of-mouth
- Hydraulic flow level

TORO-0000196 (Ex. 3) (emphasis added). These same surveys also routinely identified lift capacity as a compact utility loader feature most in need of improvement. *See, e.g. id. at* TORO-0000190 (identifying "Lift Capacity" as the characteristic most recently "pushed" on a compact utility loader).

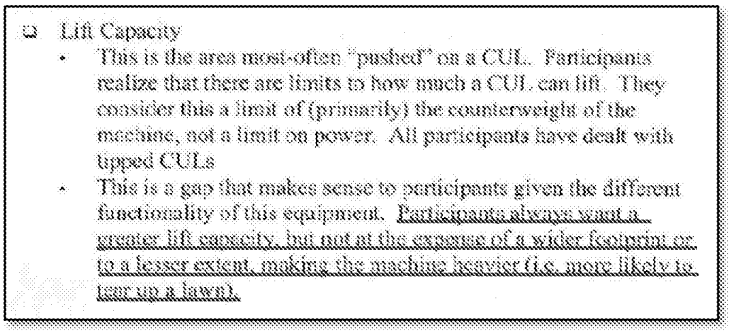
[3] Toro's Siteworks division is responsible for the design, manufacture and sale of Toro's compact utility loader machines. *See* Borenstein Dep. Tr. (Ex. 2) at 29:17-30:6.

For as long as customers have sought increased lift capacity, Toro has worked to satisfy that demand. *See* Borenstein Dep. Tr. (Ex. 2) at 39:20-42:25 ("Q: …all else equal, you want lift capacity to be as high as possible, right? A: If everything else is equal, you would – you would want any specification to exceed – to be as high as possible."). Toro's marketing materials tout the efforts Toro undertakes to improve its designs based on customer feedback. Those materials show that Toro's engineers have been focused on the specific problem of lift capacity for years:

> *The rest of the history of the Toro Dingo focuses on continuous improvement by listening to the wants and needs of the end user. In 2000, Toro introduced the TX 420, the first tracked, walk-behind Dingo machine. Two years later in 2002, the Dingo TX 425 was introduced to the marketplace, and proved to be an incredibly popular machine. In 2006, Toro provided yet another tracked Dingo model, the Dingo TX 525, which featured a higher rated operating capacity and a number of operator-centric upgrades. Since 2006, many other upgrades have been incorporated into the entire Dingo product line, effectively demonstrating Toro's commitment to innovation and continuous improvement.*

See Toro Press Release (Ex. 4) (emphasis added).

Increasing lift capacity posed a difficult problem because customers also wanted a machine that was small, lightweight, and maneuverable. Toro's marketing surveys reflected this:



- Lift Capacity
  - This is the area most-often "pushed" on a CUL. Participants realize that there are limits to how much a CUL can lift. They consider this a limit of (primarily) the counterweight of the machine, not a limit on power. All participants have dealt with tipped CULs
  - This is a gap that makes sense to participants given the different functionality of this equipment. Participants always want a greater lift capacity, but not at the expense of a wider footprint or, to a lesser extent, making the machine heavier (i.e. more likely to tear up a lawn).

TORO-0000190 (Ex. 3) (emphasis added).

Machine characteristics such as size, weight, and maneuverability were in direct conflict with lift capacity because the traditional ways of enhancing lift capacity required compromising those other features of the machine. Toro's Marketing Director admitted that throughout its development history, Toro achieved increased lift capacity by making its machines bigger, making them heavier, and by decreasing "reach" through the use of shorter radial lift arms—things that the customer did not want:

> *Q: Other than simply adding weights to the back of the machine, are you aware of other designs proposed by Toro engineers specifically motivated by the interest of increasing lift capacity?*
>
> *A: Oh, yeah. We – we've increased lift capacity in different ways over the years.*
>
> *Q: What are those ways?*
>
> *A: We've made a bigger machine, We've made a heavier machine. Vertical lift is one of the ways.[4] Uh, we changed – you can change where – how far a reach it has.*

Borenstein Dep. Tr. (Ex. 2) at 233:23-234:15.

The engineering challenges presented by this lift capacity problem were so daunting that Toro's engineers worked for years without making any significant progress. For almost two decades, Toro's engineers repeatedly returned to traditional methods of enhancing lift capacity, including increasing the size and weight of their radial-armed machines.

Toro's development efforts in the early and mid-2000s typify its efforts to address the lift capacity problem. In 2000, Toro's most capable compact tool carrier was the TX-

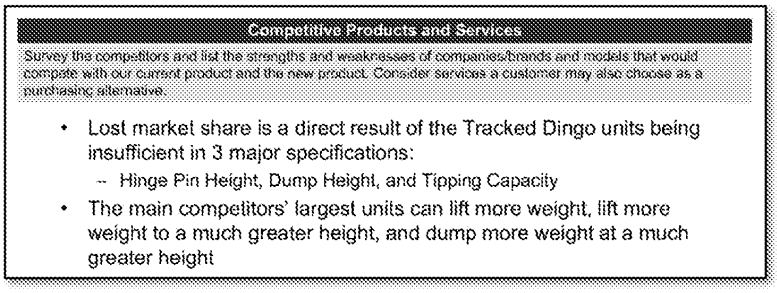
[4] Vertical lift was not pursued by Toro until 2013. *See, e.g.,* Kuemper Dep. Tr. (Ex. 1) at 29:25-30:6 ("Q: Okay. When was the first time you recall learning that there was an effort within Toro to develop a new compact utility loader that ultimately became the TX 1000? A: I believe that was in 2013.").

425. This machine incorporated a radial-lift arm, weighed 1,880 pounds, and advertised a lift capacity of 500 pounds. *See* TX-425 Operator's Manual at 15 (Ex. 5). Aware of its need to deliver a machine with improved lift capacity, Toro worked for the next *six years* to develop a new machine that could satisfy customer demand. *See* Borenstein Dep. Tr. (Ex. 2) at 58:5-59:11. The result of that effort was the TX-525 machine, which Toro released in 2006. This new machine still relied on a radial-lift armature, but now provided a lift capacity of 553 pounds at a total weight of 2,013 pounds. During the six year period between the release of these two machines, Toro had only been able to increase the lift capacity of its design by 53 pounds, and that improvement came at the cost of an additional 133 pounds in machine weight.[5]

Publicly, Toro presented the new TX-525 as a successful example of its ability to deliver increased lift capacity to its customers. *See, e.g.,* Ex. 4 ("*In 2006, Toro provided yet another tracked Dingo model, the Dingo TX 525, which featured a higher rated operating capacity and a number of operator-centric upgrades.").* But internally, Toro recognized that its products were inadequate and failed to meet customer expectations. In fact, internal documents generated shortly after the release of the TX-525 reflect Toro's acknowledgement that its persistent difficulties in solving the lift capacity problem were directly responsible for Toro's significant decline in market share[6]:

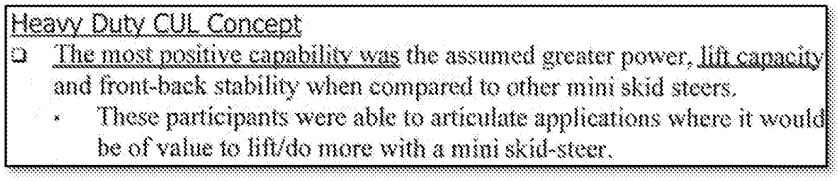
[5] Toro's TX-425 offered a lift capacity to weight ratio of 0.266. *See* Ex. 5. After six years of development work, Toro was only capable of increasing this ratio for the TX-525 to 0.275. *See* TX-525 Specifications (Ex. 6). This minimal improvement of 3.4%, despite six years of development work, pales in comparison to the 36.7% improvement offered by the later invention of a vertical lift compact utility loader. For example, Toro's TX-1000 boasts a lift capacity to weight ratio above 0.376. *See* TX-1000 Specifications (Ex. 7).

[6] The innovation of vertical lift on a compact utility loader, which is at issue in this reexamination, addresses all three of the features identified in Toro's design document: "Hinge Pin Height, Dump Height, and Tipping Capacity." *See, e.g.*, TORO-0000958 (Ex. 3).



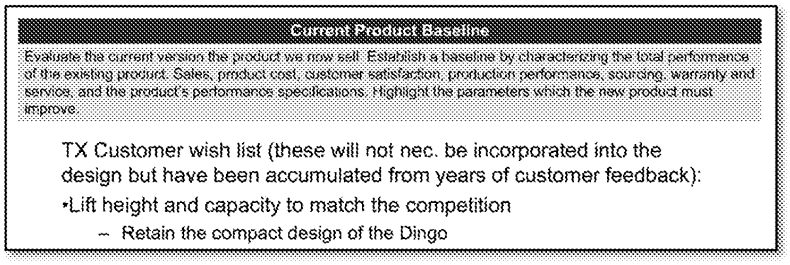
TORO-0000772 (Ex. 3).

In 2007, shortly after the release of its TX-525, Toro began work on its next generation compact tool carrier machine. During this process, Toro commissioned a round of customer marketing surveys aimed at identifying the features most in need of improvement on its machines. Unsurprisingly, customers again identified lift capacity as an important feature that required addressing:



TORO-0000175 (Ex. 3) (emphasis added).

With the results of these surveys in hand, Toro began generating design documents that would guide the development of its next generation machine. These documents reflected the difficulties Toro had experienced in meaningfully increasing lift capacity. For example, in a document Toro's engineers generated in April of 2013—five years after starting the next generation project and presumably thirteen years after beginning work on the earlier TX 525 machine—Toro's engineers ***still*** identified increased lift capacity as a top "wish list" item *and one they were not confident they could deliver in their next compact utility loader machine*:



TORO-0000781 (Ex. 3).

After Toro created this document in 2013, it went on to devote an additional two years of focused engineering work to this design project before finally developing the viable vertical lift compact utility loader it released as the TX-1000. *See* TX-1000 video, https://www.youtube.com/watch?v=7EV8_Gfs4Jw ("the all-new Dingo® TX 1000").

Considering Toro's history of trying and failing to deliver machines with enhanced lift capacity, Toro's hindsight-based assertion that vertical lift was the obvious solution to the lift capacity problem is simply not credible. Toro's development history directly contradicts its attorneys' assertion that "the obviousness of the Dingo and Komatsu combination is simply apparent on its face". *See* Request for Ex Parte Reexamination of U.S. Patent No. 9,321,386 (Control No. 90/014,109) at 58 (emphasis added). If this were true, Toro would have released a vertical lift compact utility loader years ago—certainly well before it suffered multiple years of lost market share as a direct result of its inability to deliver a machine with adequate lift capacity.

Notwithstanding the foregoing, in his deposition, Toro's Director of Marketing dutifully parroted the obviousness argument that Toro's attorneys developed for this reexamination. But he ultimately admitted that he could not corroborate Toro's manufactured obviousness story with a *single document* generated during Toro's decades of design work:

> *A: I think because vertical lift concept is known on skid-steer loaders and compact track loaders and numerous models are marketed in both designs,*

we were all aware of that, and we all had thought that wouldn't it be – you know, we'd like to – someday that concept may be appropriate for a CUL.

Q: Is there a single document you can point to that corroborates what you just said?

A: I don't believe there is.

Borenstein Dep. Tr. (Ex. 2) at 147:6-148:6 (emphasis added).

Mr. James Kuemper, the Principal Designer tasked with developing the vertical lift armature for Toro's TX-1000 machine, also tried to advance Toro's obviousness argument by suggesting that "anyone can put vertical lift on a compact utility loader." Kuemper Dep. Tr. (Ex. 1) at 178:18-179:1. He ultimately admitted that Toro's counsel fed him that argument:

Q: The opinion you expressed that anyone can put vertical lift on a compact utility loader, is that an opinion that you had prior to meeting with attorneys to prepare for depositions in this case?

A: It's a thing that I never even thought about before. I usually don't worry about what the competition is doing. I wasn't getting paid to worry about that.

Id. at 183:8-16.

Mr. Kuemper also later conceded that—despite years of trying to improve lift capacity—he was unaware of any Toro engineer ever proposing the use of vertical lift to solve that problem:

Q: Are you aware of instances in the past where engineers were aware that vertical lift could be put on a compact utility loader, and they opted not to?

A: None that I know of.

Q: So you're not aware of instances, for example, with the – what was the other earlier TX, TX 525?

A: 525…427

Q: So the 427 and 525, you're not aware of instances in which someone said: Maybe we should go vertical lift, or maybe we should go radial; no, let's go radial? That decision was never made, right?

A: Never even heard of it - - until the TX 1000.

* * *

Q: Going back to the conversation we were having a moment ago about the vertical lift systems, um, did you ever raise your hand in one of the engineering meetings and say: Hey, why aren't we putting vertical lift on our compact utility loaders?

A: No, I never did that.

Q: Why not?

A: Because you – normally, I was so busy with other projects, that why would I want any more work put on me than what I had already?

Q: Did – did anyone raise their hand and propose that solution that you're aware of?

A: Not that I'm aware of.

Id. at 88:7-25 and 89:20-90:9 (emphasis added).

In other words, for over a decade customers had been telling Toro that they wanted an improved compact tool carrier with greater lift capacity. Toro's marketing materials, internal engineering documents and witness testimony prove that Toro was acutely aware of this need and devoted significant resources to addressing that concern. Despite its express "*commitment to innovation and continuous improvement,*" Toro's engineers never pursued vertical lift as solution to that problem. As a result, Toro struggled for years to increase lift capacity without ever designing a single prototype or releasing a single machine that utilized vertical lift. Toro's sales faltered, its

market share fell, and it still failed for years to conceive of a way to *meaningfully* address the lift capacity problem.

During this entire period, a plethora of skid steer machines with vertical lift armatures were available on the market.[7] According to Toro's narrative, it would have been "simply apparent" for one of its engineers to pluck the armature from one of those machines, scale it down, and bolt it to an existing compact utility loader chassis. *See* Request for Ex Parte Reexamination of U.S. Patent No.9,321,386 (Control No. 90/014,109) at 58. And yet, Toro's engineers never did.

This stark contrast between Toro's obviousness argument and Toro's own development history is particularly incredible given Toro's recognition—once it began work on its vertical lift machine—that implementing vertical lift would also lower the overall cost of its machine. In its risk assessment plans, Toro's engineers specifically identified implementation of vertical lift as a *cost savings measure*:

Project Risks and Risk Management Plan

List the risks that may limit the project from achieving the goal. Consider all aspects including: marketing, competition, distribution, quality, performance, price, design, supply, etc. For each risk state the impact, the likelihood of occurring, the mitigation actions to prevent the occurrence and the contingency plan if it occurs.

Priority	Risk	Likely To Occur	Impact	Mitigation Actions	Contingency Actions
Rank	What is the issue that may impact the project?	High Medium Low	If it occurs how will it effect the project?	What are the actions being taken to prevent the occurrence or minimize the impact?	If the Risk does occur what actions will the team take?
1	Missing target costs due to expense of desired product features	High	Results in uncompetitive pricing or a product that does not meet customer requirements	Utilizing innovation like vertical lift to keep machine weight and corresponding costs down. Initiate DFMA activities as early in the design process as possible.	Compromise on product features to keep cost in balance

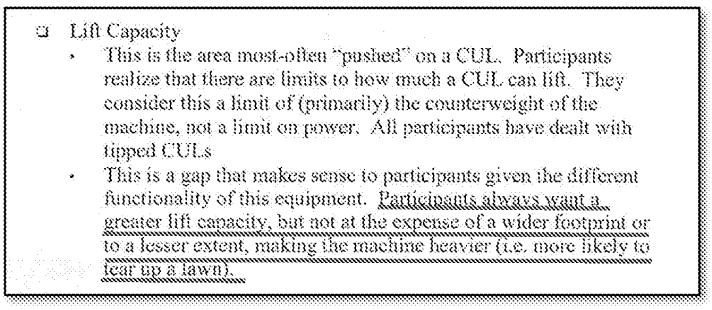
TORO-0000811 (Ex. 3) (emphasis added).

[7] *See, e.g.,* Komatsu, Mustang, Moffitt, Ulinski (Toro advances all of these references in its reexamination requests).

In other words, not only would adopting vertical lift have allowed Toro to offer machines with significantly greater lift capacity, better machine weight, size, reach, ground clearance and maneuverability, but it would also allow Toro to provide those advanced features *at a lower cost*. Considering all of this, the only explanation for Toro's failure to develop and release such a machine for well over a decade is simple—Toro's engineers had not yet conceived of a vertical lift compact tool carrier. That machine *required invention* and was not obvious.

b. Toro's Attempts to Solve the Problem of Lift Capacity Resulted in Failed Prototypes.

In 2008 and 2009, years before it would finally design and release its vertical lift TX-1000 machine, Toro conducted a round of marketing surveys that it hoped would help guide the development of its next generation machine. *See* TORO-0000170-210 (Ex. 3). These surveys reemphasized the need for enhanced lift capacity, but also made clear that customers did not want that capacity to come at the cost of machine size and weight:



- Lift Capacity
  - This is the area most-often "pushed" on a CUL. Participants realize that there are limits to how much a CUL can lift. They consider this a limit of (primarily) the counterweight of the machine, not a limit on power. All participants have dealt with tipped CULs
  - This is a gap that makes sense to participants given the different functionality of this equipment. Participants always want a greater lift capacity, but not at the expense of a wider footprint or to a lesser extent, making the machine heavier (i.e. more likely to tear up a lawn).

Id. at TORO-0000190 (emphasis added).

With the results of these surveys in hand, Toro began developing a new machine it code-named "Atlas." Despite having just received indications that customers did not want a larger or heavier machine, Atlas was conceived as a larger and heavier machine that incorporated a radial-lift armature. Toro had no choice but to follow this traditional

design path, because it had not yet conceived of enhancing lift capacity by developing a vertical lift machine.

As Toro's Director of Marketing admitted in deposition, "[w]hen we did this research, *the initial thought was to go for a bigger machine*...." Borenstein Dep. Tr. (Ex. 2) at 80:3-5 (emphasis added). Toro's Principle Designer corroborated this testimony:

> *Q: Was the Atlas program – if you know, was the Atlas program an effort to create a higher lift capacity compact utility loader?*
>
> *A: I would say, yes, because it was much larger.*

Kuemper Dep. Tr. (Ex. 1) at 138:24-139:4 (emphasis added).

For at least three years, from 2010 until 2013, Toro's engineers trudged down the well-worn path of developing a larger radial lift machine to address marketplace demand for a machine with increased lift capacity. This effort involved not just detailed design work, but also the expense associated with manufacturing a physical test machine:

> *Q: And your understanding is that there was an actual physical prototype of the Atlas machine made?*
>
> *A: I believe there was an Atlas built. I don't know how – exactly how far along they came with it.*

Id. at 139:11-18.

As soon as Toro's engineers conceived of addressing the problem of lift capacity through the development of a new vertical lift compact utility loader in 2013, Toro mothballed the Atlas project and diverted its resources to the design and development of what is now the TX-1000 machine. *See* TORO-0000803 (Ex. 3) ("refocuses spending from Atlas and the Trencher project into project W298[8]"). This shift in focus

[8] W298 was the internal Toro identifier for the TX-1000. *See* Kuemper Dep. Tr. (Ex. 1) at 28:25-29:4 ("Q: ... was there a project name or a program name that you're aware of that Toro used to refer to the TX 1000 project internally? A: I believe the project number on that we had was like a W298.").

would not have occurred if a vertical lift compact utility loader were truly obvious. If that were true, Toro would have simply focused on that design in the first place.

Patent Owner has also discovered that Toro investigated another compact utility loader design that it hoped would address the need for increased lift capacity. This other design relied on a unique weight shifting mechanism that would shift forward and backward to decrease the risk of tipping, thereby enhancing lift capacity. Although Toro has yet to produce any detailed information about this machine, Toro's marketing director confirmed that this other machine did not incorporate a vertical lift armature:

> *Q: Are you aware of Toro engineers proposing a mechanism other than a radial or vertical lift mechanism for a compact utility loader?*
>
> *A: I think at one time we had a design thought where we could move weight back and forth to increase or decrease the weight capacity.*
>
> *Q: So in other words, when the machine was lifting the load, some weight would come out the back of the machine?*
>
> *A: Yes.*

See Borenstein Dep. Tr. (Ex. 2) at 235:11-22 (emphasis added).

Toro's argument that "obviousness of the Dingo and Komatsu combination is simply apparent from its face" is in direct conflict with Toro's own prototyping work, which reflects the fact that Toro's engineers pursued other solutions—but not vertical lift—as a way to address lift capacity. Request for Ex Parte Reexamination of U.S. Patent No. 9,321,386 (Control No. 90/014,109) at 58 (emphasis added).

c. Toro's History of TX-1000 Development Contradicts its Obviousness Arguments.

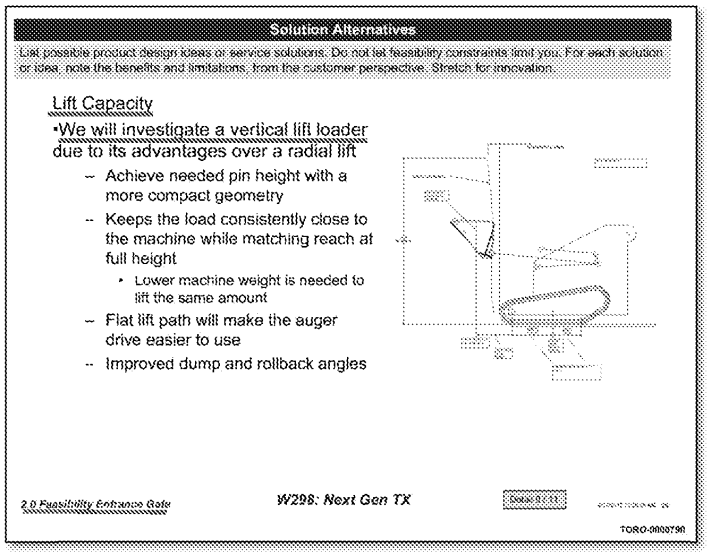
Toro's obviousness arguments should also be rejected because Toro's engineers specifically rejected—both during the development of their machine and recently in deposition—the type of prior art combination that Toro now proposes in its

reexamination papers. When developing the TX-1000, Toro's engineers did not follow the design path Toro now advances in its reexamination requests. Instead, they recognized the need to develop an entirely new vertical lift mechanism and chassis suited to the unique requirements of a vertical lift compact utility loader. Accomplishing that goal required years of engineering work and a large investment of financial resources.[9] Toro would have no reason to invest the significant resources required to design a machine from scratch if the "simply apparent" solution was to simply derive a machine from parts borrowed from known prior art machines.

Recently produced design documents relating to the TX-1000 reveal that as late as April 2013, Toro's engineers were just beginning to conduct feasibility studies[10] aimed at investigating the ***possibility*** of implementing vertical lift on its next generation compact utility loader:

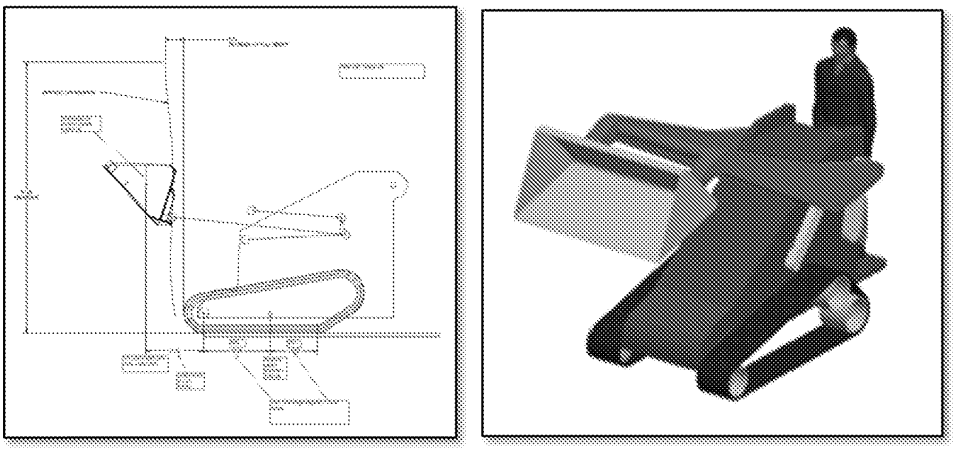
[9] Toro's design documents indicate and Toro representatives confirmed that Toro projected a total development cost of at least $2.3 million for the TX-1000. Kuemper Dep. Tr. (Ex. 1) at 189:20-190:9.

[10] As an initial matter, the need for this feasibility study makes no sense if the "simply apparent" avenue for increasing lift capacity was the combination of existing prior art components. The fact that Toro's engineers recognized the need to investigate this approach, treating it as a possibility rather than a foregone conclusion, undermines Toro's obviousness argument.



TORO-0000790 (Ex. 3) (emphasis added).

These feasibility studies included two-dimensional and three-dimensional depictions of a vertical lift system mated to a compact utility loader:



TORO-0000785-TORO-0000790 (Ex. 3).

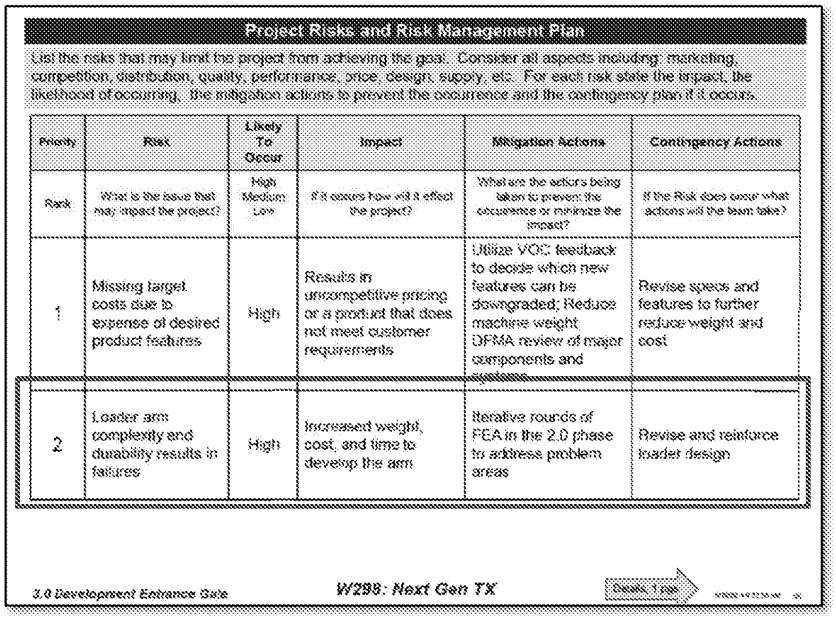
Toro's principal designer admitted in deposition that the machine depicted in this feasibility document was "pretty crude" and that the pin locations depicted in this study

were "not anywhere close to where the actual pins for the TX 1000 are…." Kuemper Dep. Tr. (Ex. 1) at 165:12-166:10. He went on to admit that it "doesn't look anything like the TX 1000" and "looks like someone just took a few blocks of this and that and threw it together to make it kind of look like a unit." *Id.* at 162:24-163:5.

These diagrams are significant because they approximate the "Frankenstein" machine that Toro's attorneys now argue a skilled artisan would produce as an obvious solution to the lift capacity problem. *See* Request for Ex Parte Reexamination of U.S. Patent No. 9,321,386 (Control No. 90/014,109) at 34-38. The fact that Toro's principal designer characterized this approach as "crude" and admitted that Toro's final machine reflects a vastly different design ethos demonstrates that Toro's litigation-motivated obviousness arguments are not realistic or consistent with the views of actual skilled artisans. As Toro's designer agreed during his deposition, "this is not an acceptable design." Kuemper Dep. Tr. (Ex. 1) at 181:7-9.

It would also make no sense for Toro to invest a significant amount of time and money into a completely new system, if the "simply apparent" solution were to deconstruct and recombine prior art components like LEGOs. Yet, Toro's internal documents show that the vertical lift mechanism of the TX-1000 was difficult to design, required serial redesign, and introduced significant risks to the project.[11] For example, the below excerpts from Toro's development documents in June of 2014, show that Toro considered development of a vertical lift mechanism to be a significant engineering challenge:

[11] Toro's Director of Marketing admitted in deposition that, to this day, its vertical lift TX-1000 machine suffers from so many quality issues that he considers the product to be a failure. *See, e.g.,* Borenstein Dep. Tr. (Ex. 2) at 141:23-143:17 (identifying the vertical lift system as one of the design elements responsible for the significant quality issues plaguing the TX-1000).



Project Risks and Risk Management Plan

List the risks that may limit the project from achieving the goal. Consider all aspects including: marketing, competition, distribution, quality, performance, price, design, supply, etc. For each risk state the impact, the likelihood of occurring, the mitigation actions to prevent the occurrence and the contingency plan if it occurs.

Priority	Risk	Likely To Occur	Impact	Mitigation Actions	Contingency Actions
Rank	What is the issue that may impact the project?	High Medium Low	If it occurs how will it effect the project?	What are the actions being taken to prevent the occurrence or minimize the impact?	If the Risk does occur what actions will the team take?
1	Missing target costs due to expense of desired product features	High	Results in uncompetitive pricing or a product that does not meet customer requirements	Utilize VOC feedback to decide which new features can be downgraded; Reduce machine weight DFMA review of major components and	Revise specs and features to further reduce weight and cost
2	Loader arm complexity and durability results in failures	High	Increased weight, cost, and time to develop the arm	Iterative rounds of FEA in the 2.0 phase to address problem areas	Revise and reinforce loader design

3.0 Development Entrance Gate W298: Next Gen TX

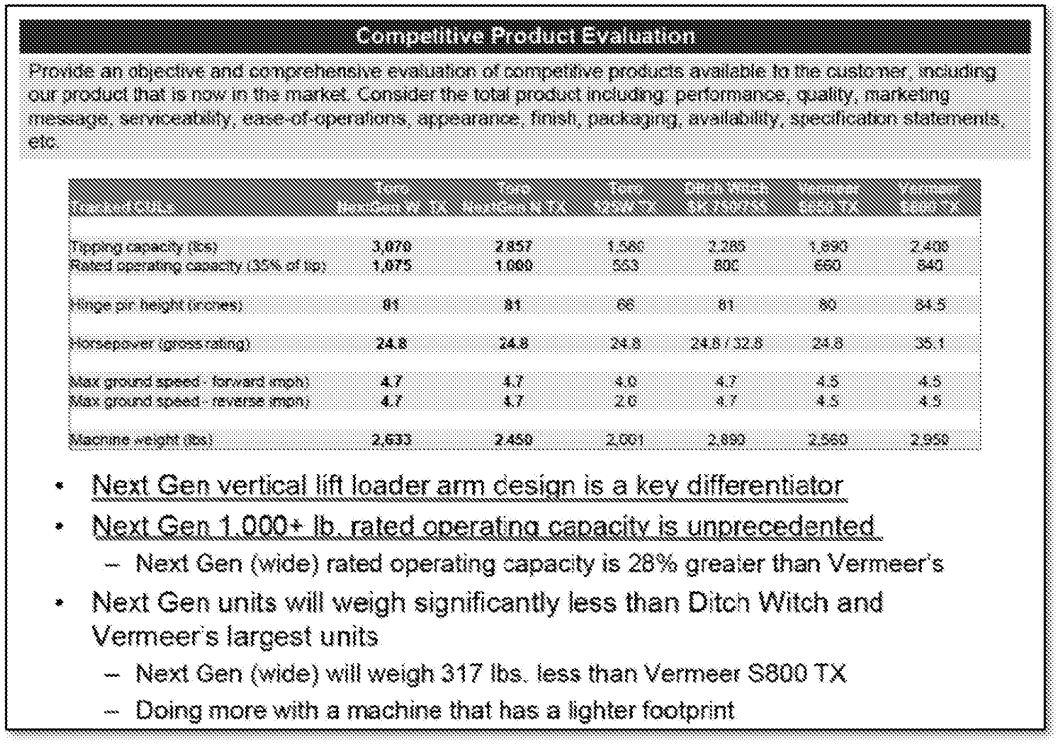
TORO-0000894 (Ex. 3) (emphasis added); *see also id.* at TORO-0000379, TORO-0000381-383, TORO-0000387, TORO-0000389, TORO-0000390, TORO-0000553-565, TORO-0000571, TORO-0001729, TORO-0001737, TORO-0001742-1743, TORO-0001748, TORO-0001750-1760, TORO-0001918, TORO-0003017, TORO-0003163-3175.

Toro's argument in reexamination that vertical lift would be an obvious solution, and simple to implement, flies directly in the face of its own decade-long search for a solution coupled with the struggles it endured when trying to develop a viable vertical lift machine.

d. Toro's Internal Documents Reflect Its Recognition that Developing a Compact Utility Loader with Vertical Lift was Innovative.

The documents Patent Owner recently obtained also shed light on Toro's internal recognition of the significance of implementing vertical lift on a compact utility loader. Although Toro's attorneys downplay this accomplishment in their reexamination filings, Toro's internal documents demonstrate that it considered the development of a vertical

lift compact utility loader a significant achievement. Toro's internal design documents recognize that offering vertical lift on a compact utility loader would be a "key differentiator" because it will offer an "unprecedented" lift capacity:



Competitive Product Evaluation

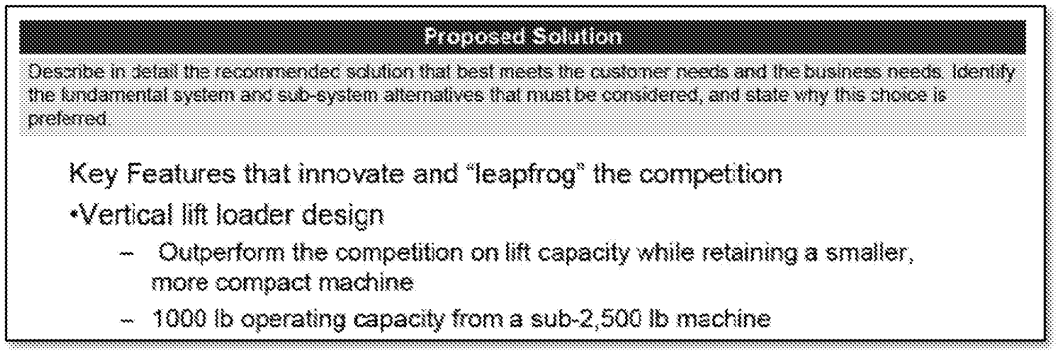
Provide an objective and comprehensive evaluation of competitive products available to the customer, including our product that is now in the market. Consider the total product including: performance, quality, marketing message, serviceability, ease-of-operations, appearance, finish, packaging, availability, specification statements, etc.

Specs	Toro Narrow (7.5')	Toro Wide (7.5')	Toro Compact	Bobcat T590	Vermeer S800 TX	Vermeer S740 TX
Tipping capacity (lbs)	3,079	2,857	1,560	2,285	1,690	2,408
Rated operating capacity (35% of tip)	1,075	1,000	553	800	660	840
Hinge pin height (inches)	81	81	66	81	80	84.5
Horsepower (gross rating)	24.8	24.8	24.8	24.8 / 32.8	24.8	35.1
Max ground speed - forward (mph)	4.7	4.7	4.0	4.7	4.5	4.5
Max ground speed - reverse (mph)	4.7	4.7	2.0	4.7	4.5	4.5
Machine weight (lbs)	2,633	2,459	2,001	2,899	2,560	2,959

- Next Gen vertical lift loader arm design is a key differentiator
- Next Gen 1,000+ lb. rated operating capacity is unprecedented
  - Next Gen (wide) rated operating capacity is 28% greater than Vermeer's
- Next Gen units will weigh significantly less than Ditch Witch and Vermeer's largest units
  - Next Gen (wide) will weigh 317 lbs. less than Vermeer S800 TX
  - Doing more with a machine that has a lighter footprint

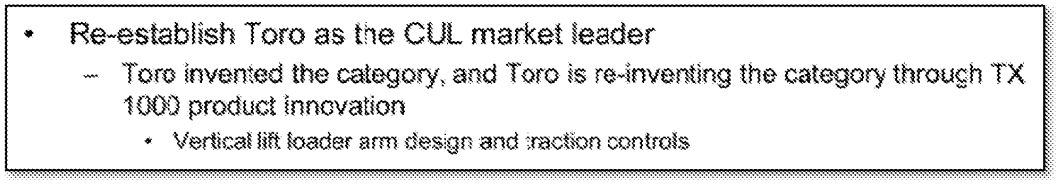
TORO-0000854 (Ex. 3) (emphasis added).

Toro's internal documents also show that Toro's engineers and marketing team considered vertical lift to be a key "innovative feature" that would allow Toro to "leapfrog the competition" by "outperforming the competition on lift capacity while retaining a smaller, more compact machine":



Id. at TORO-0000865.

Toro's documents also show that it considered itself to be "re-inventing the category" through its development of a vertical lift compact tool carrier, and that doing so would allow Toro to re-establish itself as a leader in the compact utility loader market:



TORO-0001170.4 (Ex. 3).

These sentiments are also consistent with Toro's early marketing materials, which touted vertical lift as a significant innovation:

> *"One of the greatest innovations on the all-new Dingo TX 1000 is its exclusive vertical lift loader arm design. This new design keeps loads closer to the machine, increasing the rated operating capacity to over 1,000 lbs. Unlike radial lift arms, a load on this Dingo follows a consistent vertical lift path up to full height. That makes gauging load tolerance safe and easy, so you can lift more - with more confidence. The 81" hinge pin height also delivers increased reach at full height. And this innovative*

> *design allows Toro to increase load capacity and reach without significantly increasing machine size or weight."*

See https://www.youtube.com/watch?v=-xiDQxdR4kU at Video Description (emphasis added).

These sentiments—expressed by Toro's engineers and marketing team *before Toro became aware of Vermeer's patent* and began downplaying the significance of the innovation—directly contradict the arguments Toro's attorneys now advance in reexamination. If solving the problem of lift capacity was "simply apparent," and "simply involves" scaling and bolting parts from various prior art machines, Toro should have implemented these changes in the routine course of its design work *years ago*. Instead, Toro tried and failed for years to solve the problem. Then, after conceiving of the idea and being forced to invest years of engineering work into a solution, Toro's engineers and business people hailed it as a game changing innovation that could "leap frog" the competition and re-establish Toro as the leader in the compact utility loader market. These are not the words of engineers and business people involved in mere routine and obvious development work, as Toro's attorneys would now have the Patent Office believe.

The entirety of Toro's development history plainly demonstrates the fallacy of its litigation obviousness arguments. For at least these reasons and the reasons set forth in Patent Owner's December 6, 2018 Amendment and Response, Toro's obviousness arguments should be rejected and the patentability of Patent Owner's invention should be confirmed.

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II. CONCLUSION

The Patent Owner respectfully requests reconsideration and allowance of all pending claims. The undersigned request a telephone call from the Examiner if a call might expedite allowance.

The Patent Owner authorizes the Commissioner to charge any fees which may be due in connection with this Supplemental Reply to Deposit Account No. 012384 in the name of Armstrong Teasdale LLP.

Respectfully submitted,

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Espacenet

Bibliographic data: KR200443753 (Y1) — 2008-08-20

Vertical Ascent And Descent Front Loader Equipment For Tractor And Front Loader Having The Same

Inventor(s):

Applicant(s):

Classification:	**- international:**	***E02F3/38; E02F3/627***
	- cooperative:	**E02F3/3405 (KR); E02F3/3417 (KR)**
Application number:	KR20070002770U 20070215	Global Dossier
Priority number(s):	KR20070002770U 20070215	
Also published as:	KR20080003426 (U)	

Abstract not available for KR200443753 (Y1)

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DESCRIPTION KR200443753

Vertical Ascent And Descent Front Loader Equipment For Tractor And Front Loader Having The Same}

1 is a side view showing the maximum bucket down time of the vertical mounting front loader working device for tractor mounting according to an embodiment of the present invention.

Figure 2 is a side view showing the maximum bucket raising time of the vertical mounting front loader working device for tractor mounting according to an embodiment of the present invention.

Figure 3 is a side view showing the lifted state of the vertical mounting front loader working device for a tractor according to an embodiment of the present invention.

Figure 4 is a perspective view of the tractor front loader with a vertical lifting front loader working device according to an embodiment of the present invention.

<Brief description of symbols for the main parts of the drawings>

1

: Vertical lifting front loader working device for tractor mounting according to the present invention

2
: Tractor front loader with vertical elevating front loader

10 1st vertical frame 12 Projection part 14, 24 Bracket

20 : Front frame 22: Second vertical frame 26: Support

30 : Main arm 32: first bend 34: second bend

36 : Third bend 40: bucket 50: connecting arm

60 : Supporting Arm 70: Bucket Cylinder 80: Boom Cylinder

The present invention relates to a tractor loader front loader working apparatus and a tractor front loader having the same.

More particularly, the present invention relates to a front loader working apparatus capable of vertically lifting and a tractor front loader having the same.

The front loader working device mounted on a conventional tractor has a large working radius because the bucket is raised in an arc at the time of working, and when the bucket is in the maximum horizontal direction according to the arc, the center of gravity of the loader moves toward the bucket. There were also risk factors such as conductivity. In addition, since the inclined boom cylinder is extended in the inclined direction, the working height according to the elongation was not efficient. Therefore, the present invention is to provide a front loader working apparatus and a front loader using the same for solving the above problems of the conventional tractor front loader. In the present invention, the vertical lifting of the bucket is made to reduce the working radius of the tractor front loader, and also to solve the problem of moving the center of

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gravity while drawing an arc when the bucket is raised. In addition, the present invention is to increase the efficiency of the working height according to the extension by stretching the boom cylinder in the vertical direction.

The present invention is to achieve the above object, in the tractor loader front loader working device, the lower end is fixedly coupled to the bracket installed on the side of the tractor, the projection is formed on the side of the lower end and the hinge is coupled to the top A first vertical frame; Two second vertical frames having a lower end fixedly coupled to an upper end hinged to a front frame installed at the front of the tractor; Two main arms having three bent portions which are sequentially changed in bending direction and having a front end hinged to the bucket; Two connecting arms hinged to the rear ends of each of the main arms and hinged to the top of each of the first vertical frames; Two support arms hinged to one end of the second bent portion of each of the main arms and hinged to the upper end of each of the second vertical frames; Two bucket cylinders, one end of which is hinged to the bucket and the other end of which is hinged to the first bent portion at the front end of each of the main arms and is elastic; And two boom cylinders, one end of which is hinged to the protrusion of each of the first vertical frames and the other end of which is hinged to a third bent portion at the front end of each of the main arms. It is configured to enable vertical lifting, including. In addition, according to the present invention, the front frame is fixedly coupled to the lower end to the brackets installed on the front and front sides of the tractor and the upper end is fixedly coupled to the second vertical frame, the boom cylinder according to its elongation In the vertical state, the protrusion of the first vertical frame is advanced after the angular movement retreat to the axis, and is inclined forward than the vertical state at the maximum elongation, and the support arm in the horizontal state when the boom cylinder is extended is the second vertical. As the angular movement of the other end coupled to the frame is axially raised, the connecting arm moves forward after the angular movement is retracted from the upper end of the first vertical frame, and the vertical rise of the bucket is performed. The present invention also provides the above inventions, wherein the second bent portion of the main arm is bent at a right angle, the first and third bent portions are bent at an obtuse angle, and the third bent portion is bent at an angle greater than the first bent portion. I am doing it.

On the other hand, the present invention is a tractor front loader, the tractor mounting vertical lifting front loader working devices are provided. EXAMPLES Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings. 1 is a side view showing the maximum bucket down time of the tractor mounting vertical lifting front loader working apparatus

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according to an embodiment of the present invention, Figure 2 is a vertical mounting front loader for tractor mounting according to an embodiment of the present invention It is a side view which shows the bucket raising time of a work device. 1 and 2, the tractor mounting vertical lifting front loader working device 1 according to one embodiment of the present invention is fixed to the lower end of the first vertical frame 10 to the bracket 14 installed on the side of the tractor and The protrusion 12 is formed at the lower side of the first vertical frame 10, and the upper end of the first vertical frame 10 is hinged to the connecting arm 50. The second vertical frame 22 has a lower end fixedly coupled to the front frame 20 installed in front of the tractor and the upper end is hinged to one end of the support arm 60. The main arm 30 has three bent portions 32, 34, 36, which are sequentially changed in the bending direction, and has an integrated front end hinged to the bucket 40, and hinges at the rear ends of the main arms 30, respectively. There are two connecting arms 50 which are coupled and hinged to the top of each of the first vertical frames 10. In addition, one end is hinged to the second bent portion 34 of each of the main arms 30 and the other end is hinged to the two support arms 60 and the bucket 40 hinged to the upper end of each of the second vertical frames 22. This hinge is coupled and the other end is hinged to the first bent portion 32 at the front end of each of the main arms 30, one end of the projection 12 of each of the two flexible bucket cylinder 70 and the first vertical frame 10 The hinge is coupled and the other end is hinged around the third bent portion 36 at the front end of each of the main arm 30 is composed of two flexible boom cylinder 80 is configured to enable vertical lifting of the bucket 40 portion. .

At the bottom of the tip end of the main arm 30 may be provided with a support for fixedly connecting the two main arms, the wiring for controlling the cylinder can be installed into the support. The main arm 30 includes three bent portions 32, 34, and 36, and the bending direction is sequentially changed, and the bending angle of the second bent portion 34 is almost right angle, and the remaining bent portions 32, The bending angle of 36 is larger than the second bending portion 34 and forms an obtuse angle. In addition, the third bent portion 36 may have a larger obtuse angle than the first bent portion 32. The main arm 30 formed integrally withstand the load due to the lifting and lowering of the bucket 40 containing the load. The boom cylinder 80 is inclined more forward at the time of maximum rise than at the time of maximum descending of the bucket 40. As the bucket rises, the boom cylinder 80 angularly moves around the hinge axis of the protrusion 12 of the first vertical frame 10 and then moves back. Figure 3 is a side view showing the lifted state of the vertical mounting front loader working device for a tractor according to an embodiment of the present invention. In Figure 3, looking at the lifting state of the tractor mounting vertical lifting front loader working apparatus according to an embodiment of the present invention, the support arm 60 at the maximum descending position is in parallel with the main arm 30 and the main arm It

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enters inside the opening of 30. The support arm 60 stands up while angularly moving around the upper hinge axis of the second vertical frame 22 as the bucket 40 rises. As the bucket 40 rises due to the elongation of the boom cylinder 80, the connecting arm 50 and the boom cylinder 80 each have the upper hinge axis of the first vertical frame 10 and the first vertical frame 10. The projection 12 is retracted while angularly moving in a counterclockwise direction with respect to the hinge axis in FIG. 3, and after the maximum retreat, is angularly moved in a clockwise direction when viewed in FIG. 3 again with respect to the same axis. When the boom cylinder 80 is extended, the boom cylinder 80 is stretched while angularly moving from side to side in a substantially vertical state, so that the raising height of the bucket 40 according to the extension becomes more efficient.

As shown in FIG. 3, the position of the boom cylinder 80 at the maximum ascend is inclined more clockwise than the position at the maximum ascend. Furthermore, as shown in FIG. 3, the support arm 60 stands up angularly in a clockwise direction when raised, and the main arm 30 as the boom cylinder 80 and the connecting arm 50 retreat and move forward. And the connection portion of the bucket 40 is raised to a substantially vertical state. 4 shows a tractor front loader 2 equipped with a vertical lift front loader working device according to one embodiment of the present invention. The tractor mounting vertical lifting front loader working apparatus according to an embodiment of the present invention described above is shown. The description of the above - described parts in FIG. 4 will be omitted. In FIG. 4, the front frame 20 may be fixedly coupled to the bracket (not shown) fixed to the front of the tractor, and may be formed obliquely, and the second vertical frame 22 is fixedly coupled to the upper end thereof. In addition, one end is fixedly coupled to the upper end of the front frame 20 and the other end is provided with a support 26 fixedly connected to the projection or bracket installed on the upper end side of the first vertical frame 10. Although not shown, the front bracket to which the front frame 20 is coupled may be fixed to the front wheel shaft support of the tractor. In addition, although not shown, the connection focusing portion of the wiring for controlling the bucket cylinder and the wiring for controlling the boom cylinder may be provided at the rear lower end of the first vertical frame. The tractor front loader 2 having the vertical lifting front loader working device may have any form of the vertically mounted front loader working device for tractor mounting shown in FIGS. 1 to 3 and claims of the present invention. The present invention has been described with reference to the accompanying drawings, preferred embodiments, but the scope of the present invention is not limited to this, it should be interpreted according to the appended claims. It is intended that the scope of the present invention include all modifications, alternatives, and equivalents of the preferred embodiments of the present invention within the scope of the appended claims.

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As described above, by providing the front loader working apparatus and the front loader using the same according to the present invention, the vertical rise of the bucket is possible. Since the vertical lifting of the bucket is possible according to the present invention, it is possible to reduce the working radius of the tractor front loader, and also to solve the problem of moving the center of gravity while drawing an arc when the bucket is raised. In addition, according to the present invention by the expansion and contraction of the boom cylinder in the vertical direction, the efficiency of the working height according to its extension is improved.

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CLAIMS KR200443753

1.

A tractor mounting front loader working apparatus, comprising: two first vertical frames having a lower end fixedly coupled to a bracket installed at a side of the tractor, a protrusion formed at a side of the lower end, and hinged at an upper end thereof; Two second vertical frames having a lower end fixedly coupled to an upper end hinged to a front frame installed at the front of the tractor; Two main arms having three bent portions which are sequentially changed in bending direction and having a front end hinged to the bucket; Two connecting arms hinged to the rear ends of each of the main arms and hinged to the top of each of the first vertical frames; Two support arms having one end hinged to the second bent portion of each of the main arms and the other end hinged to the upper end of each of the second vertical frames; Two bucket cylinders, one end of which is hinged to the bucket and the other end of which is hinged to the first bent portion at the front end of each of the main arms and is elastic; And two boom cylinders, one end of which is hinged to the protrusion of each of the first vertical frames and the other end of which is hinged to a third bent portion at the front end of each of the main arms. Vertical lifting front loader working device for mounting a tractor, characterized in that it comprises a.

2.

According to claim 1, wherein the front frame is fixedly coupled to the lower end and the upper end is fixed to the bracket installed on the front and front sides of the tractor, the boom cylinder in the vertical state according to its elongation The protrusion of the first vertical frame is advanced after the angular motion retreat to the axis and inclined

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forward than the vertical state at the maximum elongation, and the support arm in the horizontal state when the boom cylinder is extended is coupled to the second vertical frame. Vertical lifting front loader working device for a tractor, characterized in that the vertical lifting of the bucket is made as the connecting arm moves forward after the angular movement with respect to the axis of the upper end of the first vertical frame as the angular movement ascends to the other end of the shaft .

3.
The method of claim 1 or claim 2, wherein the second bent portion of the main arm is bent at a right angle, the first and third bent portions are bent at an obtuse angle and the third bent portion is bent at an angle greater than the first bent portion Vertical front loader operation for mounting tractors.

4.
A tractor front loader comprising the vertical elevating front loader working device for mounting a tractor according to claim 1.

5.
A tractor front loader, comprising: a vertical elevating front loader working device for mounting a tractor;

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(19) 대한민국특허청(KR)
(12) 등록실용신안공보(Y1)

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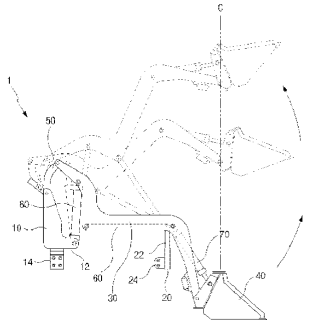
전체 청구항 수 : 총 5 항 심사관 : 김성호

(54) 트랙터 장착용 수직승강 프론트 로더 작업장치 및 그것을구비한 프론트 로더

(57) 요 약

본 고안은 트랙터 장착용 프론트 로더 작업장치에 관한 것이다. 구체적으로는, 상기 트랙터의 측부에 설치된 브라켓에 하단이 고정결합되고 상기 하단의 측부에 돌기부가 형성되고 상단이 힌지 결합된 2개의 제 1 수직 프레임과; 상기 트랙터의 전방에 설치되는 전방 프레임에 하단이 고정결합되고 상단이 힌지 결합된 2개의 제 2 수직 프레임과; 차례로 절곡방향이 바뀌는 3개의 절곡부를 구비하고 전단이 버켓에 힌지 결합된 일체형으로 된 2개의 메인암과; 상기 메인암 각각의 후단에 힌지 결합되고 상기 제 1 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 연결암과; 상기 메인암 각각의 두번째 절곡부에 일단이 힌지 결합되고 타단이 상기 제 2 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 지지암과; 상기 버켓에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 첫번째 절곡부에 힌지 결합되어 신축가능한 2개의 버켓 실린더; 및 상기 제 1 수직 프레임 각각의 상기 돌기부에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 세번째 절곡부위에 힌지 결합되어 신축가능한 2개의 붐 실린더; 를 포함하여 수직승강이 가능하도록 구성되어 있다.

대 표 도 - 도3



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실용신안 등록청구의 범위

청구항 1

트랙터 작업용 프론트 로더 작업장치에 있어서,

상기 트랙터의 측부에 설치된 브라켓에 하단이 고정결합되고 상기 하단의 측부에 돌기부가 형성되고 상단이 헌지 결합된 2개의 제 1 수직 프레임;

상기 트랙터의 전방에 설치되는 전방 프레임에 하단이 고정결합되고 상단이 헌지 결합된 2개의 제 2 수직 프레임;

차례로 결곡방향이 바뀌는 3개의 결곡부를 구비하고 전단이 버켓에 헌지 결합된 일체형으로 된 2개의 메인암;

상기 메인암 각각의 후단에 헌지 결합되고 상기 제 1 수직 프레임 각각의 상단에 헌지 결합된 2개의 연결암;

상기 메인암 각각의 두번째 결곡부에 일단이 헌지 결합되고 타단이 상기 제 2 수직 프레임 각각의 상단에 헌지 결합된 2개의 지지암;

상기 버켓에 일단이 헌지 결합되고 타단이 상기 메인암 각각의 전단에서 첫번째 결곡부에 헌지 결합되어 신축가능한 2개의 버켓 실린더; 및

상기 제 1 수직 프레임 각각의 상기 돌기부에 일단이 헌지 결합되고 타단이 상기 메인암 각각의 전단에서 세번째 결곡부위에 헌지 결합되어 신축가능한 2개의 붐 실린더; 를 포함하는 것을 특징으로 하는 트랙터 장착용 수직승강 프론트 로더 작업장치.

청구항 2

제 1 항에 있어서,

상기 전방 프레임은 상기 트랙터의 전방 및 전방 측부에 설치되는 브라켓에 하단이 고정결합되며 상단은 상기 제 2 수직 프레임과 고정결합되고,

상기 붐 실린더는 그의 신장에 따라 수직상태에서 상기 제 1 수직 프레임의 상기 돌기부를 축으로 각운동 후퇴 후 전진하고 최대 신장시 상기 수직상태보다 전방으로 기울어지고, 그리고

상기 붐 실린더의 신장시 수평상태의 상기 지지암이 상기 제 2 수직 프레임에 결합된 상기 타단을 축으로 각운동 상승할에 따라 상기 연결암이 상기 제 1 수직 프레임 상단을 축으로 각운동 후퇴 후 전진하면서 상기 버켓의 수직상승이 이루어지는 것을 특징으로 하는 트랙터 장착용 수직승강 프론트 로더 작업장치.

청구항 3

제 1 항 또는 제 2 항에 있어서,

상기 메인암의 상기 두번째 결곡부는 직각으로 결곡되고 상기 첫번째 및 세번째 결곡부는 둔각으로 결곡되고 상기 세번째 결곡부는 상기 첫번째 결곡부보다 보다 큰 각으로 결곡되어 있는 것을 특징으로 하는 트랙터 장착용 수직승강 프론트 로더 작업장치.

청구항 4

제 1 항 또는 제 2 항의 트랙터 장착용 수직승강 프론트 로더 작업장치를 구비한 것을 특징으로 하는 트랙터 프론트 로더.

청구항 5

제 3 항의 트랙터 장착용 수직승강 프론트 로더 작업장치를 구비한 것을 특징으로 하는 트랙터 프론트 로더.

도 면 없 음

고안의 상세한 설명

고안의 목적

고안이 속하는 기술 및 그 분야의 종래기술

<13> 본 고안은 트랙터 장착용 프론트 로더 작업장치 및 그것을 구비한 트랙터 프론트 로더에 관한 것이다. 더욱 상세하게는 수직승강이 가능한 프론트 로더 작업장치 및 그것을 구비한 트랙터 프론트 로더에 관한 것이다.

<14> 종래의 트랙터에 장착되는 프론트 로더 작업장치는 작업시 버켓이 호를 그리며 상승하도록 되어 있었기 때문에 작업반경이 커지고, 버켓이 그 호에 따라 최대 수평 방향에 있을 때에는 로더의 무게중심이 버켓쪽으로 이동하게 되므로 전도가능성 등의 위험요소도 있었다.

<15> 또한 경사진 붐 실린더가 경사방향으로 신장됨으로써 그 신장에 따른 작업높이가 효율적이지 못하였다.

고안이 이루고자 하는 기술적 과제

<16> 따라서 본 고안은 상기의 종래의 트랙터 프론트 로더의 문제를 해결하기 위한 프론트 로더 작업장치 및 그를 이용한 프론트 로더를 제공하기 위한 것이다.

<17> 본 고안에서는 버켓의 수직승강이 이루어지도록 하여 트랙터 프론트 로더의 작업반경을 줄이고, 또한 버켓의 상승시 원호를 그리면서 무게중심이 이동하던 문제를 해결하고자 한다.

<18> 또한 본 고안에서는 붐 실린더가 연직방향 내외에서 신축하도록 하여 그 신장에 따른 작업높이의 효율을 높이고자 한다.

고안의 구성 및 작용

<19> 본 고안은 상기 목적을 달성하기 위한 것으로, 트랙터 장착용 프론트 로더 작업장치에 있어서, 상기 트랙터의 측부에 설치된 브라켓에 하단이 고정결합되고 상기 하단의 측부에 돌기부가 형성되고 상단이 힌지 결합된 2개의 제 1 수직 프레임과; 상기 트랙터의 전방에 설치되는 전방 프레임에 하단이 고정결합되고 상단이 힌지 결합된 2개의 제 2 수직 프레임과; 차례로 절곡방향이 바뀌는 3개의 절곡부를 구비하고 전단이 버켓에 힌지 결합된 일체형으로 된 2개의 메인암과; 상기 메인암 각각의 후단에 힌지 결합되고 상기 제 1 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 연결암과; 상기 메인암 각각의 두번째 절곡부에 일단이 힌지 결합되고 타단이 상기 제 2 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 지지암과; 상기 버켓에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 첫번째 절곡부에 힌지 결합되어 신축가능한 2개의 버켓 실린더; 및 상기 제 1 수직 프레임 각각의 상기 돌기부에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 세번째 절곡부위에 힌지 결합되어 신축가능한 2개의 붐 실린더; 를 포함하여 수직승강이 가능하도록 구성되어 있다.

<20> 또한 본 고안은 상기 고안에 있어서, 상기 전방 프레임은 상기 트랙터의 전방 및 전방 측부에 설치되는 브라켓에 하단이 고정결합되며 상단은 상기 제 2 수직 프레임과 고정결합되고, 상기 붐 실린더는 그의 신장에 따라 수직상태에서 상기 제 1 수직 프레임의 상기 돌기부를 축으로 각운동 후퇴 후 전진하고 최대 신장시 상기 수직상태보다 전방으로 기울어지고, 그리고 상기 붐 실린더의 신장시 수평상태의 상기 지지암이 상기 제 2 수직 프레임에 결합된 상기 타단을 축으로 각운동 상승함에 따라 상기 연결암이 상기 제 1 수직 프레임 상단을 축으로 각운동 후퇴 후 전진하면서 상기 버켓의 수직상승이 이루어지는 것을 특징으로 하고 있다.

<21> 본 고안은 또한 상기 고안들에 있어서, 상기 메인암의 상기 두번째 절곡부는 직각으로 절곡되고 상기 첫번째 및 세번째 절곡부는 둔각으로 절곡되고 상기 세번째 절곡부는 상기 첫번째 절곡부보다 보다 큰 각으로 절곡되어 있는 것을 특징으로 하고 있다.

<22> 한편, 본 고안은 트랙터 프론트 로더로서, 상기의 트랙터 장착용 수직승강 프론트 로더 작업장치들을 구비하고 있다.

<23> < 실시예 >

<24> 이하에서, 첨부된 도면과 함께 본 고안에 따른 바람직한 실시예를 구체적으로 설명하기로 한다.

<25> 도 1은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 버켓 최대 하강시를 나타내는 측면도이고, 도 2는 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의

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버켓 최대 상승시를 나타내는 측면도이다.

<26> 도 1 및 2에서, 본 고안의 하나의 실시예인 트랙터 장착용 수직승강 프론트 로더 작업장치(1)는 트랙터의 측부에 설치된 브라켓(14)에 제 1 수직 프레임(10)의 하단이 고정결합되고 제 1 수직 프레임(10)의 하단 측부에 돌기부(12)가 형성되고 제 1 수직 프레임(10)의 상단은 연결암(50)과 힌지 결합되어 있다. 제 2 수직 프레임(22)은 트랙터의 전방에 설치되는 전방 프레임(20)에 하단이 고정결합되고 상단은 지지암(60)의 일단에 힌지 결합되어 있다. 메인암(30)은 차례로 절곡방향이 바뀌는 3개의 절곡부(32, 34, 36)를 구비하고 전단이 버켓(40)에 힌지 결합된 일체형으로 되어 있고, 메인암(30) 각각의 후단에 힌지 결합되고 제 1 수직 프레임(10) 각각의 상단에 힌지 결합된 2개의 연결암(50)이 있다. 또 메인암(30) 각각의 두번째 절곡부(34)에 일단이 힌지 결합되고 타단이 제 2 수직 프레임(22) 각각의 상단에 힌지 결합된 2개의 지지암(60)과 버켓(40)에 일단이 힌지 결합되고 타단이 메인암(30) 각각의 전단에서 첫번째 절곡부(32)에 힌지 결합되어 신축가능한 2개의 버켓 실린더(70) 및 제 1 수직 프레임(10) 각각의 돌기부(12)에 일단이 힌지 결합되고 타단이 메인암(30) 각각의 전단에서 세번째 절곡부(36) 부근에 힌지 결합되어 신축가능한 2개의 붐 실린더(80)로 구성되어 버켓(40)부의 수직승강이 가능하도록 구성되어 있다.

<27> 메인암(30)의 선단부 하단에 두 메인암을 고정연결하는 지지대를 구비할 수 있고, 이 지지대 속으로 실린더의 제어를 위한 배선을 설치할 수 있다.

<28> 메인암(30)은 3개의 절곡부(32, 34, 36)를 포함하고 있는데, 차례로 절곡방향이 바뀌고, 두 번째 절곡부(34)의 절곡각은 거의 직각에 가깝고, 나머지 절곡부(32, 36)의 절곡각은 두 번째 절곡부(34)보다 크고 둔각을 이루고 있다. 게다가 세 번째 절곡부(36)는 첫 번째 절곡부(32)보다 더 큰 둔각을 이루도록 할 수 있다. 일체형으로 형성된 메인암(30)은 적재물을 담은 버켓(40)의 승강에 따른 하중에도 더 견고하게 견딜 수 있다.

<29> 붐 실린더(80)는 버켓(40)의 최대 하강시보다 최대상승시에 더 전방으로 기울어져 있다. 버켓의 상승에 따라 붐 실린더(80)는 제 1 수직 프레임(10)의 돌기부(12)의 힌지 축을 중심으로 각운동하여 후퇴하였다가 다시 전진하게 된다.

<30> 도 3은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 승강상태를 나타내는 측면도이다.

<31> 도 3에 있어서, 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 승강상태를 살펴보면, 최대 하강시 지지암(60)은 메인암(30)과 평행하게 위치하며 메인암(30)의 개구부 내부에 들어가게 된다. 지지암(60)은 버켓(40)의 상승에 따라 제 2 수직 프레임(22)의 상단 힌지 축을 중심으로 각운동하며 일어서게 된다.

<32> 붐 실린더(80)의 신장으로 인한 버켓(40)의 상승에 따라 연결암(50) 및 붐 실린더(80)는 각각 제 1 수직 프레임(10)의 상단 힌지 축과 제 1 수직 프레임(10)의 돌기부(12) 힌지 축을 중심으로 도 3에서 볼 때 반시계 방향으로 각운동하며 후퇴하게 되고, 최대 후퇴 후에는 다시 동일 축을 중심으로 도 3에서 볼 때 시계방향으로 각운동하며 전진하게 된다. 붐 실린더(80)의 신장시 붐 실린더(80)는 거의 수직상태에서 좌우로 조금씩 각운동하면서 신장하므로 그 신장에 따른 버켓(40)의 상승 높이가 더 효율적이게 된다.

<33> 도 3에서 나타난 바와 같이 최대 상승시의 붐 실린더(80)의 위치는 최대 하강시의 위치보다 시계방향으로 더 기울어져 있다.

<34> 게다가 도 3에 나타난 바와 같이 상승할 때 지지암(60)이 시계방향으로 각운동하며 일어서게 되고, 붐 실린더(80) 및 연결암(50)의 각운동하며 후퇴 및 전진함에 따라 메인암(30)과 버켓(40)의 연결부가 거의 수직상태로 상승하게 된다.(선 C 참조)

<35>

<36> 도 4는 본 고안의 하나의 실시예에 따른 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더(2)를 나타내고 있다.

<37> 상기에서 살펴본 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치를 트랙터에 장착시킨 모습을 나타내고 있다. 도 4에서 앞서 설명한 부분에 대해서는 설명을 생략한다.

<38> 도 4에 있어서, 전방 프레임(20)은 트랙터 전방에 고정되는 브라켓(도시되지 않음)에 고정결합되고 비스듬하게 형성될 수 있고, 그 상단에 제 2 수직 프레임(22)이 고정결합되어 있다. 또 전방프레임(20)의 상단부근에 일단

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이 고정결합되고 타단이 제 1 수직 프레임(10)의 상단부 측부에 설치된 돌기부 또는 브라켓에 고정연결된 지지대(26)를 구비하고 있다. 도시되지 않았으나, 전방 프레임(20)이 결합된 전방 브라켓은 트랙축 지지대에 고정될 수도 있다. 또한, 도시되지 않았으나, 버켓 실린더를 제어하는 배선과 붐 실린더를 제어하는 배선의 연결 접속부를 제 1 수직 프레임의 후방 하단에 설치할 수도 있다.

<39> 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더(2)는 도 1 내지 3 및 본 고안의 청구항에 나타난 트랙터 강착용 수직승강 프론트 로더 작업장치의 어떤 형태도 구비할 수 있다.

<40> 이상에서 본 고안은 첨부된 도면과 함께 바람직한 실시예를 설명하였지만 본 고안의 범위는 이에 한정되지 않고, 첨부된 청구항에 따라 해석되어야 할 것이다. 본 고안의 범위는 첨부된 청구항의 범위 내에서 본 고안의 바람직한 실시예들의 변경들, 대안들, 균등물들은 모두 포함한다고 할 것이다.

도면의 간단한 설명

<41> 상기에서 살펴본 바와 같이 본 고안에 따른 프론트 로더 작업장치 및 그를 이용한 프론트 로더를 제공함으로써 상기의 버켓의 수직상승이 가능하게 되었다.

<42> 본 고안에 따라 버켓의 수직승강이 가능하게 됨으로써, 트렌치 프론트 로더의 작업반경을 줄일 수 있게 되었고, 또한 버켓의 상승시 원호를 그리면서 무게중심이 이동하던 문제를 해결하게 되었다.

<43> 또한 본 고안에 따라 볼 실린더가 연직방향 내외에서 신축함으로써 그 신장에 따른 작업높이의 효율이 향상되었다.

도면의 간단한 설명

<1> 도 1은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 버켓 최대 하강시를 나타내는 측면도.

<2> 도 2는 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 버켓 최대 상승시를 나타내는 측면도.

<3> 도 3은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 승강상태를 나타내는 측면도.

<4> 도 4는 본 고안의 하나의 실시예에 따른 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더의 사시도.

<5> < 도면의 주요부분에 대한 부호의 간단한 설명 >

<6> 1 : 본 고안에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치

<7> 2 : 본 고안에 따른 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더

<8> 10 : 제 1 수직 프레임 12 : 돌기부 14, 24 : 브라켓

<9> 20 : 전방 프레임 22 : 제 2 수직 프레임 26 : 지지대

<10> 30 : 메인붐 32 : 첫번째 결곡부 34 : 두번째 결곡부

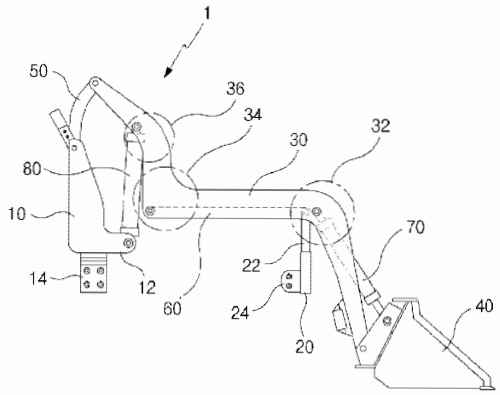
<11> 36 : 세번째 결곡부 40 : 버켓 50 : 연결암

<12> 60 : 지지암 70 : 버켓실린더 80 : 붐 실린더

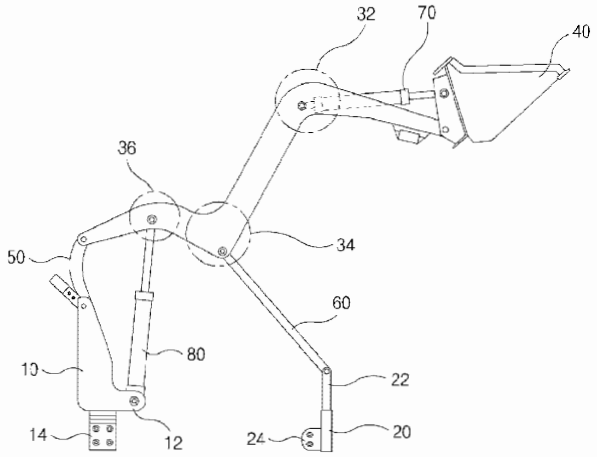
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도면

도면1



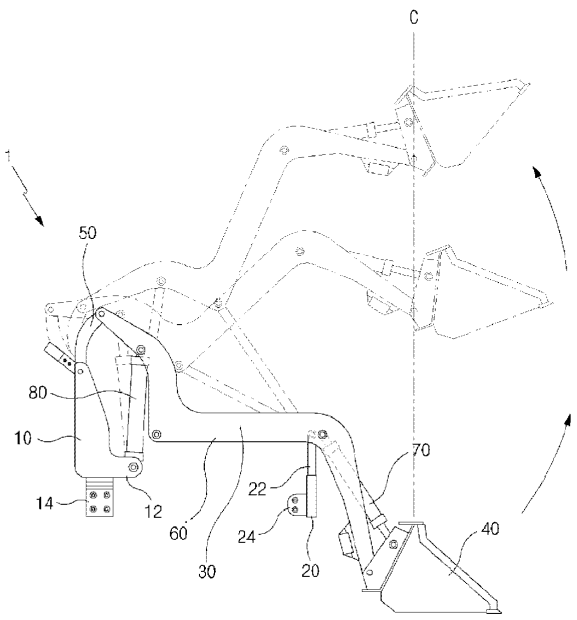
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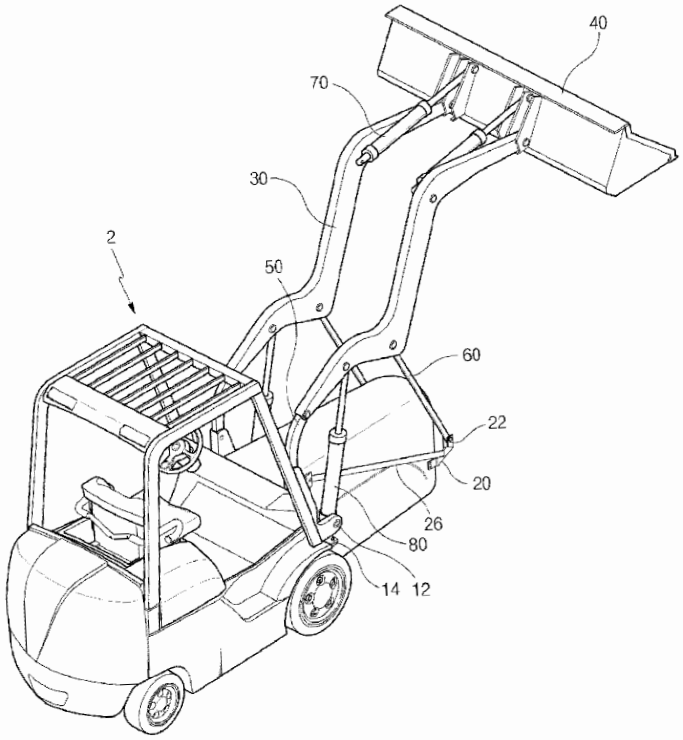
도면3



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도면4



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Vertical Ascent And Descent Front Loader Equipment For Tractor And Front Loader Having The Same

Inventor(s):

Applicant(s):

Classification:	**- international:**	***E02F3/38; E02F3/627***
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DESCRIPTION KR20080003426

Vertical Ascent And Descent Front Loader Equipment For Tractor And Front Loader Having The Same}

1 is a side view showing the maximum bucket down time of the vertical mounting front loader working device for tractor mounting according to an embodiment of the present invention.

Figure 2 is a side view showing the maximum bucket raising time of the vertical mounting front loader working device for tractor mounting according to an embodiment of the present invention.

Figure 3 is a side view showing the lifted state of the vertical mounting front loader working device for a tractor according to an embodiment of the present invention.

Figure 4 is a perspective view of the tractor front loader with a vertical lifting front loader working device according to an embodiment of the present invention.

<Brief description of symbols for the main parts of the drawings>

1

: Vertical lifting front loader working device for tractor mounting according to the present invention

2
: Tractor front loader with vertical elevating front loader

10 1st vertical frame 12 Protrusion 14, 24 Bracket

20 : Front frame 22: Second vertical frame 26: Support

30 : Main arm 32: first bend 34: second bend

36 : Third bend 40: bucket 50: connecting arm

60 : Supporting Arm 70: Bucket Cylinder 80: Boom Cylinder

The present invention relates to a tractor loader front loader working apparatus and a tractor front loader having the same.

More particularly, the present invention relates to a front loader working apparatus capable of vertically lifting and a tractor front loader having the same.

The front loader working device mounted on a conventional tractor has a large working radius because the bucket is raised in an arc at the time of working, and when the bucket is in the maximum horizontal direction according to the arc, the center of gravity of the loader moves toward the bucket. There were also risk factors such as conductivity. In addition, since the inclined boom cylinder is extended in the inclined direction, the working height according to the elongation was not efficient. Therefore, the present invention is to provide a front loader working apparatus and a front loader using the same for solving the above problems of the conventional tractor front loader. In this invention, the vertical lifting of the bucket is made to reduce the working radius of the tractor front loader, and also to solve the problem of moving the center of gravity

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while drawing an arc when the bucket is raised. In addition, the present invention is to increase the efficiency of the working height according to the extension by stretching the boom cylinder in the vertical direction.

The present invention is to achieve the above object, in the tractor loader front loader working device, the lower end is fixedly coupled to the bracket installed on the side of the tractor, the projection is formed on the side of the lower end and the hinge is coupled to the top A first vertical frame; Two second vertical frames having a lower end fixedly coupled to an upper end hinged to a front frame installed at the front of the tractor; Two main arms having three bent portions which are sequentially changed in bending direction and having a front end hinged to the bucket; Two connecting arms hinged to the rear ends of each of the main arms and hinged to the top of each of the first vertical frames; Two support arms having one end hinged to the second bent portion of each of the main arms and the other end hinged to the upper end of each of the second vertical frames; Two bucket cylinders, one end of which is hinged to the bucket and the other end of which is hinged to the first bent portion at the front end of each of the main arms and is elastic; And two boom cylinders, one end of which is hinged to the protrusions of each of the first vertical frames and the other end of which is hinged to a third bent portion at the front end of each of the main arms. It is configured to enable vertical lifting, including. In addition, according to the present invention, the front frame is fixedly coupled to the lower end to the brackets installed on the front and front sides of the tractor and the top is fixedly coupled to the second vertical frame, the boom cylinder according to its elongation In the vertical state, the protrusion of the first vertical frame is advanced after the angular movement retreat to the axis and inclined forward than the vertical state at the maximum elongation, and the support arm in the horizontal state when the boom cylinder is extended is the second vertical. As the angular movement of the other end coupled to the frame is axially raised, the connecting arm moves forward after the angular movement is retracted from the upper end of the first vertical frame, and the vertical rise of the bucket is performed. The present invention also provides the above inventions, wherein the second bent portion of the main arm is bent at a right angle, the first and third bent portions are bent at an obtuse angle, and the third bent portion is bent at an angle greater than the first bent portion. I am doing it.

On the other hand, the present invention is a tractor front loader, the tractor mounting vertical lifting front loader working devices are provided. EXAMPLES Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings. 1 is a side view showing the maximum bucket down time of the tractor mounting vertical lifting front loader working apparatus

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according to an embodiment of the present invention, Figure 2 is a vertical mounting front loader for tractor mounting according to an embodiment of the present invention It is a side view which shows the bucket raising time of a work device. 1 and 2, the tractor mounting vertical lifting front loader working device 1 according to one embodiment of the present invention is fixed to the lower end of the first vertical frame 10 to the bracket 14 installed on the side of the tractor and The protrusion 12 is formed at the lower side of the first vertical frame 10, and the upper end of the first vertical frame 10 is hinged to the connecting arm 50. The second vertical frame 22 has a lower end fixedly coupled to the front frame 20 installed in front of the tractor and the upper end is hinged to one end of the support arm 60. The main arm 30 has three bent portions 32, 34, 36, which are sequentially changed in the bending direction, and has an integrated front end hinged to the bucket 40, and hinges at the rear ends of the main arms 30, respectively. There are two connecting arms 50 which are coupled and hinged to the top of each of the first vertical frames 10. In addition, one end is hinged to the second bent portion 34 of each of the main arms 30 and the other end is hinged to the two support arms 60 and the bucket 40 hinged to the upper end of each of the second vertical frames 22. This hinge is coupled and the other end is hinged to the first bend 32 at the front end of each of the main arms 30, one end to the projection 12 of each of the two flexible bucket cylinder 70 and the first vertical frame 10 The hinge is coupled and the other end is hinged around the third bent portion 36 at the front end of each of the main arm 30 is composed of two stretchable boom cylinder 80 is configured to enable vertical lifting of the bucket 40 portion. .

At the bottom of the tip end of the main arm 30 may be provided with a support for fixedly connecting the two main arms, the wiring for controlling the cylinder can be installed into the support. The main arm 30 includes three bent portions 32, 34, and 36, and the bending direction is sequentially changed, and the bending angle of the second bent portion 34 is almost right angle, and the remaining bent portions 32, The bending angle of 36 is larger than the second bending portion 34 and forms an obtuse angle. In addition, the third bent portion 36 may have a larger obtuse angle than the first bent portion 32. The main arm 30 formed integrally withstand the load due to the lifting and lowering of the bucket 40 containing the load. The boom cylinder 80 is inclined more forward at the time of maximum rise than at the time of maximum descending of the bucket 40. As the bucket rises, the boom cylinder 80 angularly moves around the hinge axis of the protrusion 12 of the first vertical frame 10 and retracts and moves forward. Figure 3 is a side view showing the lifted state of the vertical mounting front loader working device for a tractor according to an embodiment of the present invention. In Figure 3, looking at the lifting state of the tractor mounting vertical lifting front loader working apparatus according to an embodiment of the present invention, the support arm 60 at the maximum descending position is in parallel with the main arm 30 and the main

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arm It enters inside the opening of 30. The support arm 60 stands up while angularly moving around the upper hinge axis of the second vertical frame 22 as the bucket 40 rises. As the bucket 40 rises due to the elongation of the boom cylinder 80, the connecting arm 50 and the boom cylinder 80 each have the upper hinge axis of the first vertical frame 10 and the first vertical frame 10. The projection 12 retreats angularly in the counterclockwise direction with respect to the hinge axis, and after the maximum retreat, the angular motion is moved forward in the clockwise direction with respect to the same axis again. When the boom cylinder 80 is extended, the boom cylinder 80 is stretched while angularly moving from side to side in a substantially vertical state, so that the raising height of the bucket 40 according to the extension becomes more efficient.

As shown in FIG. 3, the position of the boom cylinder 80 at the maximum ascend is inclined more clockwise than the position at the maximum ascend. Furthermore, as shown in FIG. 3, the support arm 60 stands up while angularly moving in a clockwise direction, and the main arm 30 as the boom cylinder 80 and the connecting arm 50 retreat and moves forward. And the connection portion of the bucket 40 is raised to a substantially vertical state. 4 shows a tractor front loader 2 equipped with a vertical lift front loader working device according to one embodiment of the present invention. The tractor mounting vertical lifting front loader working apparatus according to an embodiment of the present invention described above is shown. The description of the above - described parts in FIG. 4 will be omitted. In FIG. 4, the front frame 20 may be fixedly coupled to the bracket (not shown) fixed to the front of the tractor, and may be formed obliquely, and the second vertical frame 22 is fixedly coupled to the upper end thereof. In addition, one end is fixedly coupled to the upper end of the front frame 20 and the other end is provided with a support 26 fixedly connected to the protrusion or bracket provided on the upper end side of the first vertical frame 10. Although not shown, the front bracket to which the front frame 20 is coupled may be fixed to the front wheel shaft support of the tractor. In addition, although not shown, the connection focusing portion of the wiring for controlling the bucket cylinder and the wiring for controlling the boom cylinder may be provided at the rear lower end of the first vertical frame. The tractor front loader 2 having the vertical lifting front loader working device may have any form of the vertically mounted front loader working device for tractor mounting shown in FIGS. 1 to 3 and claims of the present invention. The present invention has been described with reference to the accompanying drawings, preferred embodiments, but the scope of the present invention is not limited to this, it should be interpreted according to the appended claims. It is intended that the scope of the present invention include all modifications, alternatives, and equivalents of the preferred embodiments of the present invention within the scope of the appended claims.

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As described above, by providing the front loader working apparatus and the front loader using the same according to the present invention, the vertical rise of the bucket is possible. Since the vertical lifting of the bucket is possible according to the present invention, it is possible to reduce the working radius of the tractor front loader, and also to solve the problem of moving the center of gravity while drawing an arc when the bucket is raised. In addition, according to the present invention by the expansion and contraction of the boom cylinder in the vertical direction, the efficiency of the working height according to its extension is improved.

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CLAIMS KR20080003426

1.

A tractor mounting front loader working apparatus, comprising: two first vertical frames having a lower end fixedly coupled to a bracket installed at a side of the tractor, a protrusion formed at a side of the lower end, and hinged at an upper end thereof; Two second vertical frames having a lower end fixedly coupled to an upper end hinged to a front frame installed at the front of the tractor; Two main arms having three bent portions which are sequentially changed in bending direction and having a front end hinged to the bucket; Two connecting arms hinged to the rear ends of each of the main arms and hinged to the top of each of the first vertical frames; Two support arms having one end hinged to the second bent portion of each of the main arms and the other end hinged to the upper end of each of the second vertical frames; Two bucket cylinders, one end of which is hinged to the bucket and the other end of which is hinged to the first bent portion at the front end of each of the main arms and is elastic; And two boom cylinders, one end of which is hinged to the protrusions of each of the first vertical frames and the other end of which is hinged to a third bent portion at the front end of each of the main arms. Vertical lifting front loader working device for mounting a tractor, characterized in that it comprises a.

2.

According to claim 1, wherein the front frame is fixedly coupled to the lower end and the upper end is fixed to the bracket installed on the front and front sides of the tractor, the boom cylinder in the vertical state according to its elongation The protrusion of the first vertical frame is advanced after the angular motion retreat to the axis and inclined

forward than the vertical state at the maximum elongation, and the support arm in the horizontal state when the boom cylinder is extended is coupled to the second vertical frame. Vertical lifting front loader working device for a tractor, characterized in that the vertical lifting of the bucket is made as the connecting arm moves forward after the angular movement with respect to the axis of the upper end of the first vertical frame as the angular movement ascends to the other end of the shaft .

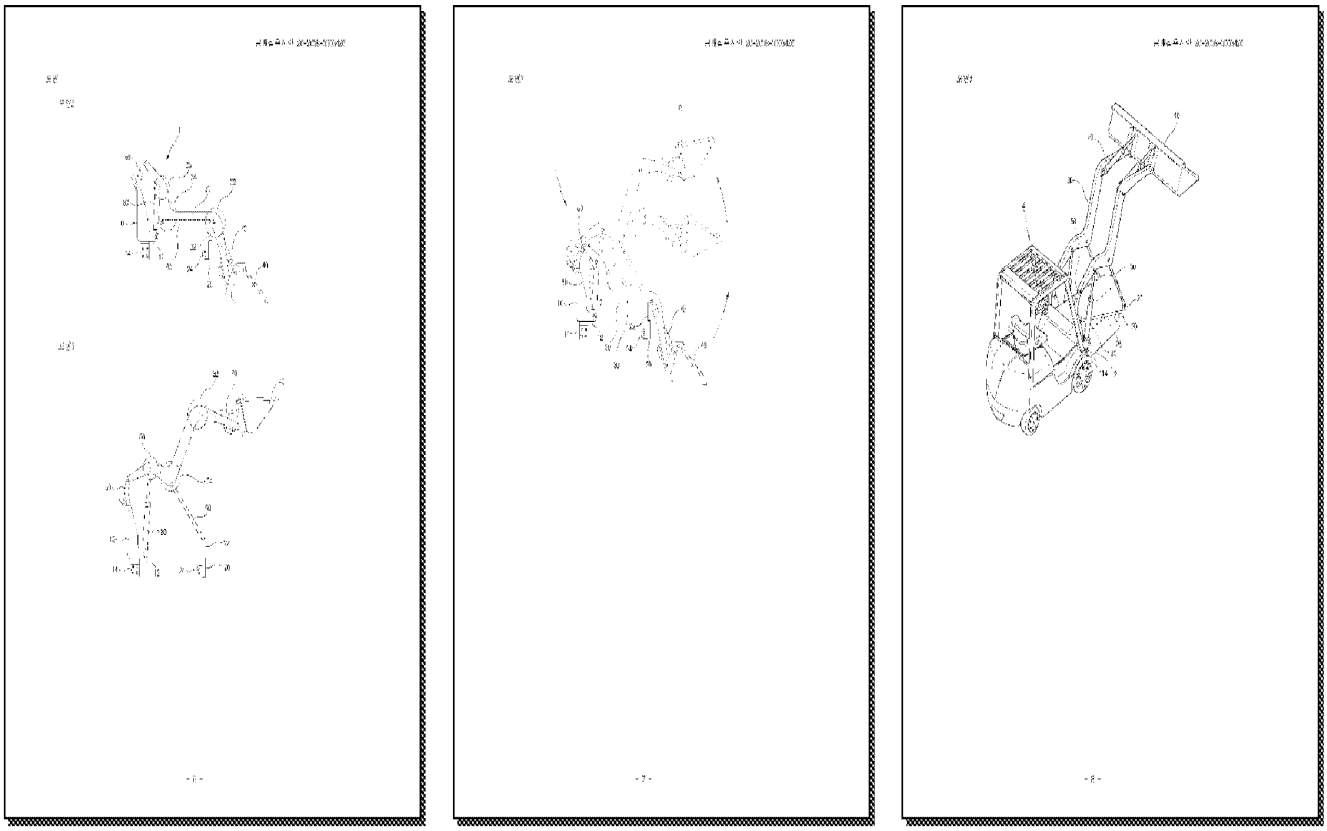
3.
The method of claim 1 or claim 2, wherein the second bent portion of the main arm is bent at a right angle, the first and third bent portions are bent at an obtuse angle and the third bent portion is bent at an angle greater than the first bent portion Vertical front loader operation for mounting tractors.

4.
A tractor front loader comprising the vertical elevating front loader working device for mounting a tractor according to claim 1.

5.
A tractor front loader, comprising: a vertical elevating front loader working device for mounting a tractor;

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Drawing pages of KR20080003426 U

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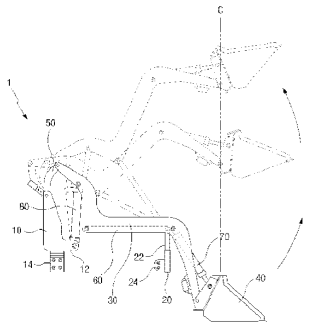
전체 청구항 수 : 총 5 항

(54) 트랙터 장착용 수직승강 프론트 로더 작업장치 및 그것을구비한 프론트 로더

(57) 요 약

본 고안은 트랙터 장착용 프론트 로더 작업장치에 관한 것이다. 구체적으로는, 상기 트랙터의 측부에 설치된 브라켓에 하단이 고정결합되고 상기 하단의 측부에 돌기부가 형성되고 상단이 힌지 결합된 2개의 제 1 수직 프레임과; 상기 트랙터의 전방에 설치되는 전방 프레임에 하단이 고정결합되고 상단이 힌지 결합된 2개의 제 2 수직 프레임과; 차례로 절곡방향이 바뀌는 3개의 절곡부를 구비하고 전단이 버켓에 힌지 결합된 일체형으로 된 2개의 메인암과; 상기 메인암 각각의 후단에 힌지 결합되고 상기 제 1 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 연결암과; 상기 메인암 각각의 두번째 절곡부에 일단이 힌지 결합되고 타단이 상기 제 2 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 지지암과; 상기 버켓에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 첫번째 절곡부에 힌지 결합되어 신축가능한 2개의 버켓 실린더; 및 상기 제 1 수직 프레임 각각의 상기 돌출부에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 세번째 절곡부위에 힌지 결합되어 신축가능한 2개의 붐 실린더; 를 포함하여 수직승강이 가능하도록 구성되어 있다.

대표도 - 도3



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실용신안 등록청구의 범위

청구항 1

트랙터 장착용 프론트 로더 작업장치에 있어서,

상기 트랙터의 측부에 설치된 브라켓에 하단이 고정결합되고 상기 하단의 측부에 돌기부가 형성되고 상단이 헌지 결합된 2개의 제 1 수직 프레임;

상기 트랙터의 전방에 설치되는 전방 프레임에 하단이 고정결합되고 상단이 헌지 결합된 2개의 제 2 수직 프레임;

자체로 절곡방향이 바뀌는 3개의 절곡부를 구비하고 전단이 버켓에 헌지 결합된 일체형으로 된 2개의 메인암;

상기 메인암 각각의 후단에 헌지 결합되고 상기 제 1 수직 프레임 각각의 상기 상단에 헌지 결합된 2개의 연결암;

상기 메인암 각각의 두번째 절곡부에 일단이 헌지 결합되고 타단이 상기 제 2 수직 프레임 각각의 상기 상단에 헌지 결합된 2개의 지지암;

상기 버켓에 일단이 헌지 결합되고 타단이 상기 메인암 각각의 전단에서 첫번째 절곡부에 헌지 결합되어 신축가능한 2개의 버켓 실린더; 및

상기 제 1 수직 프레임 각각의 상기 들출부에 일단이 헌지 결합되고 타단이 상기 메인암 각각의 전단에서 세번째 절곡부위에 헌지 결합되어 신축가능한 2개의 붐 실린더; 를 포함하는 것을 특징으로 하는 트랙터 장착용 수직승강 프론트 로더 작업장치.

청구항 2

제 1 항에 있어서,

상기 전방 프레임은 상기 트랙터의 전방 및 전방 측부에 설치되는 브라켓에 하단이 고정결합되며 상단은 상기 제 2 수직 프레임과 고정결합되고,

상기 붐 실린더는 그의 신장에 따라 수직상태에서 상기 제 1 수직 프레임의 상기 돌출부를 축으로 각운동 후 전진하고 최대 신장시 상기 수직상태보다 전방으로 기울어지고, 그리고

상기 붐 실린더의 신장시 수평상태의 상기 지지암이 상기 제 2 수직 프레임에 결합된 상기 타단을 축으로 각운동 상승할때 따라 상기 연결암이 상기 제 1 수직 프레임 상단을 축으로 각운동 후퇴 후 전진하면서 상기 버켓의 수직상승이 이루어지는 것을 특징으로 하는 트랙터 장착용 수직승강 프론트 로더 작업장치.

청구항 3

제 1 항 또는 제 2 항에 있어서,

상기 메인암의 상기 두번째 절곡부는 직각으로 절곡되고 상기 첫번째 및 세번째 절곡부는 둔각으로 절곡되고 상기 세번째 결곡부는 상기 첫번째 절곡부보다 보다 큰 각으로 절곡되어 있는 것을 특징으로 하는 트랙터 장착용 수직승강 프론트 로더 작업장치.

청구항 4

제 1 항 또는 제 2 항의 트랙터 장착용 수직승강 프론트 로더 작업장치를 구비한 것을 특징으로 하는 트랙터 프론트 로더.

청구항 5

제 3 항의 트랙터 장착용 수직승강 프론트 로더 작업장치를 구비한 것을 특징으로 하는 트랙터 프론트 로더.

발 생 서

고안의 상세한 설명

고안의 상세

고안이 속하는 기술 및 그 분야의 종래기술

<13> 본 고안은 트랙터 장착용 프론트 로더 작업장치 및 그것을 구비한 트랙터 프론트 로더에 관한 것이다. 더욱 상세하게는 수직승강이 가능한 프론트 로더 작업장치 및 그것을 구비한 트랙터 프론트 로더에 관한 것이다.

<14> 종래의 트랙터에 장착되는 프론트 로더 작업장치는 작업시 버켓이 호를 그리며 승강하도록 되어 있었기 때문에 작업반경이 커지고, 버켓이 그 호에 따라 최대 수평 방향에 있을 때에는 로더의 무게중심이 버켓쪽으로 이동하게 되므로 전도가능성 등의 위험요소도 있었다.

<15> 또한 경사진 논 실린더가 경사방향으로 신장됨으로써 그 신장에 따른 작업높이가 효율적이지 못하였다.

고안이 이루고자 하는 기술적 과제

<16> 따라서 본 고안은 상기의 종래의 트랙터 프론트 로더의 문제를 해결하기 위한 프론트 로더 작업장치 및 그를 이용한 프론트 로더를 제공하기 위한 것이다.

<17> 본 고안에서는 버켓의 수직승강이 이루어지도록 하여 트랙터 프론트 로더의 작업반경을 줄이고, 또한 버켓의 상승시 원호를 그리면서 무게중심이 이동하던 문제를 해결하고자 한다.

<18> 또한 본 고안에서는 붐 실린더가 연직방향 내외에서 신축하도록 하여 그 신장에 따른 작업높이의 효율을 높이고자 한다.

고안의 구성 및 작용

<19> 본 고안은 상기 목적을 달성하기 위한 것으로, 트랙터 장착용 프론트 로더 작업장치에 있어서, 상기 트랙터의 측부에 설치된 브라켓에 하단이 고정결합되고 상단의 측부에 돌기부가 형성되고 상단이 힌지 결합된 2개의 제 1 수직 프레임과; 상기 트랙터의 전방에 설치되는 전방 프레임에 하단이 고정결합되고 상단이 힌지 결합된 2개의 제 2 수직 프레임과; 차체로 직교방향이 바뀌는 3개의 링곡부를 구비하고 전단이 버켓에 힌지 결합된 일체형으로 된 2개의 메인암과; 상기 메인암 각각의 후단에 힌지 결합되고 상기 제 1 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 연결암과; 상기 메인암 각각의 두번째 링곡부에 일단이 힌지 결합되고 타단이 상기 제 2 수직 프레임 각각의 상기 상단에 힌지 결합된 2개의 지지암과; 상기 버켓에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 첫번째 링곡부에 힌지 결합되어 신축가능한 2개의 버켓 실린더; 및 상기 제 1 수직 프레임 각각의 상기 돌출부에 일단이 힌지 결합되고 타단이 상기 메인암 각각의 전단에서 세번째 링곡부에 힌지 결합되어 신축가능한 2개의 붐 실린더; 를 포함하여 수직승강이 가능하도록 구성되어 있다.

<20> 또한 본 고안은 상기 고안에 있어서, 상기 전방 프레임은 상기 트랙터의 전방 및 전방 측부에 설치되는 브라켓에 하단이 고정결합되며 상단은 상기 제 2 수직 프레임과 고정결합되고, 상기 붐 실린더는 그의 신장에 따라 수직상태에서 상기 제 1 수직 프레임의 상기 돌출부를 축으로 각운동 후퇴 후 전진하고 최대 신장시 상기 수직상태보다 전방으로 기울어지고, 그리고 상기 붐 실린더의 신장시 수평상태의 상기 지지암이 상기 제 2 수직 프레임에 결합된 상기 타단을 축으로 각운동 상승함에 따라 상기 연결암이 상기 제 1 수직 프레임 상단을 축으로 각운동 후퇴 후 전진하면서 상기 버켓의 수직상승이 이루어지는 것을 특징으로 하고 있다.

<21> 본 고안은 또한 상기 고안들에 있어서, 상기 메인암의 상기 두번째 링곡부는 직각으로 링곡되고 상기 첫번째 및 세번째 링곡부는 둔각으로 링곡되고 상기 세번째 링곡부는 상기 첫번째 링곡부보다 보다 큰 각으로 링곡되어 있는 것을 특징으로 하고 있다.

<22> 한편, 본 고안은 트랙터 프론트 로더로서, 상기의 트랙터 장착용 수직승강 프론트 로더 작업장치들을 구비하고 있다.

<23> < 실시예 >

<24> 이하에서, 첨부된 도면과 함께 본 고안에 따른 바람직한 실시예를 구체적으로 설명하기로 한다.

<25> 도 1은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 버켓 최대 하강시를 나타내는 측면도이고, 도 2는 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 버켓 최대 상승시를 나타내는 측면도이다.

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<26> 도 1 및 2에서, 본 고안의 하나의 실시예인 트랙터 장착용 수직승강 프론트 로더 작업장치(1)는 트랙터의 측부에 설치된 브라켓(14)에 제 1 수직 프레임(10)의 하단이 고정결합되고 제 1 수직 프레임(10)의 하단 측부에 볼기부(12)가 형성되고 제 1 수직 프레임(10)의 상단은 연결암(50)과 힌지 결합되어 있다. 제 2 수직 프레임(22)은 트랙터의 전방에 설치되는 전방 프레임(20)에 하단이 고정결합되고 상단은 지지암(60)의 일단에 힌지 결합되어 있다. 메인암(30)은 차례로 경곡방향이 바뀌는 37개의 경곡부(32, 34, 36)를 구비하고 전단이 붐컷(40)에 힌지 결합된 일체형으로 되어 있고, 메인암(30) 각각의 후단에 힌지 결합되고 제 1 수직 프레임(10) 각각의 상단에 힌지 결합된 암결합부(34)에 일단이 힌지 결합되고 타단이 제 2 수직 프레임(22) 각각의 상단에 힌지 결합된 27개의 지지암(60)과 붐컷(40)에 일단이 힌지 결합되고 타단이 메인암(30) 각각의 전단에서 첫 번째 경곡부(32)에 힌지 결합되어 신축가능한 27개의 붐컷 실린더(70) 및 제 1 수직 프레임(10) 각각의 돌출부(12)에 일단이 힌지 결합되고 타단이 메인암(30) 각각의 전단에서 세번째 경곡부(36)에 후단이 힌지 결합된 27개의 붐컷 실린더(80)로 구성되어 있다. 또 3개의 경곡부(32, 34, 36)를 구비하고 전단이 붐컷(40)에 힌지 결합되어 신축가능한 붐 실린더(80)의 상승에 따라 메인암(30)과 붐컷(40)이 이루는 각도가 변화하여 붐 실린더(80)의 신장이 최소가 되는 경우에도 붐컷(40)의 상승높이가 일정 높이 이상을 유지하도록 구성되어 있다.

<27> 메인암(30)의 선단부 하면에 두 메인암을 고정연결하는 지지대를 구비할 수 있고, 이 지지대 속으로 실린더의 체어를 위한 배선을 설치할 수 있다.

<28> 메인암(30)은 3개의 경곡부(32, 34, 36)를 포함하고 있는데, 차례로 경곡방향이 바뀌고, 두 번째 경곡부(34)의 경곡각은 거의 직각에 가깝고, 나머지 경곡부(32, 36)의 경곡각은 두 번째 경곡부(34)보다 크고 둔각을 이루고 있다. 제다가 세 번째 경곡부(36)는 첫 번째 경곡부(32)보다 더 큰 둔각을 이루도록 할 수 있다. 일체형으로 형성된 메인암(30)은 적재물을 담은 붐컷(40)의 승강에 따른 하중에도 더 견고하게 견딜 수 있다.

<29> 붐 실린더(80)는 붐컷(40)의 최대 하강시보다 최대상승시에 더 전방으로 기울어져 있다. 버켓의 상승에 따라 붐 실린더(80)는 제 1 수직 프레임(10)의 돌출부(12)의 힌지 축을 중심으로 각운동하여 후퇴하였다가 다시 전진하게 된다.

<30> 도 3은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 승강상태를 나타내는 측면도이다.

<31> 도 3에 있어서, 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 승강상태를 살펴보면, 최대 하강시 지지암(60)은 메인암(30)과 평행하게 위치하며 메인암(30)의 게구부 내부에 들어가게 된다. 지지암(60)은 붐컷(40)의 상승에 따라 제 2 수직 프레임(22)의 상단 힌지 축을 중심으로 각운동하며 일어서게 된다.

<32> 붐 실린더(80)의 신장으로 인한 붐컷(40)의 상승에 따라 연결암(50) 및 붐 실린더(80)는 각각 제 1 수직 프레임(10)의 상단 힌지 축과 제 1 수직 프레임(10)의 돌출부(12) 힌지 축을 중심으로 도 3에서 볼 때 반시계 방향으로 각운동하며 후퇴하게 되고, 최대 후퇴 후에는 다시 등일 축을 중심으로 도 3에서 볼 때 시계방향으로 각운동하며 전진하게 된다. 붐 실린더(80)의 신장시 붐 실린더(80)는 거의 수직상태에서 좌우로 조금씩 각운동하면서 신장하므로 그 신장에 따른 붐컷(40)의 상승 높이가 더 효율적이게 된다.

<33> 도 3에서 나타난 바와 같이 최대 상승시의 붐 실린더(80)의 위치는 최대 하강시의 위치보다 시계방향으로 더 기울어져 있다.

<34> 제다가 도 3에 나타난 바와 같이 상승할 때 지지암(60)이 시계방향으로 각운동하며 일어서지 되고, 붐 실린더(80) 및 연결암(50)의 각운동하며 후퇴 및 전진함에 따라 메인암(30)과 버켓(40)의 연결부가 거의 수직상태로 상승하게 된다.(신 C 참조)

<35>

<36> 도 4는 본 고안의 하나의 실시예에 따른 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더(2)를 나타내고 있다.

<37> 상기에서 살펴본 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치를 트랙터에 장착시킨 모습을 나타내고 있다. 도 4에서 앞서 설명한 부분에 대해서는 설명을 생략한다.

<38> 도 4에 있어서, 전방 프레임(20)은 트랙터 전방에 고정되는 브라켓(도시되지 않음)에 고정결합되고 비스듬하게 형성될 수 있고, 그 상단에 제 2 수직 프레임(22)이 고정결합되어 있다. 또 전방프레임(20)의 상단부근에 일단이 고정결합되고 타단이 제 1 수직 프레임(10)의 상단부 측부에 설치된 돌출부 또는 브라켓에 고정연결된 지지대(26)를 구비하고 있다. 도시되지 않았으나, 전방 프레임(20)이 결합된 전방 브라켓은 트랙터의 전륜축 지지대

에 고정될 수도 있다. 또한, 도시되지 않았으나, 버켓 실린더를 제어하는 배선과 붐 실린더를 제어하는 배선의 연결 집속부를 제 1 수직 프레임의 후방 하단에 설치할 수도 있다.

<39> 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더(2)는 도 1 내지 3 및 본 고안의 청구항에 나타난 트랙터 장착용 수직승강 프론트 로더 작업장치의 어떤 형태도 구비할 수 있다.

<40> 이상에서 본 고안은 첨부된 도면과 함께 바람직한 실시예를 설명하였지만 본 고안의 범위는 이에 한정되지 않고, 첨부된 청구항에 따라 해석되어야 할 것이다. 본 고안의 범위는 첨부된 청구항의 범위 내에서 본 고안의 바람직한 실시예들의 변경들, 대안들, 균등물들은 모두 포함한다고 할 것이다.

고안의 효과

<41> 상기에서 살펴본 바와 같이 본 고안에 따른 프론트 로더 작업장치 및 그를 이용한 프론트 로더를 제공함으로써 상기의 버켓의 수직상승이 가능하게 되었다.

<42> 본 고안에 따라 버켓의 수직승강이 가능하게 됨으로써, 트랙터 프론트 로더의 작업반경을 줄일 수 있게 되었고, 또한 버켓의 상승시 원호를 그리면서 무게중심이 이동하던 문제를 해결하게 되었다.

<43> 또한 본 고안에 따라 붐 실린더가 연직방향 내외에서 신축함으로써 그 신장에 따른 작업높이의 효율이 향상되었다.

도면의 간단한 설명

<1> 도 1은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 버켓 최대 하강시를 나타내는 측면도.

<2> 도 2는 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 버켓 최대 상승시를 나타내는 측면도.

<3> 도 3은 본 고안의 하나의 실시예에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치의 승강상태를 나타내는 측면도.

<4> 도 4는 본 고안의 하나의 실시예에 따른 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더의 사시도.

<5> < 도면의 주요부분에 대한 부호의 간단한 설명 >

<6> 1 : 본 고안에 따른 트랙터 장착용 수직승강 프론트 로더 작업장치

<7> 2 : 본 고안에 따른 수직승강 프론트 로더 작업장치를 구비한 트랙터 프론트 로더

<8> 10 : 제 1 수직 프레임 12 : 돌출부 14, 24 : 브라켓

<9> 20 : 전방 프레임 22 : 제 2 수직 프레임 26 : 지지대

<10> 30 : 메인암 32 : 첫번째 절곡부 34 : 두번째 절곡부

<11> 36 : 세번째 절곡부 40 : 버켓 50 : 연결암

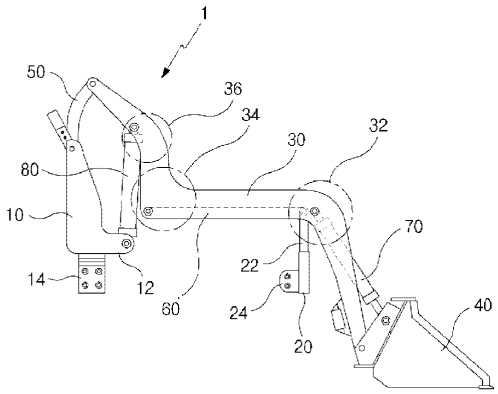
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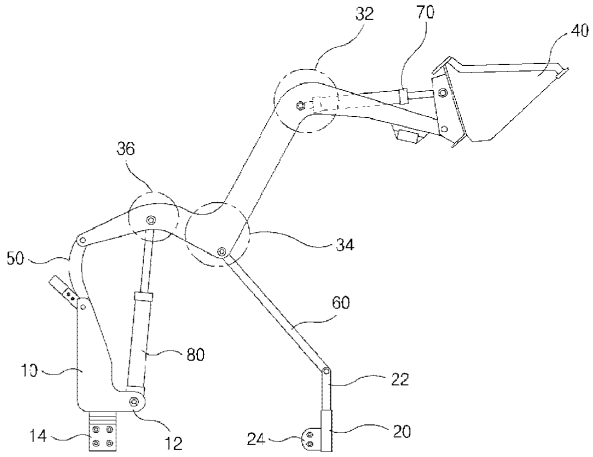
Ex. 2035
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도면

도면1



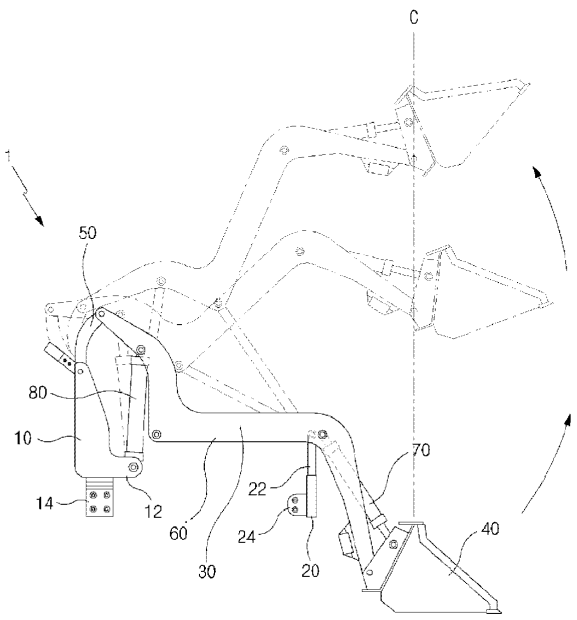
도면2



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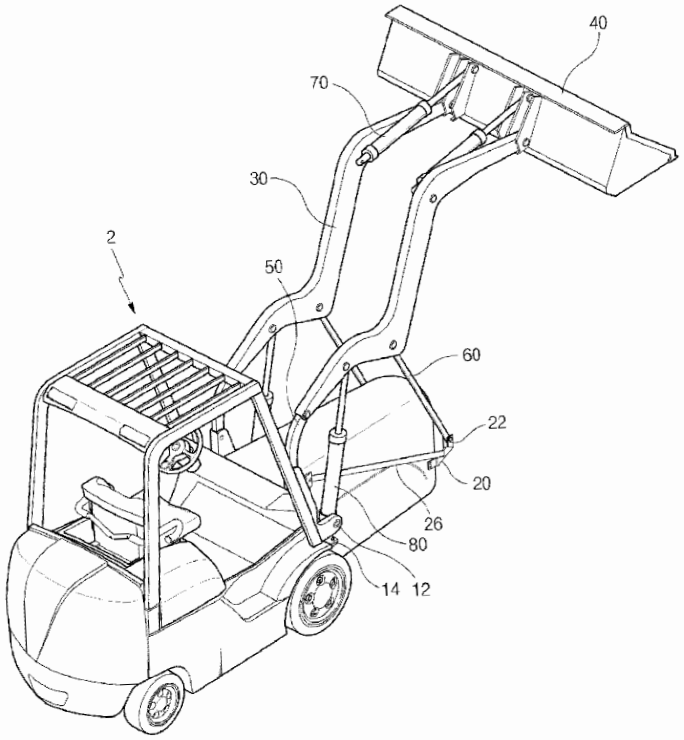
도면3



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도면4



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

September 19, 2019

INTERVIEW SUMMARY

The August 21, 2019 interview was conducted for Reexamination Control No. 90/014,269. During the interview, merged Reexamination Control Nos. 90/014,109 and 90/014,124 were discussed to the extent described below. Patent Owner's Interview Summary for Reexamination Control No. 90/014,269 is copied below for submission in the merged Reexamination Control Nos. 90/014,109 and 90/014,124 in the interest of full disclosure.

* * * * *

The undersigned counsel for the Patent Owner thank the Examiner and Conferees for the telephone interview of August 21, 2019 in which this reexamination of U.S. Patent No. 10,202,266 ("the '266 Patent") was discussed. The rejection of claims 19-23, 25 and 27 under 35 U.S.C. §102 as anticipated by the Ramrod Brochure, which published after the earliest priority date of the '266 Patent, was discussed.

Counsel discussed support for claim 19 of the '266 Patent. In particular, Counsel discussed how the claim was supported in the Figures of the application. Counsel also discussed how material that was incorporated into the specification from SAE J2752 supported the claims. Counsel also discussed how SAE J2752 was properly incorporated by reference in the patent application that led to the '266 Patent and in the chain of patent applications that extend to the February 20, 2015 priority date.

The Examiner discussed his interpretation of the claimed subject matter and discussed support for the subject matter of claim 19. No agreement was reached and Patent Owner agreed to present further evidence and arguments in Patent Owner's response to the Office action.

Counsel also discussed objective evidence of non-obviousness received from the third-party Requestor of this reexamination proceeding, The Toro Company ("Toro"), and that such evidence had recently been cleared to be shared with the Patent Office. Counsel stated that such evidence relates to various material inconsistencies between the arguments Toro presents in its reexamination requests and Toro's actual history of attempting to solve the problem of increasing lift capacity in compact tool carriers. The Examiner noted that such evidence may be valuable in his patentability analysis. The Examiner and Conferees noted that the Patent Owner may consider filing a Request for Extension of Time for reply to the Office action if needed to review and consider such objective evidence received from Toro. The Examiner and Conferees stated that they would be open to a reasonable extension of time such as a one-month extension of time for the Patent Owner to review and consider such evidence.

Because Counsel stated that they may include such objective evidence on non-obviousness received from Toro in a Supplemental Reply in the merged Reexamination Proceeding Control Nos. 90/014,109 and 90/014,124 and in Reexamination Proceeding Control No. 90/014,148, Counsel agreed to enter this Interview Summary in these related proceedings.

Respectfully submitted,

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90/014109

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,124	04/13/2018	9321386	Vermeer-386Reex-3	8217

76656 7590 08/27/2019

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
08/27/2019	PAPER

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

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

PTOL-90A (Rev. 04/07)

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AUG 2 7 2019

(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

James W. Miller, Attorney
527 Marquette Avenue
Suite 1960, Rand Tower
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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/014,124*. + 90/014109

PATENT NO. *9321386*.

ART UNIT *3993*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Applicant-Initiated Interview Summary	**Control Nos.:** 90/014,109 and 90/014,124, merged	**Applicant(s)** 9,321,386	
	Examiner RUSSELL D STORMER	**Art Unit** 3993	**AIA (FITF) Status** Yes

All participants (applicant, applicants representative, PTO personnel):

(1) RUSSELL D. STORMER.

(2) Mike Vander Molen.

(3) Gay Spahn, Robert Fetsuga (USPTO).

(4) Mike Munsell.

Date of Interview: 21 August 2019.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☐103 ☑Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 19.

Identification of prior art discussed: Ramrod.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

See Continuation Sheet.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☑ Attachment

/RUSSELL D STORMER/ Primary Examiner, Art Unit 3993	Conferees: /RMF/ and /GAS/

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

The August 21, 2019 interview was initially conducted for the 90/014,269 proceeding. During the interview, the merged '109-'124 proceeding was discussed briefly to the extent shown below. Therefore, a copy of the interview summary of the '269 proceeding is being placed in the file of the '109-'124 proceeding in the interest of full disclosure.

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Patent Owner, through the representatives, argued that the instant '266 patent is entitled to the filing dates of its parent applications due to the incorporation of the SAE J2752 standard into said parent applications. The Examiner noted that the "barrier guard" and its definition in the specification was added at the time of filing of the application of the '266 patent, and further that the SAE standard did not provide support for the barrier guard as described as claimed. It was noted that the description of the claimed "barrier guard" is essential subject matter and may not be incorporated by reference to non-patent publications. The Examiner asserted that the definition in lines 1-4 of column 4 of the '266 patent appeared to define the entire silhouette of the machine structure when a barrier guard for the operator would seem to be limited to structure around the operator's area, for example, the area above the operator platform 37 would be consistent with the SAE standard. Patent Owner argued that the pivot points, not the barrier guard, are the object of patentability in claim 19. To this end, the Examiner stated that the pivot points should be claimed with respect to what is shown in the drawings. Clearly, the drawings show structure around the operator area which could arguably be called a barrier guard, and this structure should be the focus. The possibility of amending the specification was discussed, such as amendments limited to what is shown in the drawings.
Patent Owner described evidence recently introduced during litigation proceedings, such as Third Party Requester Toro's difficulties and failures in designing a linkage-type tool carrier or mini-skid steer machine which parallel the difficulties asserted by Patent Owner in declarations filed in the related reexamination proceeding (the merged proceedings 90/014,109 and 90/014,124). The Examiner stated that such evidence would be valuable, especially when considered along with the declarations by Patent Owner. Evidence of copying, if available, would also be valuable, and Patent Owner noted that there could possibly be such evidence with respect to the Ramrod reference used to reject claims in the previous Office action.
Finally, the Examiner noted that this interview summary would likely be entered in the related merged proceeding since Patent Owner inquired about filing a supplemental response in the merged proceedings and the Examiner considered the possibility of entering such a supplemental response. There was no substantive discussion of the merged proceeding.
Finally, Patent Owner was reminded of the requirement to file a separate summary of the interview as per MPEP 2281.

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Date:	8/13/2019 3:57:56 PM	*Pages (Including Cover Page):*	3
Client-Matter #:	31681-296		
To:	**Examiner Stormer**		
Firm:			
Fax:	1-571-273-6687	Main No.:	
From:	Colleen Croft f/ Michael J. Vander Molen	*E-mail:*	CCroft@ArmstrongTeasdale.com

Re:

Reexamination Control Nos. 90/014,109 and 90/014,124, merged

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 10,202,266
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control No.: 90/014,269
Filed: February 26, 2019
Confirmation No.: 3337
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer

INTERVIEW AGENDA

Time: 11:00 AM EST, August 21, 2019

Conference Number: 1-866-740-1260 Passcode: 2594734

Attendees: Mike Vander Molen (Reg. No. 57,274) and Mike Munsell (Reg. No. 43,820) and Scott Rempe (Reg. No. 47,018)

I. **Claims reciting a "barrier guard" are entitled to the February 20, 2015 Priority Date**

   a. **The Figures of the '266 Patent Provide Support for the Barrier Guard**

   b. **The Barrier Guard was also Properly Incorporated By Reference**

      i. **MPEP §211.06(B)**

         1. **The disclosure of the '266 Patent is the same as the disclosure of the parent applications because the "Barrier Guard" would not constitute new matter in the parent applications**
            a. **Each application incorporated by reference SAE J2752 which expressly recited the term "barrier guard"**

      ii. **MPEP §608.01(p)**

         1. **"An application is entitled to rely upon the filing date of an earlier application, even if the earlier application itself incorporates essential material by reference to another**

document. See *Ex parte Maziere*, 27 USPQ2d 1706, 1706-07 (Bd. Pat. App. & Inter. 1993)."

2. **See Also "Example 2":**

"Upon review of the specification, the examiner determined that the subject matter incorporated by reference from a foreign patent was "nonessential material" and therefore, did not object to the incorporation by reference. In reply to a non-final Office action, applicant filed an amendment to the claims to add a new limitation that was supported only by the foreign patent. The amendment filed by the applicant caused the examiner to re-determine that the incorporated subject matter was "essential material" under **37 CFR 1.57(d)**. The examiner rejected the claims that include the new limitation under **35 U.S.C. 112(a)** in a final Office action.

Since the rejection under **35 U.S.C. 112(a)** was necessitated by the applicant's amendment, the finality of the Office action is proper. If the applicant wishes to overcome the rejection under **35 U.S.C. 112(a)** by filing an amendment under **37 CFR 1.57(g)** to add the subject material disclosed in the foreign patent into the specification, applicant may file the amendment as an after final amendment in compliance with **37 CFR 1.116**. Alternatively, applicant may file an RCE under **37 CFR 1.114** accompanied by the appropriate fee, and an amendment per **37 CFR 1.57(g)**within the time period for reply set forth in the final Office action."

II. Introduction of Additional Objective Evidence of Non-Obviousness

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

March 26, 2019

SECOND NOTICE OF CONCURRENT PROCEEDINGS

Related U.S. Patent Application No. 15/704,685 issued as U.S. Patent No. 10,202,266 ("the '266 Patent") on February 12, 2019. The '266 Patent is involved in the following proceedings:

- *Vermeer Manufacturing Company v. The Toro Company*, Case No. 4:19-cv-00050-CRW-HCA (S.D. IA. filed February 12, 2019)

- A third party Request for *Ex Parte* Reexamination filed by The Toro Company on February 26, 2019 and assigned Control Number 90/014,269.

A continuation of U.S. Patent No. 9,321,386 was filed on February 7, 2019 and assigned Application No. 16/270,070.

Respectfully submitted,

/Michael J. Vander Molen/

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Brad Thomas et al.	)	
	)	
Reexam Control No.: 90/014,109 &	)	
90/014,124	)	Art Unit 3993
	)	
Patent No. 9,321,386	)	Examiner Russell D. Stormer

THIRD PARTY REQUESTER'S CHANGE OF CORRESPONDENCE ADDRESS

Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please change the Correspondence Address for the above-identified merged *ex parte* patent reexaminations to the following new business address for the registered practitioner who is responsible for handling such reexaminations on behalf of the Third Party Requester. The new Correspondence Address is:

James W. Miller, Attorney
120 S 6TH ST.
Suite 2310
Minneapolis, MN 55402-1829

February 4, 2019

Respectfully submitted,

/James W. Miller/

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Certificate of Service

It is certified that a copy of this Third Party Requester's Change Of Correspondence Address has been served in its entirety on the Patent Owner as provided in 37 CFR 1.33(c). The name and address of the party served and the date of service are:

Armstrong Teasdale, LLP
770 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

Date of Service: February 4, 2019 By: /James W. Miller/

James W. Miller
Registration No. 27,661

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

December 6, 2018

AMENDMENT AND RESPONSE TO OFFICE ACTION

TO THE COMMISSIONER FOR PATENTS,

SIR:

Please enter the following amendments and consider the following remarks in the above-identified *ex parte* reexamination of U.S. Patent No. 9,321,386.

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ii. One of Ordinary Skill in the Art Would Not have Been Motivated to Modify the Dingo 322 Tool Carrier to Include the Vertical-Lift Loader Arm Configuration of Komatsu 23

a. The Office's proposed modification would have rendered the Dingo 322 unsatisfactory for its intended purpose. 23

b. One of ordinary skill in the art would not have had a reasonable expectation of success in making the modifications to the Dingo 322 proposed by the Office. 32

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I. AMENDMENTS TO THE CLAIMS

Please amend claim 21 as follows:

21. (Amended) The compact tool carrier as set forth in claim 1 wherein the linkage is a first linkage, the first linkage being pivotally attached to the first side of the mainframe at a first pivot point and pivotally attached to the loader arm at a second pivot point, the actuator being attached to the mainframe at a third pivot point and pivotally attached to the loader arm at a fourth pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a fifth pivot point and pivotally attached to the loader arm at a sixth pivot point, wherein as the loader travels from a down position to a vertically raised position, the first, second, third, fourth, fifth, and sixth pivot points are (1) disposed between the operator controls and a bottom of the mainframe [[and/]] or (2) disposed forward of the control station.

Please amend claim 46 as follows:

46. (Amended) The compact tool carrier as set forth in claim 45 wherein the loader comprises:

a first arm;

a second arm; and

a cross-member that extends from the first arm to the second arm, the cross-member being <u>fully</u> disposed forward of the first linkage pivot point, the second linkage pivot point, and the actuator pivot point.

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Please insert new claims 64-87:

64. (New) The compact tool carrier as set forth in claim 1 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform extending from the mainframe.

65. (New) The compact tool carrier as set forth in claim 64 wherein least a portion of the operator platform is forward of the rear end of the mainframe.

66. (New) The compact tool carrier as set forth in claim 15 wherein the pivot point at which the actuator is attached to the first side of the mainframe is above the rotational axis.

67. (New) The compact tool carrier as set forth in claim 15 wherein the pivot point at which the linkage is attached to the first side of the mainframe is disposed above the tracks or wheels.

68. (New) The compact tool carrier as set forth in claim 55 wherein the drive mechanism further comprises a drive sprocket, the drive sprocket rotating about the rotational axis, and the pivot point at which the actuator is attached to the first side of the mainframe being above the rotational axis.

69. (New) The compact tool carrier as set forth in claim 55 wherein the pivot point at which the linkage is attached to the first side of the mainframe is above the tracks or wheels.

70. (New) A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the

second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface, at least a portion of the tracks angling downward from the drive sprocket toward the front end of the mainframe, the linkage pivot point being disposed above the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

71. (New) The compact tool carrier as set forth in claim 70 wherein the linkage is a first linkage and the linkage pivot point is a first linkage pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a second linkage pivot point and pivotally attached to the loader arm, the first linkage being forward of the second linkage.

72. (New) The compact tool carrier as set forth in claim 70 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform extending from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

73. (New) The compact tool carrier as set forth in claim 70 wherein the mainframe incorporates a single weldment.

74. (New) A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a first linkage pivotally attached to the first side of the mainframe at a first linkage pivot point and pivotally attached to the loader arm;

a second linkage pivotally attached to the first side of the mainframe at an second linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface, the tracks being spaced from the rear end of the mainframe, at least a portion of the tracks angling downward from the drive sprocket toward the front end of the mainframe, each of the first linkage pivot point, second linkage pivot point, and actuator pivot point being (1) disposed above at least part of the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe or (2) disposed between the tracks and the rear end of the mainframe; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted

toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation; and

an operator platform for standing operation of the operator controls of the control station.

75. (New) The compact tool carrier as set forth in claim 74 wherein the first linkage is forward of the second linkage, the first linkage being disposed above the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe.

76. (New) The compact tool carrier as set forth in claim 74 wherein the operator platform extends from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

77. (New) The compact tool carrier as set forth in claim 74 wherein the mainframe incorporates a single weldment.

78. (New) A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface, the tracks being spaced from the rear end of the mainframe; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation; and

an operator platform for standing operation of the operator controls of the control station that extends from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

79. (New) The compact tool carrier as set forth in claim 78 wherein the mainframe incorporates a single weldment.

80. (New) A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

a drive mechanism comprising tracks for propelling the compact tool carrier over a supporting surface, the drive mechanism having a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4, both D2 and D4 being less than 2.0 D5, the pivot point at which the linkage is attached to the mainframe being disposed above the tracks; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

81. (New) The compact tool carrier as set forth in claim 80 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform extending from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

82. (New) The compact tool carrier as set forth in claim 81 wherein the mainframe incorporates a single weldment.

83. (New) A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

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a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

a drive mechanism comprising tracks for propelling the compact tool carrier over a supporting surface, the drive mechanism having a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4, both D2 and D4 being less than 2.0 D5, the pivot point at which the actuator is attached to the mainframe being above the rotational axis; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

84. (New) The compact tool carrier as set forth in claim 83 further comprising an operator platform for standing operation of the operator controls of the control station.

the operator platform extending from the mainframe, at least a portion of the operator platform being forward of the rear end of the mainframe.

85. (New) The compact tool carrier as set forth in claim 83 wherein the mainframe incorporates a single weldment.

86. (New) A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool, the loader being moveable between a down position and a vertically raised position;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a first linkage pivotally attached to the first side of the mainframe at a first linkage pivot point and pivotally attached to the loader arm;

a second linkage pivotally attached to the first side of the mainframe at a second linkage pivot point and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe at an actuator pivot point and pivotally attached to the loader arm;

a drive mechanism comprising tracks or wheels, the drive mechanism having a rotational axis, the pivot point at which the actuator is attached to the mainframe being above the rotational axis;

an attachment plate for removably attaching a tool to the compact tool carrier, at least a portion of the attachment plate being forward of the drive mechanism when the loader is in the vertically raised position;

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation; and

an operator platform for standing operation of the operator controls of the control station.

87. (New) The compact tool carrier as set forth in claim 86 wherein the mainframe incorporates a single weldment.

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II. REMARKS

The Office action of September 6, 2018 has been carefully considered and the following remarks are made in response. On October 29, 2018 the Office granted Patent Owner's request for a one month extension of time thereby extending the due date for response to December 6, 2018.

A. EXECUTIVE SUMMARY

Vermeer Manufacturing Company ("Vermeer") is the assignee of the '386 Patent at issue in both reexaminations (90/014,109 and 90/014,124). The '386 Patent describes and claims a compact tool carrier that has a vertical-lift loader arm configuration in which the loader is not directly attached to the mainframe of the machine. Achieving this vertical-lift configuration on the compact tool carrier frame had never before been achieved and was believed to be "difficult, if not impossible" in the industry—as stated by Requester Toro Corporation at the time of the invention.

Before Vermeer's invention, the industry had been chasing the goal of increasing lift capacity on compact tool carriers. The engineering solutions being pursued, however, yielded only minor, incremental gains in the lift capacity of these machines. By contrast, Vermeer's vertical-lift compact tool carrier, claimed in the '386 Patent, resulted in a substantial increase in the lift-capacity of these compact machines. Recognizing the significance of its inventors' discovery, Vermeer filed patent applications and has been granted two patents, the '386 Patent and U.S. Patent No. 9,975,750.

Although the claims of the '386 Patent and the new claims added herein define different features of Vermeer's novel compact tool carrier, they all share the following limitations: (1) an engine bracket spaced from the rear end of the mainframe and (2) a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader such that the loader is not directly attached to the mainframe. The Office has rejected the claims of the '386 Patent as obvious over Dingo Parts Catalog and Dingo Operator's Manual in view of Komatsu (and, for some claims, further in view of the Vermeer Brochure). The Office's rejection should be withdrawn.

As shown by the factual record discussed below, one of ordinary skill in the art would not have been motivated to modify or replace the radial-lift loader arms of the Dingo 322 machine (described in the two Dingo references) with any of the vertical-lift loader arm configurations taught in Komatsu. And even if it had occurred to a person of ordinary skill in the art to do so, he or she would not have had a reasonable expectation of success. Indeed, the modifications proposed by the Office would have rendered the Dingo 322 compact tool carrier unsatisfactory for its intended purpose. Regardless, even if the modifications proposed by the Office were made, *the resulting compact tool carrier would not satisfy all of the limitations of the claims*. This fundamental fact alone requires that the Office withdraw the objection. Finally, secondary considerations of non-obviousness such as long felt need, failure of others, customer and industry praise, commercial success, skepticism of experts and unexpected results support the patentability of the claims.

B. AMENDMENT SUMMARY

Original claims 1-13 and 20 of the '386 Patent are subject to reexamination. Claims 15 and 17 as amended and claims 21-63 as added in Reexamination Control No. 90/013,915 are also subject to reexamination. The Patent Owner has amended claims 21 and 46. Claims 64-87 have been added, including new independent claims 70, 74, 78, 80, 83 and 86. Claims 1-15, 17 and 19-87 are pending with claims 1-13, 15, 17 and 20-87 being subject to examination in this reexamination proceeding. Claims 14 and 19 are not subject to the reexamination proceeding.

No new matter has been added. In particular, none of the amendments or new claims broadens the claim scope beyond the claims of the original patent. Each of the new independent claims incorporates each and every element of original claim 1 of the '386 Patent and therefore is not broader than original patent claim 1.

Support for the amendments and added claims can be found throughout the specification of the '386 Patent. In particular, support for the amendment to claim 21 may be found at column 4, lines 14-32 and Figures 1 and 3. Support for the

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amendment to claim 46 may be found at least at Figures 1-3 that show the location of the loader cross-member relative to the pivot points that are formed in the loader. Support for new claims 64, 65, 72, 76, 81 and 84 may be found at least at Figures 2-3 that show the operator platform extending from the mainframe with at least a portion of the operator platform being forward to the rear end of the mainframe. Support for new claims 66 and 68 may be found at column 3, lines 20-28 and Figures 1-3 and 5. Support for new claims 67 and 69 is shown at least at Figures 1-3 and 5 that show the pivot point at which the linkage is attached to the first side of the mainframe being disposed above the drive mechanism.

Support for new independent claim 70 may be found at column 3, lines 20-28 and Figures 1-3 of the '386 Patent that show the linkage pivot point being disposed above the portion of the tracks that angles downward from the drive sprocket toward to the front end of the mainframe. Possession of an invention may be shown "by disclosure of drawings . . . that are sufficiently detailed to show that applicant was in possession of the claimed invention as a whole." MPEP §2163(II)(A)(3)(a). Further, the drawings alone may provide written description of the invention under 35 U.S.C. §112. See, e.g., MPEP §2163(II)(A)(3)(a) and *Vas-Cath, Inc. v. Mahurkar,* 935 F.2d 1555, 1560, 19 USPQ2d 1111, 1114 (Fed. Cir. 1991) ("drawings alone may provide a 'written description' of an invention as required by Sec. 112"); *In re Wolfensperger,* 302 F.2d 950, 133 USPQ 537 (CCPA 1962) (the drawings of applicant's specification provided sufficient written descriptive support for the claim limitation at issue); *Autogiro Co. of Am. v. United States,* 384 F.2d 391, 398, 155 USPQ 697, 703 (Ct. Cl. 1967) ("In those instances where a visual representation can flesh out words, drawings may be used in the same manner and with the same limitations as the specification."). Support for new claim 71 may be found at column 4, lines 28-31 and Figures 1-3. Support for new claims 73, 77, 79, 82, 85, and 87 may be found at column 3, lines 20-28.

Support for new independent claim 74 may be found at column 3, lines 20-24 and 46-47; column 4, lines 28-31 and Figures 1-3 and 5 that show the relative positon of the first linkage pivot point, the second linkage pivot point and actuator pivot point relative to the tracks and the mainframe. Support for new claim 75 may be found at

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Figures 1-3 and 5 which show the forward linkage being above portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe.

Support for new independent claim 78 may be found at column 3, lines 20-24 and Figures 1-3 and 5 that show the tracks being spaced from the rear end of the mainframe and that show the operator platform extending from the mainframe with at least a portion of the operator platform being forward to the rear end of the mainframe.

Support for new independent claims 80 and 83 may be found at column 3, lines 20-28; column 5, lines 4-23 and Figures 1-3 and 5 that show the pivot point at which the linkage is attached to the mainframe being disposed above the tracks and that show the pivot point at which the actuator is attached to the mainframe being disposed above the rotational axis.

Support for new independent claim 86 may be found at column 2, lines 46-48; column 3, lines 20-28 and 46-47; column 4, lines 28-31 and Figure 3 that shows at least a portion of the attachment plate being forward of the drive mechanism when the loader is in the vertically raised positon.

C. REJECTIONS UNDER 35 U.S.C. §103

The Office has rejected claims 1-13, 15, 17, 20-36, 45-60 and 62-63 under 35 U.S.C. §103 as being obvious over the document entitled “Dingo 322, Dingo Compact Utility Loader, Operator’s Manual” (“Dingo 322 Operator’s Manual”), the document entitled “Dingo 322 Compact Utility Loader, Parts Catalog” (“Dingo 322 Parts Catalog” and collectively “Dingo 322”) in view of JP 11-140900 to Komatsu (“Komatsu”) (Ground 1). Claim 37 is rejected under 35 U.S.C. §103 as being obvious over the Dingo 322 Operator’s Manual and Dingo 322 Parts Catalog in view of Komatsu and in further view of the brochure entitled “Vermeer S600/S600TX” (“the Vermeer Brochure”) (Ground 2). Claims 38-44 and 55-63 are rejected under 35 U.S.C. §103 as being obvious over the Dingo 322 Operator’s Manual and Dingo 322 Parts Catalog in view of Komatsu and the Vermeer Brochure (Ground 3). The reexamined claims and new claims 64-87 are patentable over the cited references for the reasons set forth below.

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1. Claims 1-13, 21-22 and New Claims 64-65 are Not Obvious

Independent claim 1 is directed to a compact tool carrier for standing or walk-behind operator control. The compact tool carrier has a longitudinal axis and a mass of less than about 1500 kg and comprises:

> a loader having an arm, the loader being adapted to carry a tool;
>
> a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;
>
> a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;
>
> an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm; and
>
> a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

The Office articulates its rationale for obviousness of claim 1 over Dingo Parts Manual and Dingo Operator's Manual in view of Komatsu as follows:

> From the teachings of Komatsu, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the tool carrier of Dingo/Dingo Parts Catalog such that the loader arm was not directly attached to the mainframe and instead included a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm in order to change the trajectory of the tool or bucket from a

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> radial lift to a vertical lift. This would yield the predictable result of increasing the stability of the loader by reducing the front-to-back travel of the center of gravity of the tool or load.
>
> Page 6 of the Office action.

To reject a claim based on some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art references to arrive at the claimed invention, the Office must articulate the following:

> (1) a finding that there was some teaching, suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;
>
> (2) a finding that there was reasonable expectation of success; and
>
> (3) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

MPEP §2143(I)(G).

It would not have been obvious to one of ordinary skill in the art to make the modification proposed by the Office before the effective filing date of the claimed invention. The proposed modification of the Dingo 322 machine would have rendered it unsatisfactory for its intended purpose. Further, one of ordinary skill in the art would not have had a reasonable expectation of success in modifying Dingo 322 with the vertical-lift loader arm configuration of Komatsu.

Regardless, the modification of Dingo 322 proposed by the Office would not have yielded the claimed invention. Therefore, even if the Office believes that a person of ordinary skill in the art would have modified Dingo 322 in the manner suggested by the Office, the resulting compact tool carrier would not have satisfied all of the limitations of claim 1. For this reason alone, the rejection must be withdrawn.

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Finally, the objective indicia of non-obviousness demonstrate that the claimed subject matter would not have been obvious. The evidence shows a long-felt need for increased lift capacity. The industry failed to satisfy this long-felt need by developing a vertical-lift compact tool carrier (along with its substantial gains in lift capacity). Instead, the industry took incremental steps towards achieving minor improvements in lift-capacity. Further, the industry—including Toro and Vermeer—was skeptical as to whether a vertical-lift compact tool carrier could be successfully developed. The patented invention has also garnered industry praise and enjoyed significant commercial success. All of these facts further demonstrate that the claimed invention was not obvious to one of ordinary skill in the art as of the effective filing date of Vermeer's patent application.

i. The Prior Art

The Dingo Operator's Manual is a set of guidelines for operating a compact utility loader referred to as "Dingo 322". The compact utility loader shown in the Dingo 322 Operator's Manual includes a loader that is directly attached to the mainframe as shown in Figure 9 of the Dingo 322 Operator's Manual:

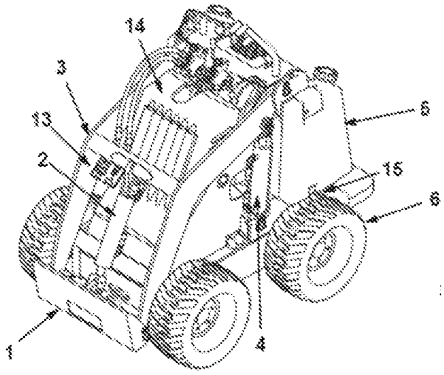
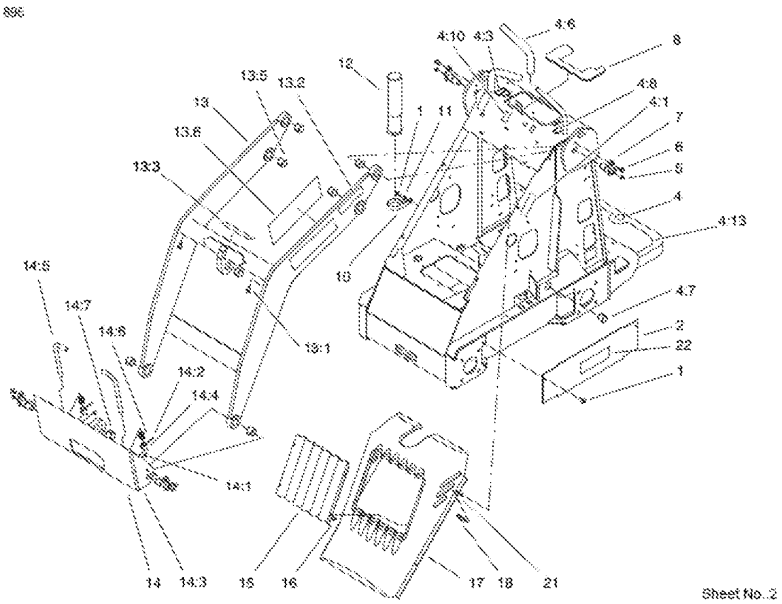


Fig. 9 of the Dingo Operator's Manual

The Dingo 322 Parts Catalog includes exploded part diagrams of various assemblies of a compact utility loader described as the "Dingo 322 Compact Utility Loader". The compact utility loader shown in the Dingo 322 Parts Catalog includes a

loader that is directly attached to the mainframe as shown on the “Frame and Loader Arm Assembly” set forth on page 1:



Page 1 of the Dingo Operator’s Manual

Komatsu describes and schematically illustrates a full-sized skid steer loader (i.e., in which the operator is seated during operation). Komatsu discussed conventional skid steers having a vertical lift configuration (Figs. 11 and 12) and a radial-lift configuration (Fig. 13). The stated objective of Komatsu was to improve on these conventional designs (paras. [0006]-[0007]). The skid steer loader of Komatsu is configured such that “it is possible to get on and off when in a loaded state” (Abstract).

On page 6 of the Office action, the Office references the embodiments shown in Figures 1 and 7 of Komatsu. Figure 1 of Komatsu includes a loader that is indirectly connected to the frame:

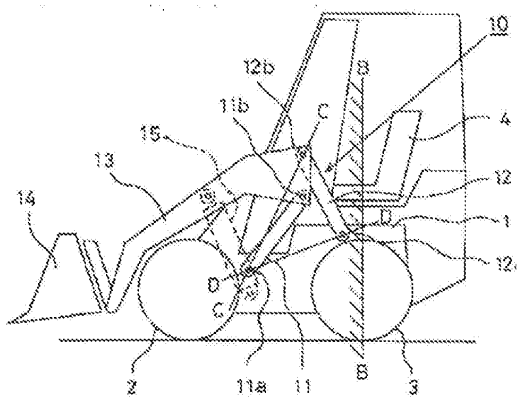


Figure 1 of Komatsu

First and second linkages are connected to the loader and the side of the frame and an actuator is connected to the loader and the front of the frame. Figure 7 of Komatsu includes a loader this is indirectly connected to the frame by first and second linkages connected to the side of the machine:

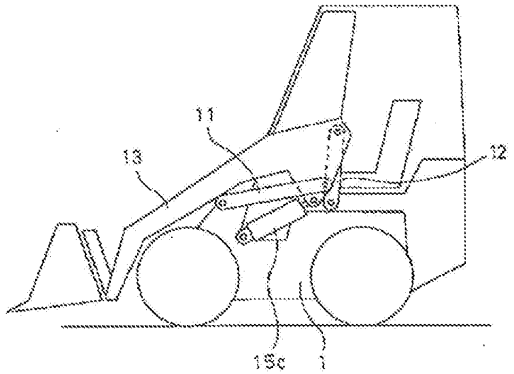


Figure 7 of Komatsu

ii. One of Ordinary Skill in the Art Would Not have Been Motivated to Modify the Dingo 322 Tool Carrier to Include the Vertical-Lift Loader Arm Configuration of Komatsu

a. The Office's proposed modification would have rendered the Dingo 322 unsatisfactory for its intended purpose.

"If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." MPEP 2143.01(V); *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Here the Office's proposed modification would render the Dingo 322 tool carrier unsatisfactory for its intended purpose.

Komatsu discloses six embodiments of a vertical lift loader. In particular, Komatsu shows an embodiment of a vertical lift loader in a lowered and raised position in Figures 1 and 5 and shows additional embodiments in Figures 6-10. One of ordinary skill in the art would not have modified Dingo 322 by using any of the Komatsu vertical-lift loader embodiments because the resulting machine could not be used for its intended purpose as a compact utility loader[1]. Figures A and B depict the Dingo 322 machine[2] as altered to include the loader of Figure 1 of Komatsu[3]. The depicted loader includes the bucket of Dingo 322.

---

[1] Dingo 322 was modeled without the fuel tank limiting the available space for linkages and actuators. The Dingo 322 fuel tank would further constrain the location of the linkages and actuators.

[2] As explained in the Prost-Domasky Declaration, the Dingo 322 mainframe shape and size was disclosed in the Dingo 322 Service Manual.

[3] To simulate the loader of Figure 1 of Komatsu (and of the additional embodiments shown below), the loader was scaled to position the bucket flat on the ground ahead of the wheels with the pivot points being positioned within the mainframe of Dingo 322. The depicted loader includes the same loader arm as Komatsu and includes the same arrangement of the linkages and of the actuator including the respective pivot point locations in the mainframe and in the loader arm.

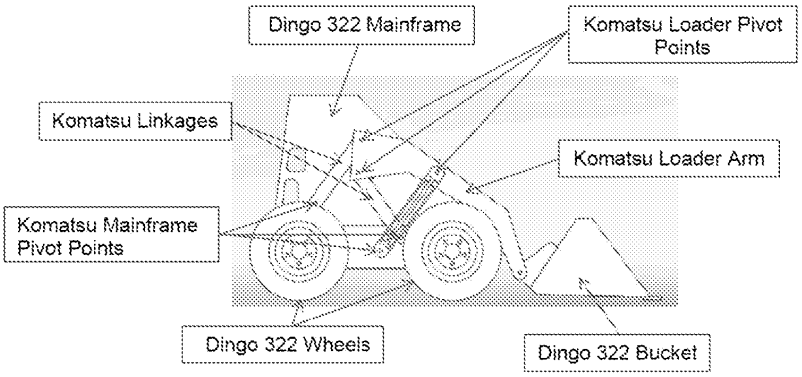


Figure A: Loader of Figure 1 of Komatsu on Dingo 322 in Lowered Position

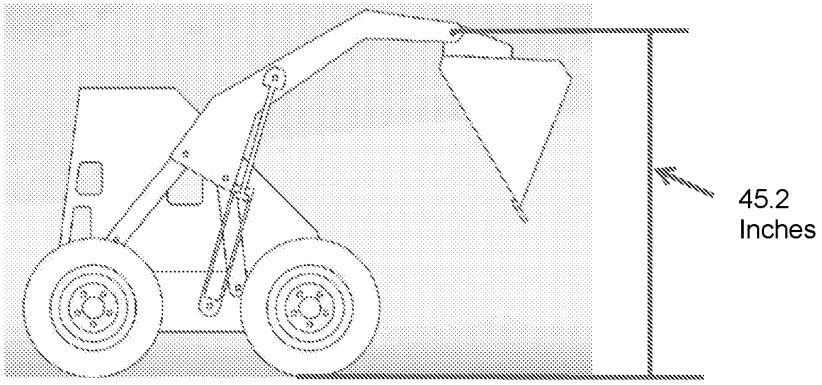


Figure B: Loader of Figure 1 of Komatsu on Dingo 322 in Raised Position

As explained in the Prost-Domasky Declaration, the height of loader in the raised position (i.e., the "hinge-pin" height, a common metric used in the industry) was measured using the known wheel-base measurement of Dingo 322 as a reference. When in the raised positon, the loader of Figure 1 of Komatsu would result in a hinge-pin height of 45.2 inches. As further explained below, this hinge pin height is insufficient for the machine to operate for its intended purpose as a compact utility loader.

The embodiments of the loader of Figures 6 and 8-10 of Komatsu when used on the Dingo 322 machine are shown in Figures C-F below:

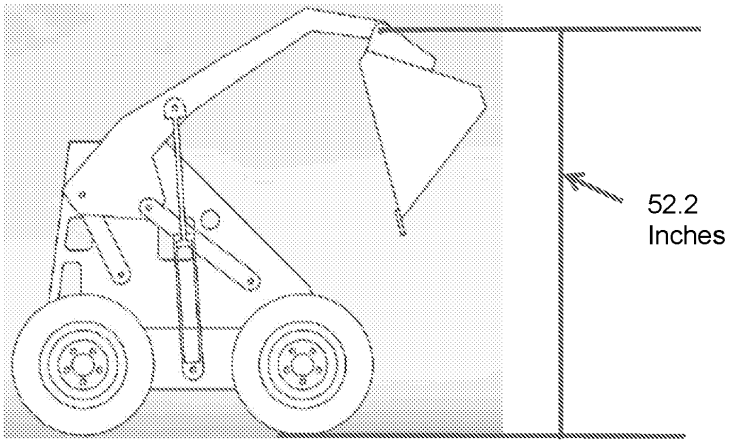


Figure C: Loader of Figure 6 of Komatsu on Dingo 322

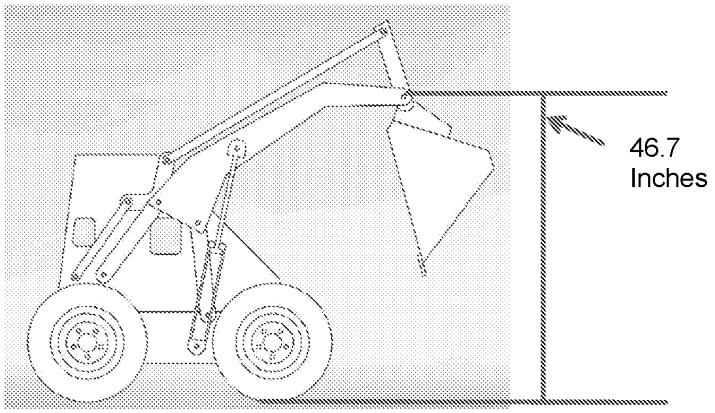


Figure D: Loader of Figure 8 of Komatsu on Dingo 322

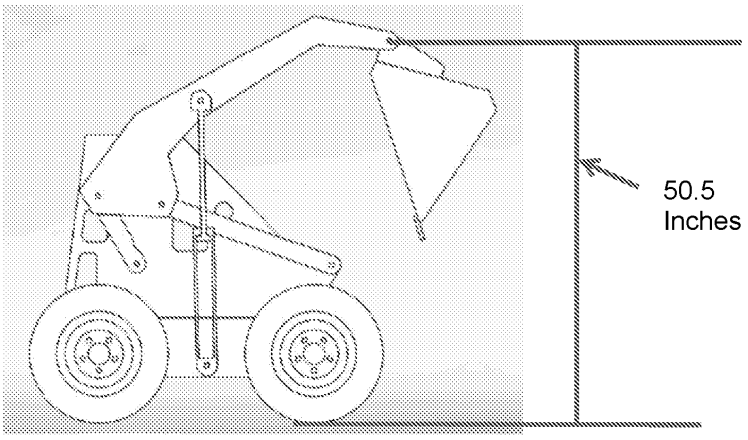


Figure E: Loader of Figure 9 of Komatsu on Dingo 322[4]

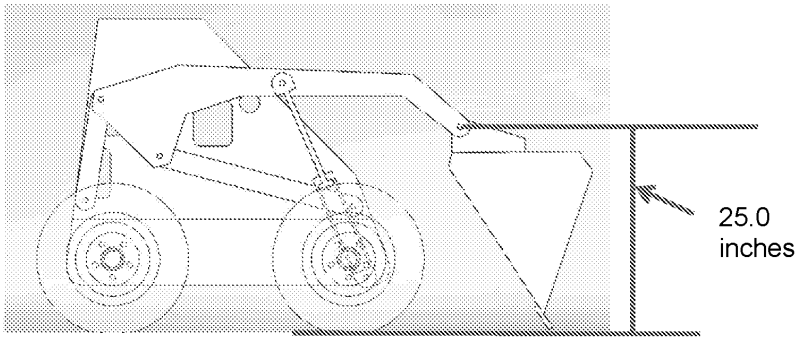
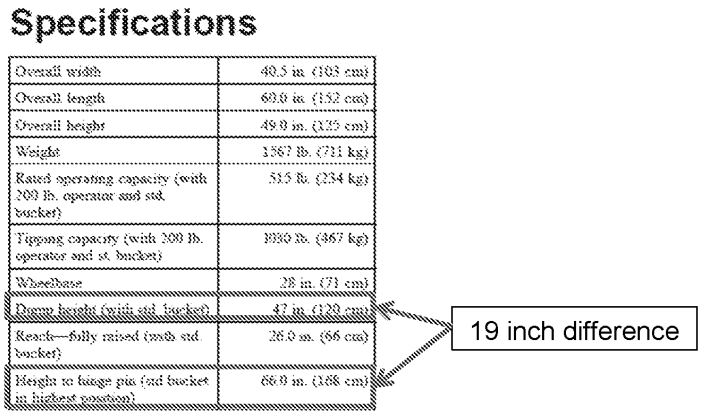


Figure F: Loader of Figure 10 of Komatsu on Dingo 322

The highest hinge-pin height of the embodiments of Figures 1, 6 and 8-10 of Komatsu on Dingo 322 would be the 52.2 inch hinge-pin height when the loader of Figure 6 is used (Figure C).

[4] As Figure 8 of Komatsu did not include a cylinder, a cylinder location was assumed to provide maximum lift height.

A hinge pin height of 52.2 inches and the resulting dump height of 33.2 inches[5] are inadequate height for a compact utility loader. Dingo 322 was designed to achieve a much higher hinge pin height of 66 inches and a dump height of 47 inches.



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As stated in the Hartke Declaration, a hinge pin height of 52.2 inches and a dump height of 33.2 inches are inadequate for a compact utility loader to dump a load into standard receptacles in its field of endeavor (e.g., landscaping) such as dumpsters and pick-up trucks. A hinge-pin height of 52 inches is insufficient to unload a pallet from most trucks and is incompatible with other attachments (e.g., augers used for digging holes) that require relatively high ground clearance. Indeed, of the various commercial compact utility loaders, the Patent Owner is not aware of any with a hinge-pin height of less than about 66 inches (see Table 1 below).

Model	Introduction Year	Hinge Pin Height (In.)
Bobcat MT52	2003	71.3
Bobcat MT55	2004	71.2

[5] With the Dingo 322 bucket, the dump height is 19 inches less than hinge pin height which results in a dump height of 33.2 inches (52.2 inches minus 19 inches).

Model	Introduction Year	Hinge Pin Height (In.)
Bobcat MT85	2015	80.9
Boxer 427	2005	70
Boxer 532DX	2008	76
Boxer 950HD	2016	95
Ditch Witch SK500	2003	81
Ditch Witch SK650	2006	81
Ditch Witch SK850	2014	83
Ditch Witch SK1050	2016	83
Ditch Witch SK1550	2017	94.5
Toro Dingo 322	1999	66
Toro Dingo TX420	2000	90.1
Toro Dingo TX525	2006	65.8
Toro Dingo TX1000	2015	81
Vermeer S600TX	2005	80
Vermeer S400TX	2007	69
Vermeer S450TX	2012	72
Vermeer CTX 50	2015	72
Vermeer CTX100	2016	88

Table 1. Sampling of Hinge Pin Heights of Commercial Compact Utility Loaders

As can be seen from Table 1, a hinge-pin height of 52.2 inches and a dump height of 33.2 inches are insufficient in the field of endeavor of compact utility loaders.

The embodiment of Figure 7 of Komatsu is also not suitable for use on Dingo 322. A principal consideration in the design of compact utility loaders is the reach of the loader at full height. Dingo 322 achieves a reach at full height of 26 inches when the bucket is rotated to 34° as shown in the Dingo Operator's Manual and the Dingo 322 Service Manual:[6]

Specifications

Overall width	40.5 in. (103 cm)
Overall length	60.0 in. (152 cm)
Overall height	49.0 in. (125 cm)
Weight	1567 lb. (711 kg)
Rated operating capacity (with 200 lb. operator and std. bucket)	515 lb. (234 kg)
Tipping capacity (with 200 lb operator and st. bucket)	1030 lb. (467 kg)
Wheelbase	38 in. (71 cm)
Dump height (with std. bucket)	47 in. (120 cm)
Reach—fully raised (with std. bucket)	26.0 in. (66 cm)
Height to hinge pin (std bucket in highest position)	66.0 in. (168 cm)

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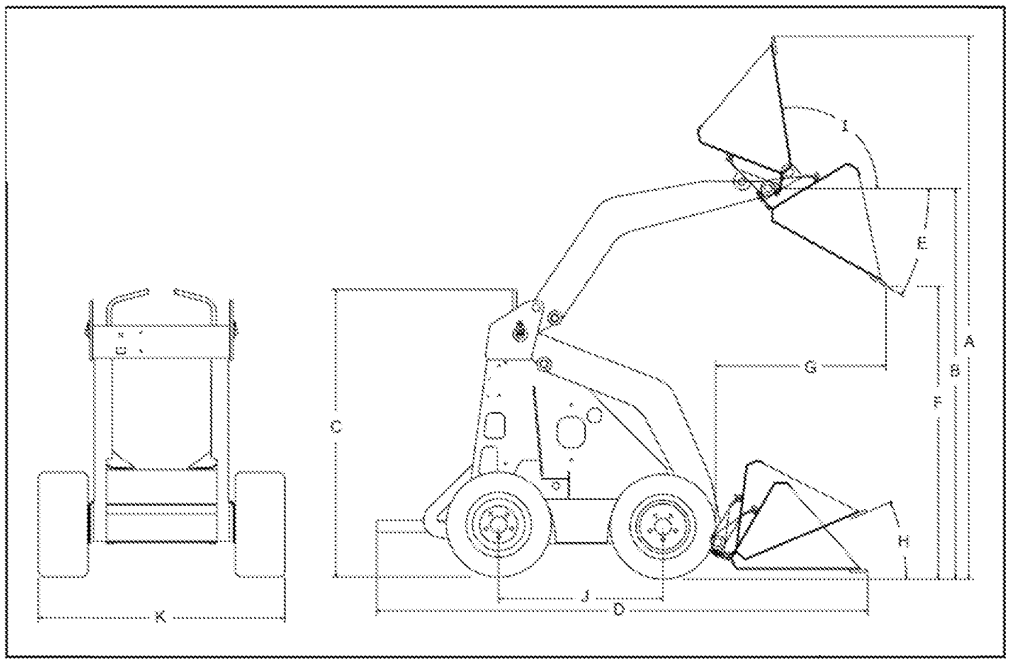
[6] The Dingo 322 Service Manual is being submitted herewith in an Information Disclosure Statement.

SPECIFICATIONS

Dimensions

A. Overall operating height, fully raised / 91.2" (2317mm)
B. Hinge pin height, fully raised / 66.0" (1676mm)
C. Overall height / 48.7" (1237mm)
D. Overall length / 82.2" (2088mm)
E. Dump angle / 34°
F. Dump height / 47.0" (1194mm)
G. Reach, fully raised / 26.0" (660mm)
H. Bucket rollback, ground position / 19°
I. Bucket rollback, fully raised / 97°
J. Wheelbase / 28.0" (711mm)
K. Overall width / 40.5" (1029mm)
X. Ground Clearance, front / 5.8" (147mm)
X. Ground Clearance, rear / 5.8" (147mm)
X. Reach, maximum / 28.0" (711mm)
X. Bucket rollback, carry position / 20°

X. = Dimension not shown



Page 2/1-2 of the Dingo 322 Service Manual

As shown in Figure G, use of the loader of Figure 7 of Komatsu on Dingo 322 results in a reach of only **9.6 inches** at full height with the bucket at a dump angle of 34°.

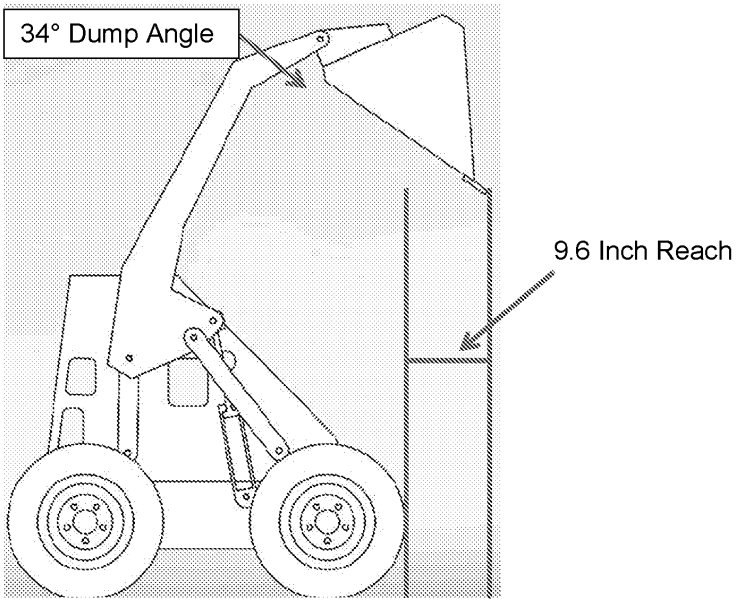


Figure G: Loader of Figure 7 of Komatsu on Dingo 322

Indeed, a reach of 9.6 inches is about half of the reach of commercial compact utility loaders as shown in Table 2:

Model	Introduction Year	Reach, Fully Raised (In.)
Bobcat MT52	2003	20.3
Bobcat MT55	2004	20.3
Bobcat MT85	2015	18.6
Toro Dingo 322	1999	26
Toro Dingo TX420	2000	21.8
Toro Dingo TX525	2006	21.8
Toro Dingo TX1000	2015	24.5

Model	Introduction Year	Reach, Fully Raised (In.)
Vermeer S600TX	2005	27.3
Vermeer S400TX	2007	21.8
Vermeer S450TX	2012	19.3
Vermeer CTX 50	2015	19.7
Vermeer CTX100	2016	22.6

Table 2. Sampling of Reach at Full Height of Commercial Compact Utility Loaders[7]

Because use of the loader of Figure 7 of Komatsu on Dingo 322 only achieves a reach of 9.6 inches when fully raised, the compact utility loader proposed by the Office would lack sufficient clearance between its front tires and the front of the bucket to discharge material into a pick-up truck or dumpster which is common in the field of endeavor of compact utility loaders (See Hartke Declaration).

The hinge pin heights that are achieved when the loaders of Figures 1, 6 and 8-10 of Komatsu are used on the Dingo 322 machine (45.2", 52.2", 46.7", 50.5" and 25.0", respectively) are unsatisfactory for the intended purpose of compact utility loaders. The reach at full height of the loader of Figure 7 of Komatsu when used on the Dingo 322 machine (9.6") is also unsatisfactory for the intended purpose of compact utility loaders. Therefore, "there is no suggestion or motivation to make the proposed modification." MPEP 2143.01(V); *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

b. One of ordinary skill in the art would not have had a reasonable expectation of success in making the modifications to the Dingo 322 proposed by the Office.

One of ordinary skill in the art would not have had a reasonable expectation of success in making the modifications to Dingo 322 proposed by the Office. Modifying the

[7] Table 2 includes models in which reach was published by the manufacturer or sourced internally by Vermeer.

configuration of the loader arms and related linkages results in unpredictable results. This is especially true in light of the small size and light weight of compact tool carriers.

As shown below, small changes to pivot points, weight distribution, and the like in compact tool carriers cause significant changes in the lift profile and lift capacity of the machine. The inventors experienced this unpredictability firsthand, as evidenced by the failures that occurred while developing the compact tool carrier of the '386 Patent despite resort to state-of-the-art tools. Finally, others in the industry expressly noted that there was no reason to expect success in achieving a vertical-lift compact tool carrier. Indeed, Toro itself noted that this would have been "difficult if not impossible." Because there was no reasonable expectation of success in achieving the modification proposed by the Office, the rejection must be withdrawn.

The unpredictability of modifying the loader arm configurations was apparent during development of the compact utility loader claimed in the '386 Patent. As described in the Hartke Declaration, Vermeer attempted several vertical lift loader arrangements that were unsuccessful. The Vermeer inventors first attempted the linkage and actuator arrangement shown in Figure H-1.

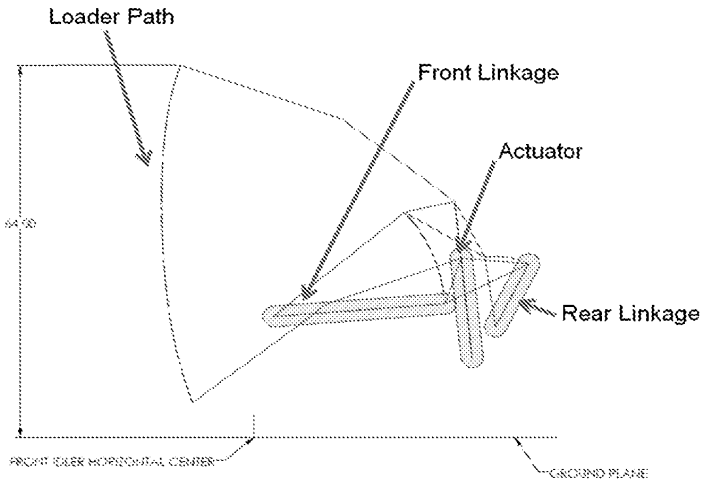


Figure H-1: Lift Path of the Initial Prototype

This resulted in the loading profile shown in Figure H-2[8]:

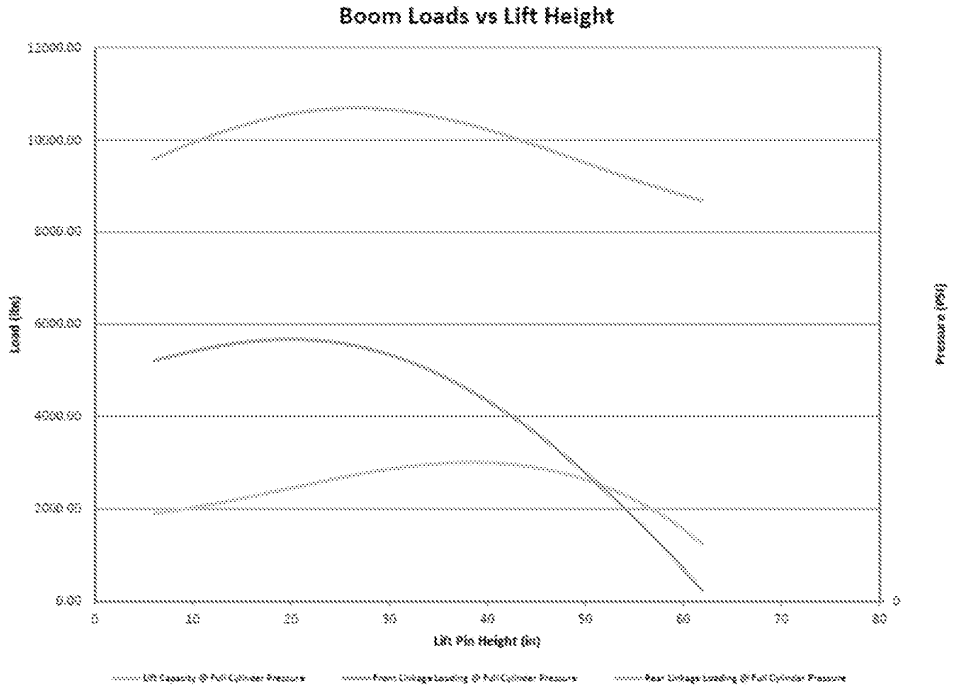


Figure H-2: Loading Profile of the Initial Prototype

To improve the stability of the initial prototype of the compact utility loader, the inventors attempted to lengthen the mainframe in a second modeled prototype[9] shown in Figure I-1.

[8] In Figures H-2, I-2 and J-2, the lift capacity is the lower curve, the front linkage loading is the middle curve, and the rear linkage loading is the highest curve.

[9] The second prototype was mathematically modeled in an attempt to scale up the first prototype and was not built due to the poor loading profile.

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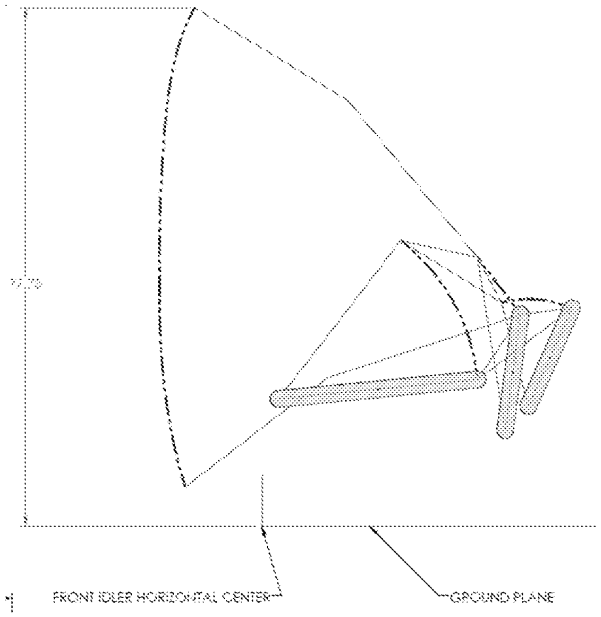


Figure I-1: Lift Profile of the Second Prototype

The inventors scaled up the linkages and actuators from the smaller initial prototype to the second prototype. Mere scaling, however, proved unsuccessful as shown in the lift profile of Figure I-2:

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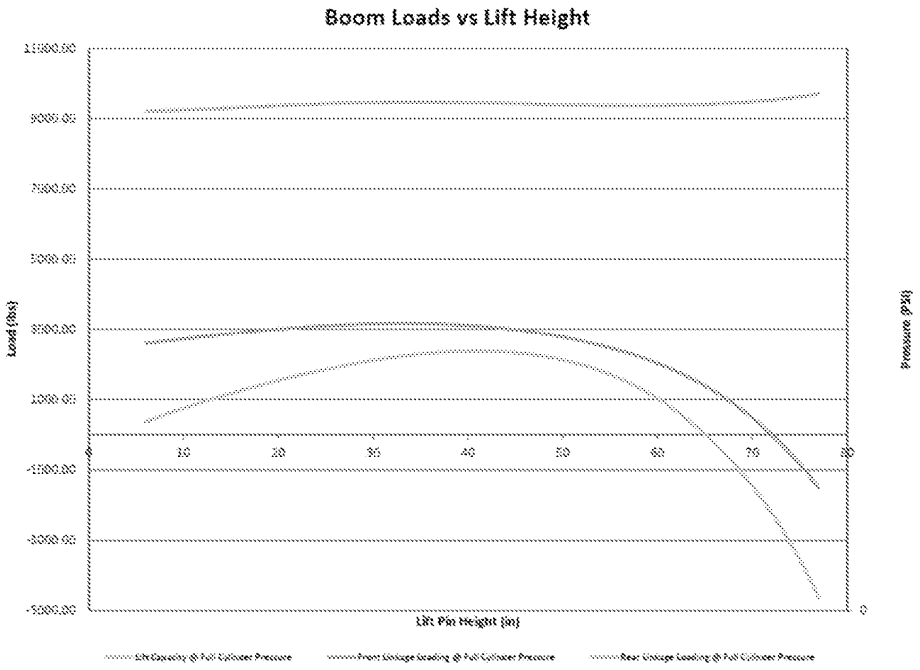


Figure I-2: Loading Profile of the Second Prototype

It was determined that the second prototype **would only be able to lift a load of 192 pounds** when the loader was lifted from the supporting surface, *which is nearly insufficient to even lift the weight of the bucket when empty*.

The inventors moved the pivot point in the actuator **slightly rearward** as shown in Figure J-1.

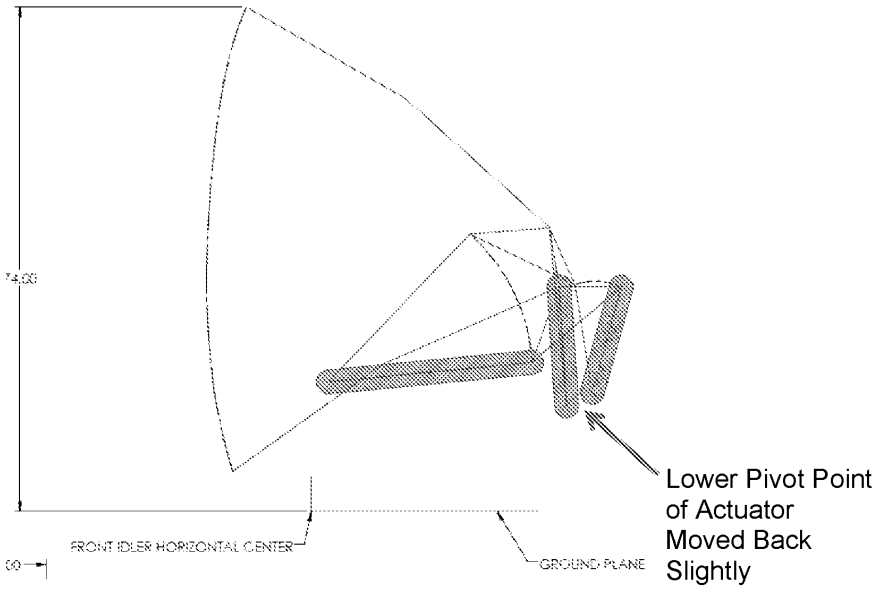


Figure J-1: Lift Profile of an Embodiment of the '386 Patent

This resulted in a much improved loading profile shown in Figure J-2:

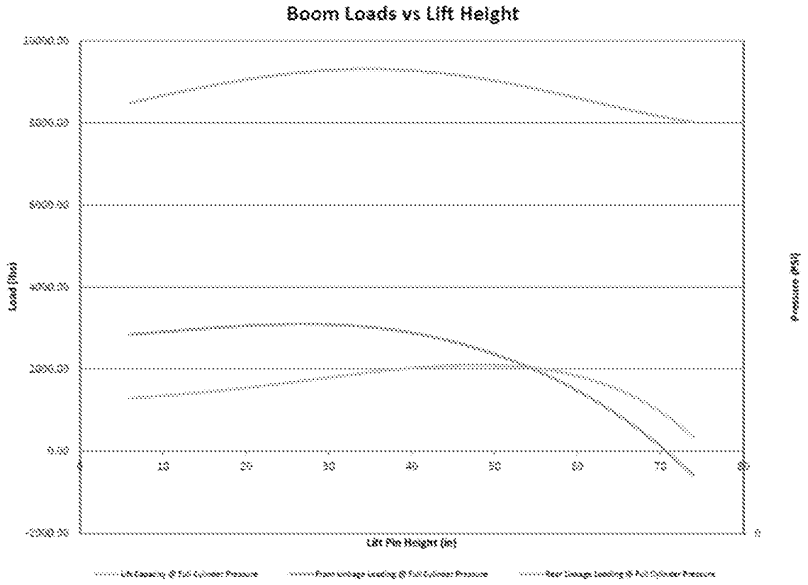


Figure J-2: Loading Profile of Third Prototype

The lift profile of Figure J-1 was incorporated into Vermeer's CTX50 commercial compact utility loader.

Because scaling up the linkages and actuators from the first prototype to the second prototype was not successful and because small changes in a single pivot point location caused significant changes in the lift profile, it is evident that development of a vertical-lift compact tool carrier is unpredictable.

The Vermeer inventors experienced many failures during development of the loader arrangement claimed in the '386 Patent. These failures are illustrated in the Figures below and in the presentation materials submitted during the Examiner Interview. These failures further evidence the unpredictability associated with modifying compact tool carrier loader arm configurations.

As explained in the Hartke Declaration, while developing a compact tool carrier that could support a vertical lift loader, the Vermeer Inventors experienced catastrophic fractures of the loader arms (Figure K).

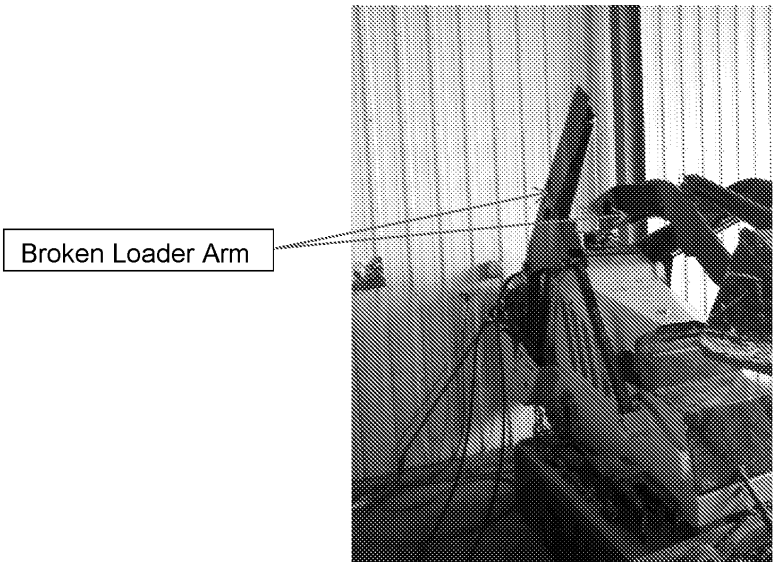


Figure K

The Inventors experienced breakage of pivot pin retainers (Figure L) and many retainers bent during testing (Figure M).



Figure L

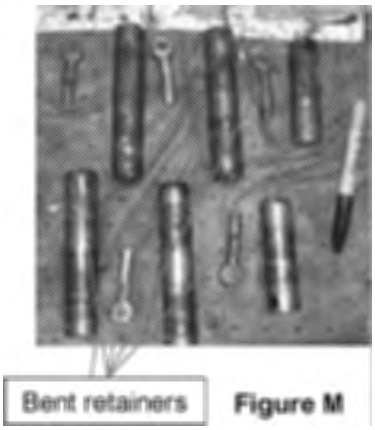


Figure M

These failures resulted from the loader arms not being directly attached to the mainframe of the loader as recited in claim 1 of the '386 Patent (see Hartke Declaration). These failures are strong evidence that the field of endeavor of the '386 Patent is unpredictable.

Toro, the Requester of this *Ex Parte* Reexamination, recognized that there is no expectation of success in incorporating a **vertical lift loader arm** such as that of Komatsu onto a compact utility loader such as Dingo 322 because the compact utility loader lacks the space to accommodate the large loader arms of full sized skid steers. Toro, as Applicant of U.S. Patent Publication No. 2016/0244937, admits that:

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> **[0007]** Finally, the vertical reach of the loader arms on compact utility loaders is somewhat limited. While high lift loader arms are known on full size skid steer loaders as disclosed in U.S. Pat. No. 5,542,814, the use of such high lift loader arms on a compact utility loader has been considered difficult if not impossible due to size and durability constraints. Accordingly, it would be a further advance in the art to provide a way of safely and durably providing high lift loader arms on compact utility loaders to extend the vertical reach of such loaders. For example, this would allow a compact utility loader to dump debris or materials at higher elevations than previously, thus allowing the use of larger trucks to accept such debris or materials for transport.

Toro's admission in U.S. Patent Publication No 2016/0244937 that incorporation of a vertical lift loader arm such as that of Komatsu onto a compact utility loader such as Dingo 322 "*is difficult if not impossible*" is compelling <u>evidence</u> that there is no expectation of success in making the modification proposed by the Office[10]. The statement by Toro proves that others of ordinary skill in the art recognized that the inventive design was difficult or impossible. They also recognized that the loader arms of compact tool carriers needed to have a small profile so as to not reduce the field of vision of operators positioned toward the rear of the machine:

[10] US Patent Publication No. 2016/0244937 has a priority date of February 20, 2015, and is not prior art against the '386 Patent. Toro's admission in U.S. Patent Publication No. 2016/0244937 must be considered by the Office because references that provide factual evidence need not antedate the priority date of the '386 Patent. See MPEP §2124 which states that references that are cited to show certain facts need not antedate the filing date.

> The present invention relates to a small loader that is manually operated by a standing operator at the rear of the loader. The loader has a low lift arm profile, so that an operator standing at the rear of the loader can see the work area. The low profile lift arms aid side-to-side visibility.
>
> Various small self-propelled loaders have been advanced, where an operator will either stand or walk on the ground behind the loader or stand on a platform on the loader frame to manipulate the work element that is attached to the forward ends of pivoting lift arms.
>
> These loaders find utility in small load applications, where loads that are too heavy for a person to lift can be hoisted. The ability of the loaders to be operated in small areas is important. Ease of manipulation of the bucket or work tool, as well as the ability to see the work that is being carried out is also important.

U.S. Patent No. 6,695,568, col. 1, lines 6-21

One of ordinary skill in the art would not expect the relatively large loader arms of a vertical lift loader to operate on a substantially smaller compact utility loader with any expectation of success. "Evidence showing there was no reasonable expectation of success may support a conclusion of nonobviousness." MPEP §2143.02(II). The lack of a reasonable expectation of success is a critical factor in the obviousness rationale:

> Many basic approaches that a practitioner may use to demonstrate nonobviousness also continue to apply in the post-KSR era. Since it is now clear that a strict teaching-suggestion-motivation approach is not the only way to establish a prima facie case of obviousness, it is true that practitioners have been required to shift the emphasis of their nonobviousness arguments to a certain degree. However, familiar lines of argument still apply, including teaching away from the claimed invention by the prior art, **lack of a reasonable expectation of success**, and unexpected results. Indeed, they **may have even taken on added importance** in view of the recognition in KSR of a variety of possible rationales.
>
> MPEP §2145; Emphasis added.

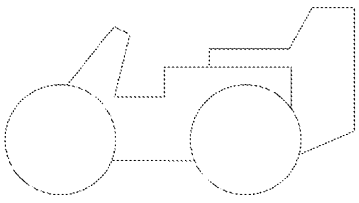
During the October 24, 2018 interview, the Examiner noted that he considered the mainframe of Komatsu and the mainframe of Dingo 322 to be similar and that this similarity furthered the *prima facie* case of obviousness. In fact, however, the mainframes of Komatsu and Dingo 322 are not similar. As appreciated by those of skill in the art and as shown in Figure N below, the protective cage in which the operator sits in the loader of Komatsu does not support the loader and does not form part of the mainframe.



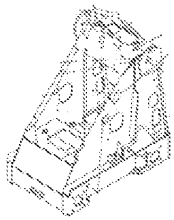
Figure N: Example Skid Steer

See also Hartke Declaration; US 6,643,563 at col. 1, lines 17-20 (a Komatsu patent, which specifies that "Earth-moving machines are composed of a frame mounted on four wheels . . . and a cab for housing an operator, *mounted on the frame*").

As shown in the Figures below, the Komatsu mainframe is elongated and does not extend toward the top of the machine while the mainframe of Dingo 322 is more angular and extends upward toward the top.



Komatsu Mainframe



Dingo 322 Mainframe

As shown, the Komatsu mainframe and the Dingo 322 mainframe are quite dissimilar. In light of these differences, one of ordinary skill would not have predicted that substituting radial lift of the Dingo 322 mainframe with the vertical lift loader arm configuration of Komatsu would work.

iii. The Proposed Combination Does Not Include Each Feature of Claim 1

Regardless of whether one of ordinary skill in the art would have modified the Dingo 322 compact tool carrier in the manner suggested by the Office, *the resulting combination would not have had all of the required elements of claim 1*. Specifically, the proposed combination would not have satisfied the limitation that the engine bracket be "spaced from the rear end of the mainframe." For this reason alone, the rejection should be withdrawn.

With reference to Figure 6 of the '386 Patent, in which an example mainframe of a compact tool carrier is shown, claim 1 recites a compact tool carrier having a mainframe 10 with an engine bracket 60 that extends from the first side toward the second side of the mainframe 10 for mounting an engine to the mainframe. The engine bracket 60 is **spaced from the rear end of the mainframe**.

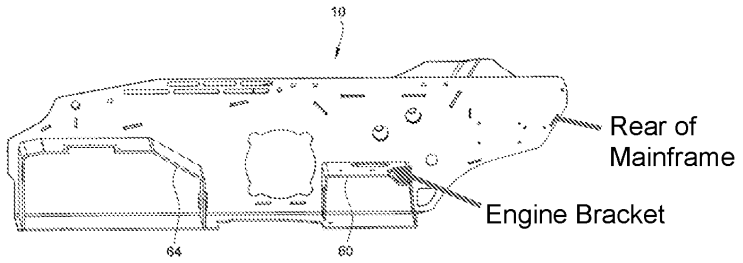
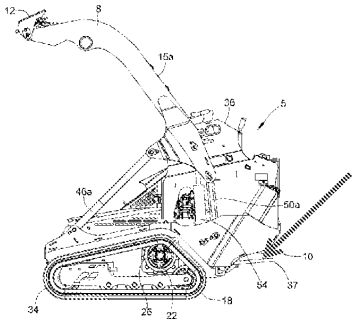


Fig. 6 of the Application

By spacing the engine bracket 60 from the rear of the mainframe 10, the operator platform may be brought forward such that the mainframe surrounds at least a portion of

the operator platform (see dependent claim 65). This provides a protective pocket to guard the operator.



Operator platform 37 set forward from rear of mainframe 10 to provide a protective pocket for operator

Fig. 3 of the Application

As discussed further below, the engine bracket of Dingo 322 is not spaced from the rear of the mainframe, as recited in claim 1. Because the engine bracket is not spaced from the rear of the mainframe, the operator platform is not capable of being set forward from the rear of the mainframe to form a protective pocket for the operator of the machine.

The Office states on page 5 of the Office action that Dingo 322 includes an engine bracket spaced from the rear of the mainframe as shown in Figure 9 of the Dingo 322 Operator's Manual and/or Figure 4 of the Dingo 322 Parts Catalog which show "an engine bracket ahead of the rear end of the operator platform and/or of the rear ends of the triangular gussets".

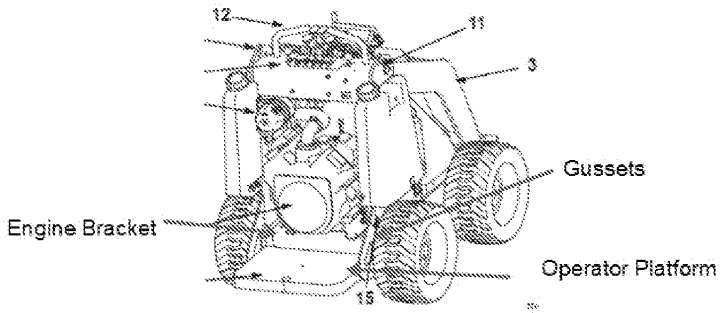


Fig. 9 of Dingo Operator's Manual

As best understood by the Patent Owner, the Office considers the operator platform and triangular gussets to be part of the mainframe. This interpretation is incorrect due to both the intrinsic evidence (e.g., the specification of the '386 Patent) and extrinsic evidence (e.g., evidence of how those having ordinary skill in the art understand the meaning of "mainframe"). Even under a broadest reasonable interpretation, this interpretation is incorrect.

"Mainframe" is used in the '386 Patent to describe the **body of the compact tool carrier that supports the loader**. This is how the specification uses the term "mainframe." For example, the specification uses "body" and "mainframe" interchangeably:

> In the illustrated embodiment, the control station 36 is attached to an upper frame 39 (FIG. 7) that is attached and supported by the mainframe 10. In other embodiments, rather than being integrated as one unit in the compact tool carrier 5, the control station 36 is separate from the **body (e.g., mainframe)** of the carrier and is operated remotely. In such embodiments, the control station 36 may be wired or may operate wirelessly to propel the carrier 5 and/or raise and lower the loader 8.
>
> Col. 3, line 62 to col. 4, line 3; Emphasis added.

This is consistent with the plain meaning of words "main" and "frame." "Frame" simply means a rigid supporting structure. (Oxford Dictionary – submitted herewith in an Information Disclosure Statement) (defining the noun "frame" as "the rigid supporting structure of a vehicle, aircraft, or other object"). And the addition of "main" to "frame" simply indicates that this frame is the primary—or most important—frame of the vehicle. *Id.* (defining the adjective "main" as "chief in size or importance"). "[W]ords of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification." MPEP 2111.01. Because neither the operator platform nor gussets form the body of the machine that supports the loader, the operator platform and gussets cannot be part of the mainframe.

The specification of the '386 Patent demonstrates that the operator platform is separate from the mainframe. For example, the mainframe 10 is shown in Figures 4-6 of the '386 Patent and, significantly, the operator platform is not shown in any of these Figures:

"Fig. 4 is a **perspective view of the mainframe** of the compact tool carrier" (col. 2, lines 31-32; Emphasis added):

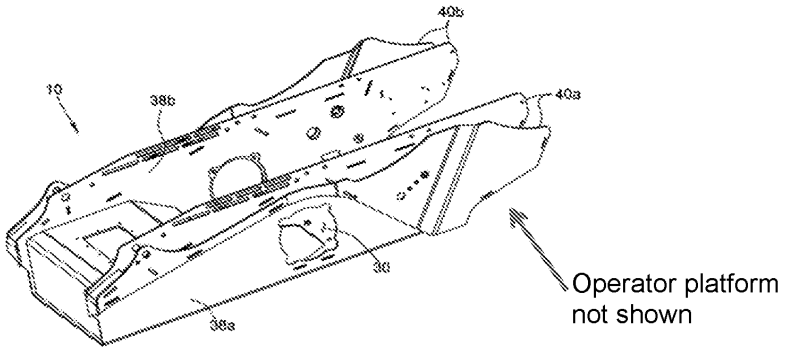


Figure 4 of the Application

* * * * *

"Fig. 5 is a **side view of the mainframe** and loader of the compact tool carrier" (col. 2, lines 33-34; Emphasis added):

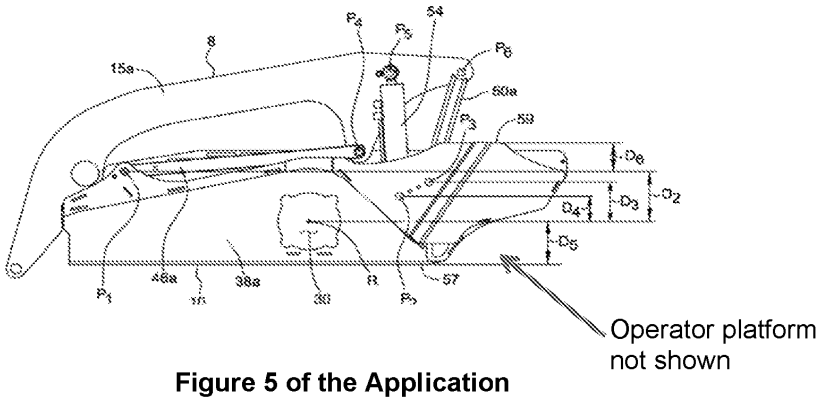


Figure 5 of the Application

* * * * *

"Fig. 6 is a cross-section **side view of the mainframe**" (col. 2, line 35):

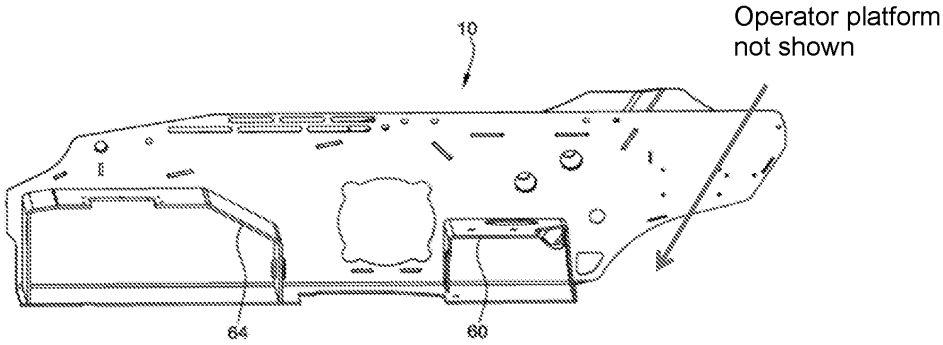


Figure 6 of the Application

* * * * *

"Fig. 7 is an **exploded view of the mainframe** and upper frame of the compact tool carrier." (col. 2, lines 36-37):

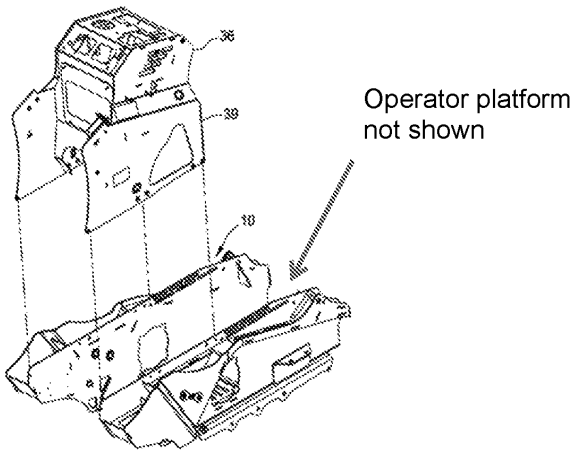


Figure 7 of the Application

Further, the specification states that the supporting platform is a component of the compact tool carrier rather than a sub-component of the mainframe:

> In the illustrated embodiment, the **compact tool carrier 5 includes an operator platform 37** . . .

Col. 3, lines 43-45; Emphasis added.

The claims of the '386 Patent themselves also demonstrate that the operator platform is not part of the mainframe. For example, claim 1 recites that the engine bracket is part of the mainframe ("mainframe comprising an engine bracket") while dependent claim 9 states that that the *compact tool carrier* comprises the operator platform ("compact tool carrier comprising an operator platform").

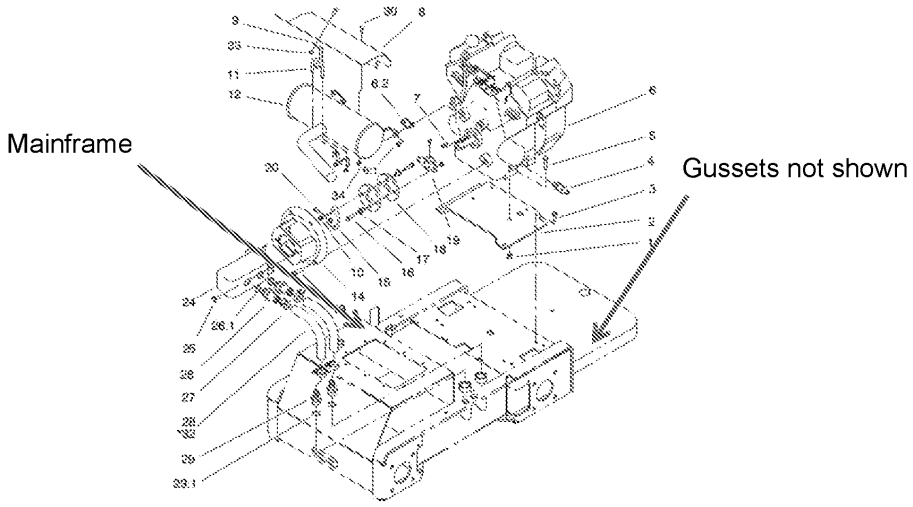
Toro, the Requester, as Applicant of US 7,980,569, provides further evidence that the operator platform is not part of the mainframe by indicating that the operator platform is separate from the mainframe which requires the operator platform to be attached to the mainframe. US 7,980,569 states that the operator platform is separate

from the mainframe such that the platform is attached to the mainframe even in embodiments in which the operator platform is *welded* to the mainframe:

> While shown as utilizing the attachment apparatus, other embodiments may attach the platform assembly 200 to the vehicle in other ways, e.g., **welding**, quick-attach mechanisms, etc. Such other methods may eliminate the need for one or both of the mounting plate 206 and attachment members 204 and permit **attachment of the platform assembly directly to the frame 102**.
>
> Col. 5, line 66 to col. 6, line 5; Emphasis added.

The Hartke Declaration is further evidence that the gussets and the operator platform are not part of the mainframe. As stated in the Hartke Declaration, those of skill in the art consider the mainframe of a compact tool carrier to be the body of the machine that supports the loader. Because the triangular gussets and operator platform of Dingo 322 do not support the loader, the gussets and platform are not considered to be part of the mainframe.

The Dingo 322 Parts Catalog demonstrates that the gussets of Dingo 322 are not part of the mainframe. In particular, in Figure 4 of the Dingo 322 Parts Catalog, the mainframe is shown and the gussets are *not* shown.



Sheet No. 4 of Dingo 322 Parts Catalog

The figures, specification, and claims of the '386 Patent indicate that components of the compact tool carrier that do not support the loader are not part of the mainframe. This is consistent with the understanding of those of skill in the art including the Requester as evidenced by US 7,980,569 and as evidenced by the Hartke Declaration. "**Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification**. The plain meaning of a term means the ordinary and customary meaning given to the term by those of ordinary skill in the art at the time of the invention. The ordinary and customary meaning of a term may be evidenced by a variety of sources, including **the words of the claims themselves, the specification, drawings, and prior art. . . .**The words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification. MPEP §2111.01. For at least these reasons, the gussets and operator platform of Dingo 322 are not part of the mainframe.

As shown in Figure 9 of the Dingo Operator's Manual, the engine bracket is ***at*** the rear of the mainframe, not spaced from the rear of the mainframe as recited in claim 1:

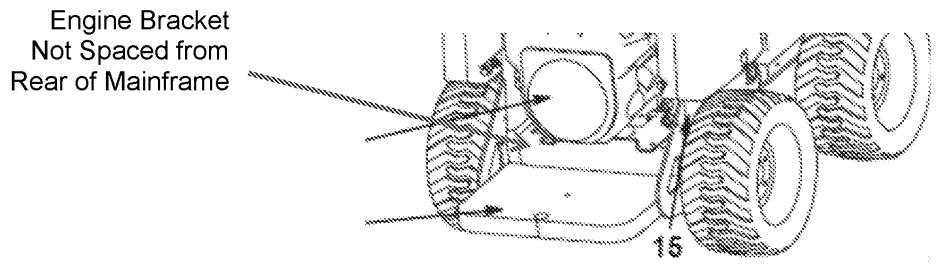


Fig. 9 of Dingo Operator's Manual

For at least this reason, the Office has failed to establish that the prior art included each claimed element and the rejection must be withdrawn. MPEP §2143(I)(A).

iv. Objective Evidence of Non-Obviousness Indicate Patentability

Secondary considerations of non-obviousness such as long felt need, failure of others, customer and industry praise, commercial success, skepticism of experts and unexpected results support the patentability of independent claim 1 over Dingo 322 in view of Komatsu. "Objective evidence relevant to the issue of obviousness must be evaluated by Office personnel. *Id.* at 17-18, 148 USPQ at 467. Such evidence, sometimes referred to as 'secondary considerations,' may include evidence of commercial success, long-felt but unsolved needs, failure of others, and unexpected results. The evidence may be included in the specification as filed, accompany the application on filing, or be provided in a timely manner at some other point during the prosecution." MPEP §2141(II). "Consideration of rebuttal evidence and arguments *requires* Office personnel to weigh the proffered evidence and arguments." MPEP §2145.

a. Long Felt Need and Failures of Others

Compact utility loaders have been under commercial development for over 30 years. Throughout this period, manufacturers continually have attempted to increase lift capacity of compact utility loaders without sacrificing machine weight and maneuverability. This is evident from Figure O which shows the ratio of the tipping

capacity of compact utility loaders to the weight of the loaders as new models of compact utility loaders were introduced to the market.[11]

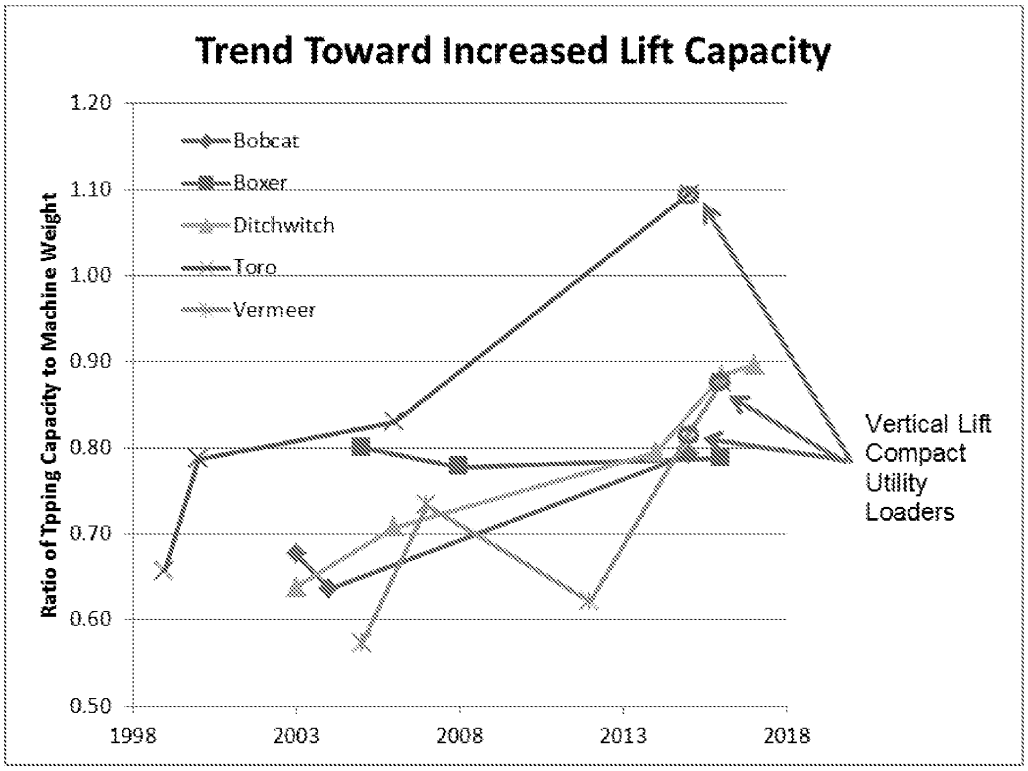
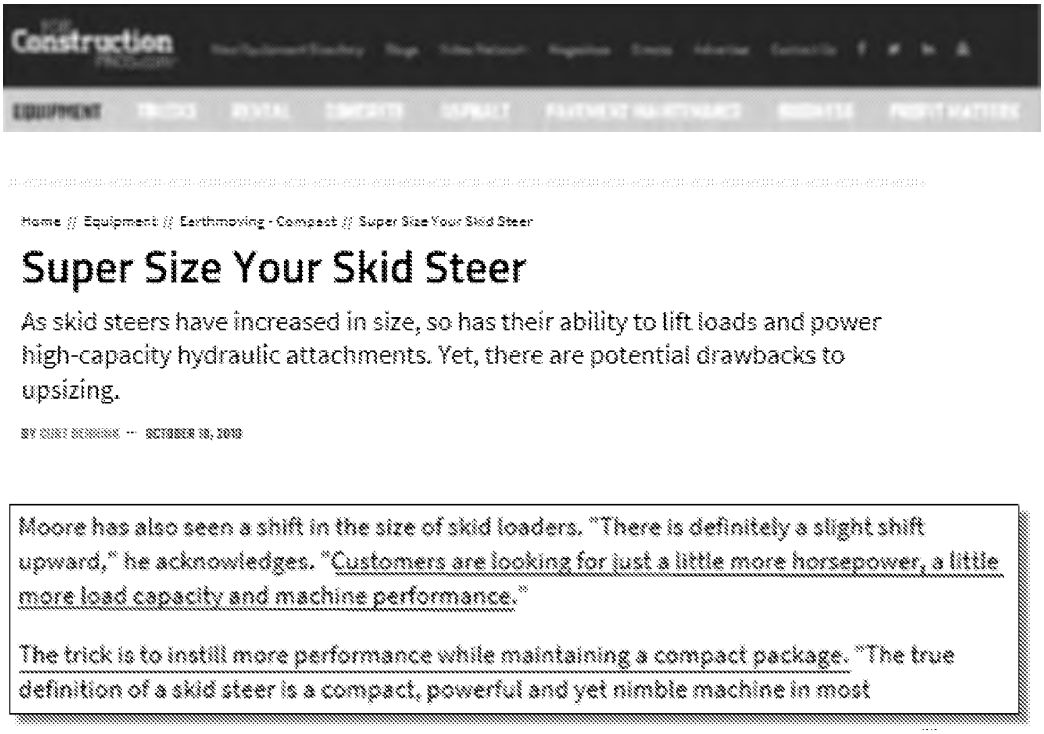


Figure O

The need for increased lift capacity without sacrificing machine weight is recognized by those of skill in the art (see also the Hartke Declaration):

[11] The following models are depicted in Figure O: Bobcat MT52, MT55, MT85; Boxer 427, 532DX, 950HD; Ditch Witch SK500, SK650, SK850, SK1050, SK1550; Toro Dingo 322, Dingo TX420, Dingo TX525, Dingo TX1000; and Vermeer S400TX, S450TX, CTX50, CTX100.



Home // Equipment // Earthmoving - Compact // Super Size Your Skid Steer

Super Size Your Skid Steer

As skid steers have increased in size, so has their ability to lift loads and power high-capacity hydraulic attachments. Yet, there are potential drawbacks to upsizing.

Moore has also seen a shift in the size of skid loaders. "There is definitely a slight shift upward," he acknowledges. "Customers are looking for just a little more horsepower, a little more load capacity and machine performance."

The trick is to instill more performance while maintaining a compact package. "The true definition of a skid steer is a compact, powerful and yet nimble machine in most

Figure I

Despite this need for increased lift, the industry turned to solutions other than vertical lift loaders. For example, manufacturers have shifted from "walk-behind" machines to predominantly "ride-on" machines. Manufacturers of ride-on machines are permitted to incorporate an average weight of an operator (165 lb standard) in the tip capacity testing which generally increases the rated lift capacity.

Other manufacturers have included "weight kits" that add weight to the back of the machine to increase lift capacity while sacrificing ground clearance and machine length (Figure P).





Weight Added toward Rear of Compact Tool Carrier

Figure P

Commercial users have even bolted their own counter-weights near the rear of the machine to increase lift capacity (Figure Q):



Weight Added by Customers

Figure Q

Prior art patents even have addressed the problem of increased lift capacity while maintaining the compact design of the machines. For example, U.S. Patent No. 6,695,568 discloses use of "far rear pivot points to increase the lift capacity:

> The far rear pivot of the lift arms permits using a longer arm on the same length machine. This increases the lift capacity for the same size actuator and there is a longer arc of movement. This means that the bucket or tool moves more vertically as it initially raises, rather that having a pronounced arcuate path that causes the bucket to move forward a significant amount as it starts to lift.

U.S. Patent No. 6,695,568; col. 1, lines 48-54.

U.S. Patent No. 7,494,314 discloses use of pivotal lift arms to allow the load carried by the compact tool carrier to be moved over the loader frame:

> A loader has lift arms that are used for mounting a number of different attachments. The attachments can be mounted to the rear of the forward end of the lift arms in order to move the center of gravity of the attachment more directly over the loader frame. Various types of attachments can be used, as shown, and can be controlled to be pivoted for dumping or loading, and can be raised and lowered on the lift arms.

U.S. Patent No. 7,494,314; abstract.

These attempts by others have resulted, at best, in marginal increases in the rated lift capacity of the compact tool carrier.

In comparison, by changing design from a radial lift compact utility loader to a vertical lift compact utility loader in which the loader is connected to the mainframe by a linkage and actuator as set forth in claim 1 of the '386 Patent, a ***32% increase*** in the rated operator capacity was achieved without significantly increasing the weight of the vehicle. The objective evidence establishes a long-felt need for increased lift capacity in compact utility loaders that was not satisfied by the attempts of others. This is clear objective evidence of the nonobviousness of claim 1 (See MPEP §2141(II)).

b. Customer and Industry Praise

Both Toro (the Requester) and other third parties have indicated that the compact tool carrier of independent claim 1 of the '386 Patent is a commercially

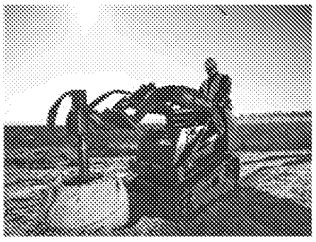
successful product with the success of the product being directly tied to the vertical-lift arrangement of the compact tool carrier. CompactEquip.com referred to the commercial product ("the CTX50") as a "game-changer" and directly linked the enhancements to the new vertical-lift arrangement of the loader:

> (http://compactequip.com/features/innovative-iron-awards-toro-vermeer-compact-tool-carriers/attachment/vermeer-compact-tool-carrier/)The Vermeer (http://vermeer.com) CTX50 boasts a 600-lb ISO-rated operating capacity and a tipping capacity of 1,715 lbs due to its vertical-lifting path. The vertical-lift path is designed to keep the load closer to the machine, allowing it to lift more than a similar-sized compact tool carrier with a radial-lift path. A vertical-lift path also provides a higher lift height. These enhancements along with the Vermeer exclusive single pilot-operated joystick and stand-on platform make the CTX50 a game-changer in the rental and landscape market.

Toro incorporated the vertical lift arrangement of claim 1 of the '386 Patent in its "Dingo TX 1000" compact tool carrier. Both the Vermeer CTX50 and Dingo TX 1000 received an "Innovative Iron Award" for the new lifting pattern and were said to "set the bar for innovation":

INNOVATIVE IRON AWARDS: TORO AND VERMEER COMPACT TOOL CARRIERS

Exploration is the engine that drives innovation, so let's go exploring. Let's search through a year's worth of creative ideas in the off-highway equipment industry and see if we can benchmark the innovative exploration of the American machine market. Over the last 12 months, global manufacturers from [illegible] to [illegible] have released compact machines that have set new standards for power, versatility, efficiency and design. Our editors have traveled across the globe to meet these manufacturers, operate their new products and give detailed reports and opinions both in print and on our website (compactequip.com). We sifted through the hundreds of models and brands released in 2015 and picked 19 units that set the bar for innovation. With this article, we salute those companies (from [illegible] to [illegible]) that have changed the commercial equipment market over the last year with their unique, interesting and innovative machines, engines and technologies.



TORO AND VERMEER BRING A NEW LIFTING PATTERN TO CTCS

Toro also notes that the vertical lift design "allows it to lift more weight" and that Toro "doubled the capacity of our current loaders" (https://www.equipmentworld.com/toros-new-vertical-lift-dingo-tx-1000-lays-claim-to-strongest-compact-utility-loader-on-the-market-photos/). Toro has also stated (in a marketing video published on YouTube) that the "vertical lift loader arms are **really unique** . . ."



"vertical loader arms which are really unique. . . "

https://www.youtube.com/watch?v=ckMKUkizcF8

Praise by Toro and other third parties of the vertical lift arrangement in which the loader is not directly attached to the mainframe as set forth in claim 1 of the '386 Patent that is incorporated in the CTX50 and Dingo TX1000 machines is further evidence of nonobviousness of independent claim 1. By attributing the increase in lift capacity to the vertical-lift design—as required by claim 1 of the '386 Patent (i.e., a machine in which the loader is connected to the mainframe by a linkage and actuator and the loader arm is not directly attached to the mainframe)—"nexus" between the commercial success and the claimed invention has been established (See MPEP §2145).

c. Commercial Success

The compact utility loader of claim 1 of the '386 Patent has been a commercial success. Since their introduction into the market on 2015, vertical-lift compact utility loaders have taken market share from radial-lift vertical loaders. In 2015, vertical lift compact utility loaders made up 11% of all compact utility loader unit sales of the Patent Owner (see Figure R). Vertical lift has continued to take market share from radial lift. In 2018, vertical lift compact utility loaders made up *37%* of all compact utility loader unit sales of the Patent Owner.

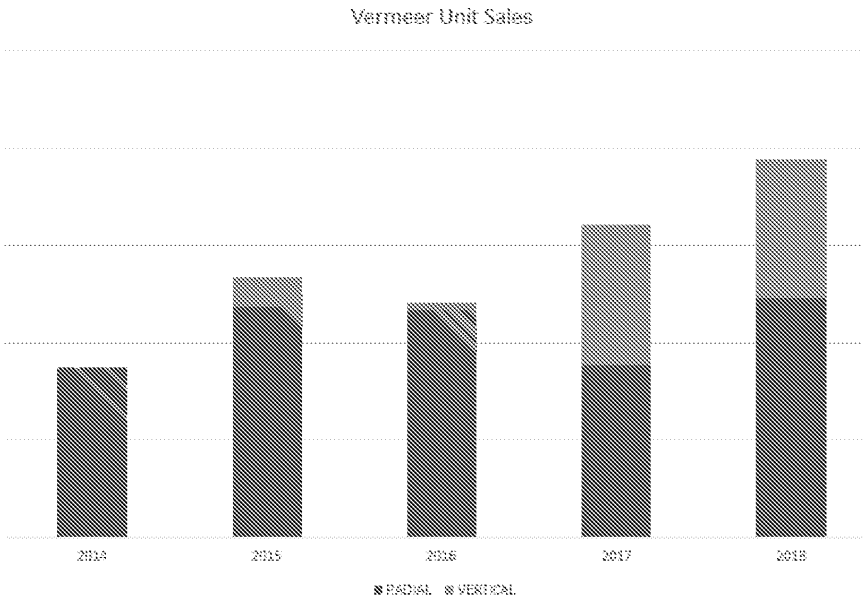


Figure R

As discussed in the Hutchinson Declaration, the trend toward vertical lift results from the benefits associated with vertical lift including increased lift capacity in a compact design and is not the result of price discounts, special offers, advertising or other factors not related to vertical lift.

Toro has also indicated commercial success of the compact tool carrier of claim 1. In Toro's 2015 annual financial statement, Toro stated that the TX1000 utility loader

which incorporates the vertical lift arrangement in which the loader is not directly attached to the mainframe fueled growth in the compact utility loader product line:

Toro's 2015 Annual Statement



The commercial success of compact utility loaders incorporating the vertical lift arrangement of claim 1 are further evidence of patentability of claim 1. See MPEP §2141.

d. Skepticism of Experts and Unexpected Results

Toro, the Requester of this *Ex Parte* Reexamination, expressed skepticism that a compact utility loader with a vertical lift loader could be developed. In particular, Toro states that such a combination is "**difficult if not impossible due to size and durability constraints**":

[0007] Finally, the vertical reach of the loader arms on compact utility loaders is somewhat limited. While high lift loader arms are known on full size skid steer loaders as disclosed in U.S. Pat. No. 5,542,814, the use of such high lift loader arms on a compact utility loader has been considered difficult if not impossible due to size and durability constraints. Accordingly, it would be a further advance in the art to provide a way of safely and durably providing high lift loader arms on compact utility loaders to extend the vertical reach of such loaders. For example, this would allow a compact utility loader to dump debris or materials at higher elevations than previously, thus allowing the use of larger trucks to accept such debris or materials for transport.

U.S. Patent Publication No. 2016/0244937.

This skepticism is shared by others in the field. As stated in the Hartke Declaration, inventor Louis Hartke was highly skeptical as to whether it would be possible to develop a compact utility loader having a loader that was not directly connected to the mainframe (i.e., a vertical lift compact utility loader) as set forth in claim 1 of the '386 Patent.

Toro's admission **that incorporation of a vertical lift loader arm onto a compact tool carrier "*is difficult if not impossible*" and Louis Hartke's belief that such a machine could not be developed is compelling evidence** proves that the conventional wisdom of those of skill in the art that the inventive design was difficult or impossible. "Expressions of disbelief by experts constitute strong evidence of nonobviousness." MPEP §716.05 (citing Environmental Designs, Ltd. v. Union Oil Co. of Cal., 713 F.2d 693, 698, 218 USPQ 865, 869 (Fed. Cir. 1983) (citing United States v. Adams, 383 U.S. 39, 52, 148 USPQ 479, 483-484 (1966)). As stated in MPEP §2145, "unexpected results . . . may have even taken on **added importance** in view of the recognition in KSR of a variety of possible rationales" (Emphasis added).

In summary, the Office has not presented a prima facie case of obviousness of the subject matter of claim 1. One of ordinary skill in the art would not have made the modification suggested by the Office because (1) the proposed modification to Dingo 322 would have rendered it unsatisfactory for its intended purpose and (2) there was no reasonable expectation of success given the unpredictability of these types of modifications—as evidenced by the failures experienced firsthand by the inventors—and the statements by Toro that it would have been "difficult if not impossible" to achieve a vertical-lift compact tool carrier. Regardless, the modification proposed by the Office *would not have contained all of the features required by claim 1*. Finally, objective evidence of non-obviousness indicate patentability of independent claim 1 over the Dingo 322 Parts Catalog, the Dingo 322 Operator's Manual and Komatsu.

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Dependent claims 2-13, 20-21 and 64-66 incorporate the recitations of independent claim 1 by way of their dependency therefrom and are patentable for at least the reasons set forth above relating to independent claim 1.

Dependent claim 21 also includes limitations requiring that the compact tool carrier have a second linkage and that, as the loader travels from a down position to a vertically raised position, the pivot points formed between the mainframe and each of the first linkage, second linkage, and actuator and the pivot points formed between the loader arm and each of the first linkage, second linkage and actuator are (1) disposed between the operator controls and the bottom of the mainframe or (2) disposed forward of the control station. In this claimed arrangement, the pivot points are positioned within the profile of the machine or forward of the control station which reduces pinch points for the operator. The Office states that in Figure 1 of Komatsu, "all of the pivot points are shown to be disposed between the operator controls and a bottom of the mainframe and/or disposed forward of the control station." However, unlike the '386 Patent, Komatsu does not even show or describe operator controls or a control station and the statement of the Office is not supported by Komatsu. For at least these reasons claim 21 is patentable over the cited references.

New dependent claim 64 recites that the operator platform "extends from the mainframe". Under the interpretation of the Office (see page 5 of the Office action), the operator platform is part of the mainframe.[12] Claim 64 precludes this interpretation because the operator platform "extends from the mainframe". For at least this reason, claim 64 is further patentable over the cited references.

With reference to Figure 2 of the application, dependent claim 65 recites that at least a portion of the operator platform 37 is forward to the rear of the mainframe 10.

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[12] Applicant submits that the operator platform must be considered to be separate from the mainframe for the reasons set forth above relating to independent claim 1.

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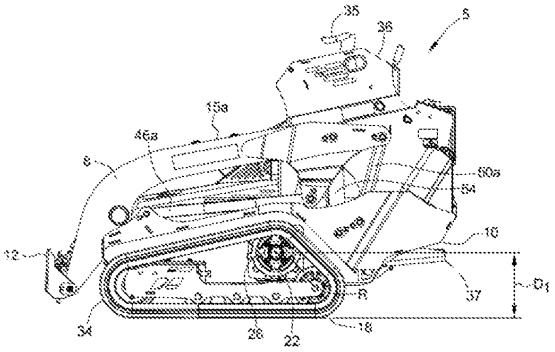
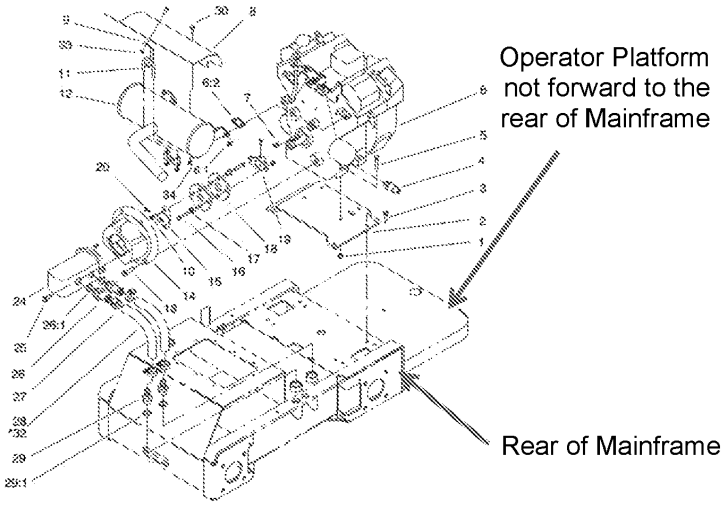


Fig. 2 of the Application

In this manner, the mainframe 10 may form a protective pocket around the operator of the compact tool carrier. As shown below, no portion of the operator platform of Dingo 322 extends forward from the rear of the mainframe.



Sheet No. 4 of Dingo Parts Catalog

For at least this reason, claim 65 is further patentable over the cited references.

2. Claims 15, 17, 20, 23-30 and 66-67 are Not Obvious

Independent claim 15 is directed to a compact tool carrier and comprises:

a loader adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

an actuator pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

a drive mechanism comprising tracks or wheels for propelling the compact tool carrier over a supporting surface, the drive mechanism being attached to the mainframe about a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4, both D2 and D4 being less than 1.5 times D1 and being less than twice D5; and

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a control station having operator controls for propelling the compact tool carrier forward and for raising and/or lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

Independent claim 15 recites a compact tool carrier having an engine bracket spaced from the rear end of the mainframe and having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and that the loader is not directly attached to the mainframe. Therefore, claim 15 is patentable over Dingo 322 Parts Catalog and Dingo 322 Operator's Manual in view of Komatsu for the reasons set forth above relating to independent claim 1.

Claim 15 is further patentable over Dingo 322 in view of Komatsu because Dingo 322 is incapable of supporting a loader in which the distance D2 between the rotational axis and the pivot point formed between a linkage and the mainframe and the distance D4 between the pivot point formed between the actuator and the rotational axis is **less than twice** the distance D5 between the rotational axis and the bottom of the first side of the mainframe.

With Reference to Figure S[13] below, Dingo 322 has a relatively small distance D5 between the bottom of the mainframe and the rotational axis of the wheels. Stated differently, Dingo 322 has a ***relatively high mainframe*** relative to the wheels to increase ground clearance.

[13] Figures S and T are taken from the Dingo 322 Service Manual.

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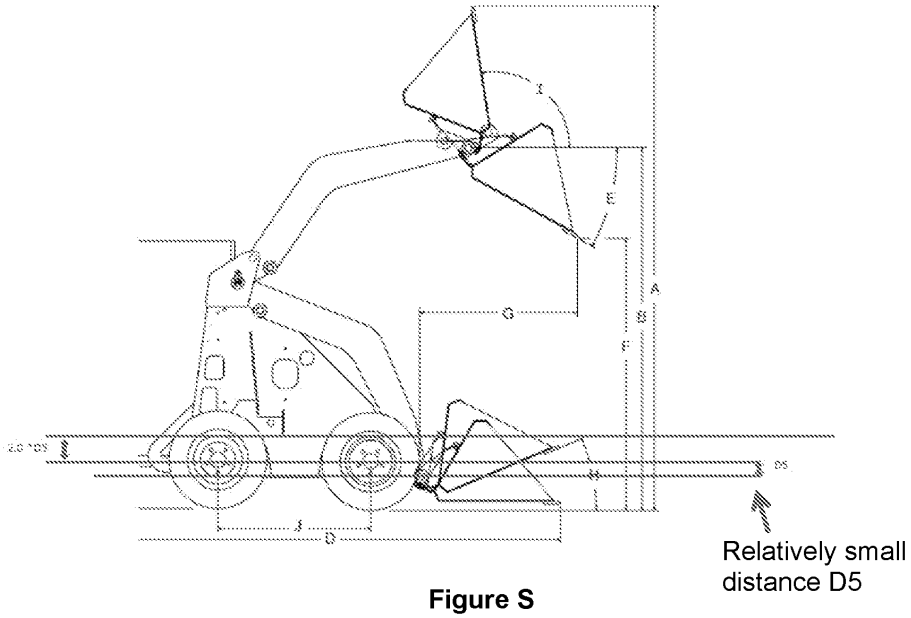


Figure S

The available space to position the actuator and linkage pivot points such that the distance between the pivot points and the rotational axis is less than 2.0 D5 is small as shown in Figure T:

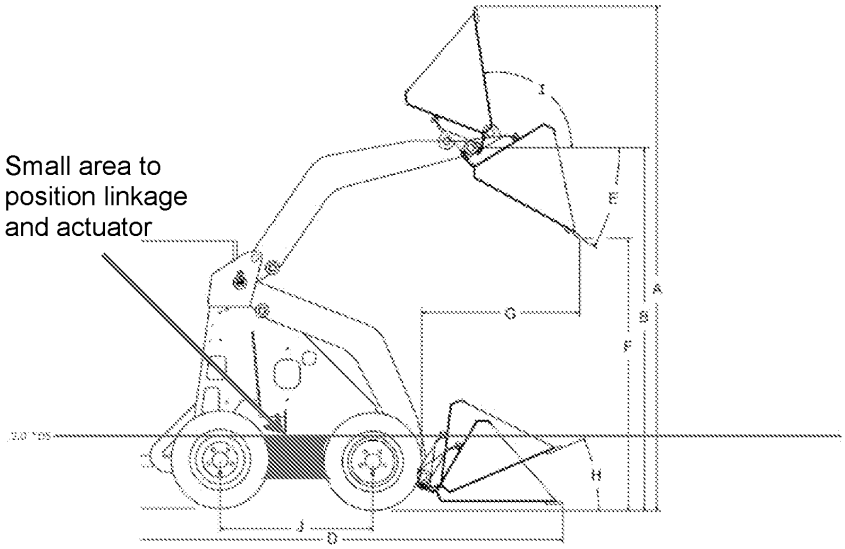


Figure T: The available space for actuator and linkage pivot points (2.0 * D5)

Dingo 322 cannot accommodate a linkage pivot point and an actuator pivot point that is less than 2.0 D5 as recited in claim 15 as this area is used to house the hydraulics of Dingo 322 as further explained below.

As disclosed in the Dingo 322 Service Manual, Dingo 322 was available in a "4-Paw" drive system in which each wheel was driven by a hydraulic motor.

Drive System

Model	220		222	220D, 320D	322	323	
	22311	22317	22300 22304	22302 22303	22305	22312	22318
Chain Drive	X	X	X				
4-Paw				X	X	X	X

Chain Drive Models:
All four wheels are powered. The two rear wheels are individually driven by hydraulic rotor vane motors. Each front wheel is chain driven from the rear wheels via #60H chain.

4-Paw Models:
All four wheels are powered. Each wheel is individually driven by a hydraulic roller vane motor.

Page 2/1-6 of the Dingo 322 Service Manual

A partial view of the 4-Paw Dingo 322 machine is shown in the Service Manual[14]. The distance between the bottom of the mainframe and the rotational axis (D5) and the area encompassed by twice this distance (2.0 D5) in which the pivot points at which a linkage and an actuator are pivotally connected to the mainframe are shown in the annotated figure below:

[14] The Service Manual discloses diesel and gas versions of Dingo 322 that appear to be identical drive systems.

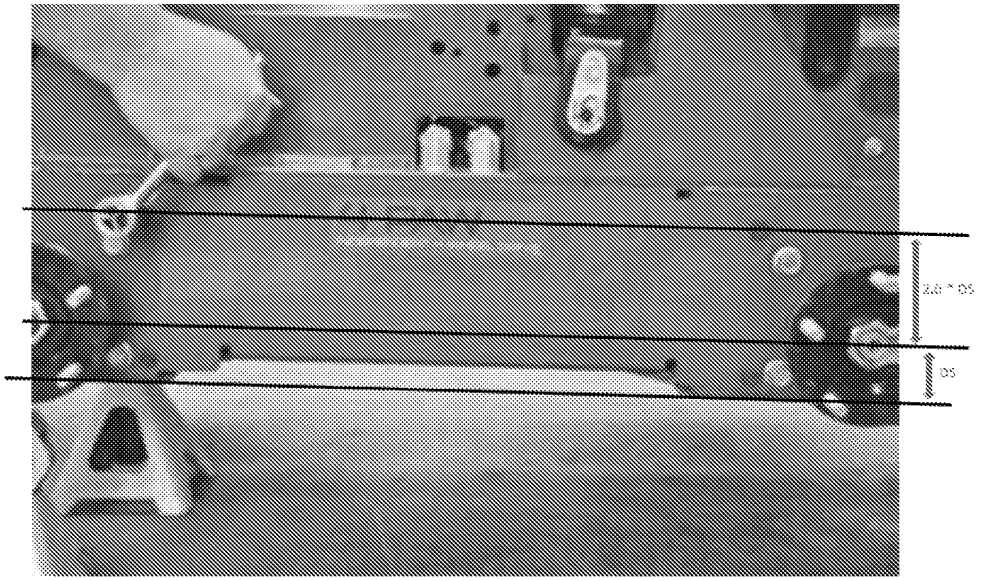


Fig. 1262 of the Dingo 322 Service Manual

As stated in the Hartke Declaration, the area available to position the pivot points is very limited and insufficient to allow a linkage and actuator to swing back and forth as in a vertical lift loader arrangement. Further, this area is **unavailable to position the pivot points** because this portion of Dingo 322 **houses the hydraulics that drive the motors** as show in Figure 0888 from the Service Manual:

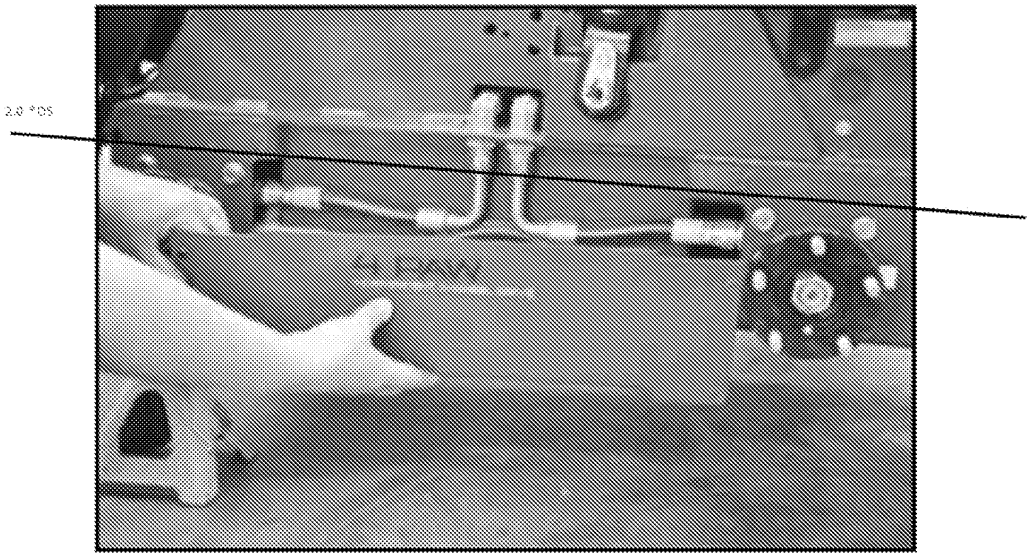


Fig. 0888 of the Dingo 322 Service Manual

One of ordinary skill in the art could not position the pivot points between the rotational axis and twice D5 because of the limited space to do so and because this area houses the hydraulic components beneath the cover plate as shown in Figure 0888. To eliminate the hydraulics that power the motors would render Dingo 322 incapable of its intended purpose as a compact utility loader or would drastically change the principle of operation of Dingo 322[15]. "If the proposed modification or combination of the prior art

[15] Dingo 322 was *not* available in a chain drive as shown on Page 2/1-6 of the Dingo 322 Service Manual. And even if it had a chain drive, one of ordinary skill in the art could not modify Dingo 322 as proposed by the Office because the chain is also positioned in the area between the rotational axis and twice D5:



Fig. 0279 (page 4/1-2 of Service Manual).

would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious." MPEP §2143.01(V). Because Dingo 322 Parts Catalog and Dingo 322 Operator's Manual, the primary references cited by the Office, are incapable of accommodating a linkage and actuator having pivot points in the mainframe that are between the rotational axis and less than twice D5, independent claim 15 is patentable over the cited references.

The modification proposed by the Office would also render the Dingo 322 unsuitable for its intended purpose to accommodate over-the-tire tracks available from Toro:

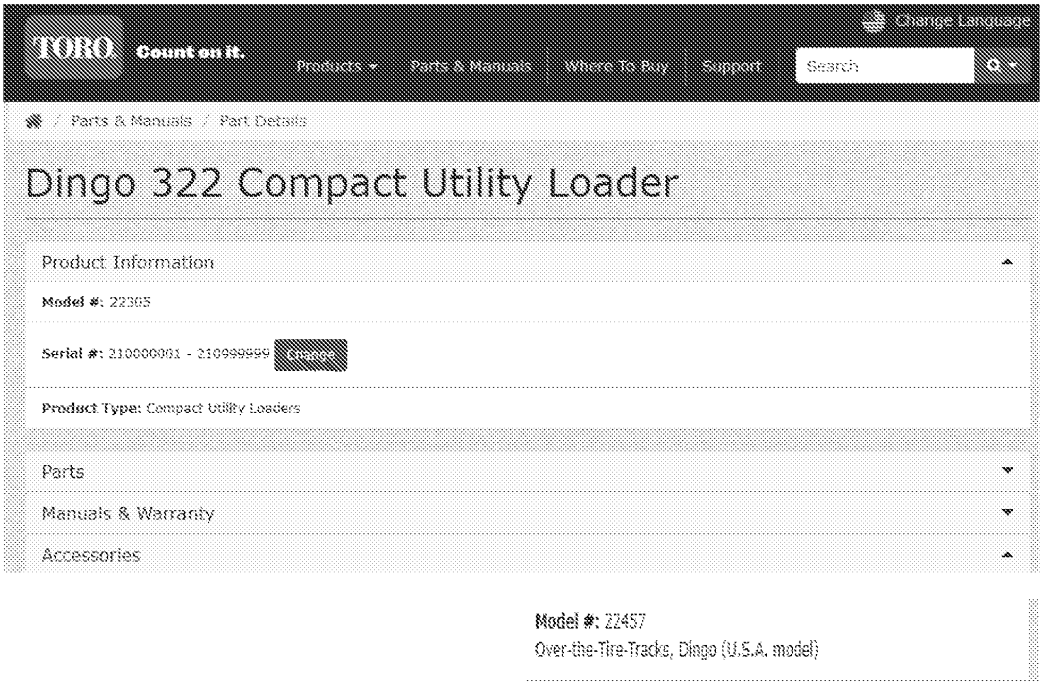


Figure U (https://www.toro.com/en/parts/partdetails/?id=23629)

The pivot point location of the actuator and linkage in the mainframe of Dingo 322 cannot be less than twice D5 because Dingo 322 cannot accommodate the over-the-tire

tracks for which Dingo 322 was designed for use if the actuator and linkage were positioned in this area:



Figure V

"If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." MPEP §2143.01(V).

Because the space that is between the rotational axis and twice D5 (i.e., twice the distance between rotational axis and the bottom of the first side of the mainframe) in the Dingo 322 machine (1) is so small in size that it cannot accommodate movement of a linkage and actuator that have pivot points in this space; (2) is occupied by the hydraulic components of the Dingo 322; and (3) is adapted to accommodate over-the-tire tracks that are sold by Toro that inhibit placement of pivot points within the area, claim 15 and claims 17, 20, 23-30, and 66-67 depending therefrom are patentable over the cited references.

Claim 23 recites that D2 is less than 1.75 D5 and claim 24 recites that both D2 and D4 are less than 1.5 D5. Claim 30 recites that the compact tool carrier includes a second linkage with one of the pivot points formed between the mainframe and the first linkage, second linkage or actuator being a forward-most pivot point with the distance between the rotational axis and the forward-most pivot point being less than 1.5 D5. As noted above, Dingo 322 cannot accommodate pivot point locations that are less than

twice D5. For at least this reason, claims 23, 24, and 30 are further patentable over the cited references.

New claim 66 recites that the pivot point at which the actuator is attached to the first side of the mainframe is above the rotational axis. With reference to Figure 1 of Komatsu, the pivot point formed between the actuator and the mainframe is **below** the rotational axis.

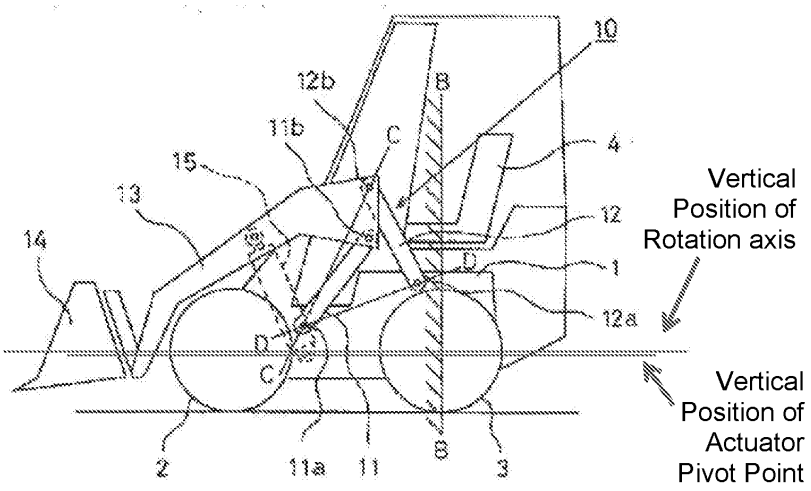


Figure 1 of Komatsu

For this reason, dependent claim 66 is further patentable over the cited references.

New claim 67 recites that the pivot point at which the linkage is attached to the mainframe is above the tracks or wheels. As claim 67 depends from claim 15, this linkage pivot point must also be less than twice D5. As shown in Figure W, the only linkage having a distance between the rotational axis and the pivot point connecting it to the mainframe of less than twice D5 is the forward linkage (D2/D5=1.0 while D3/D5=2.47).

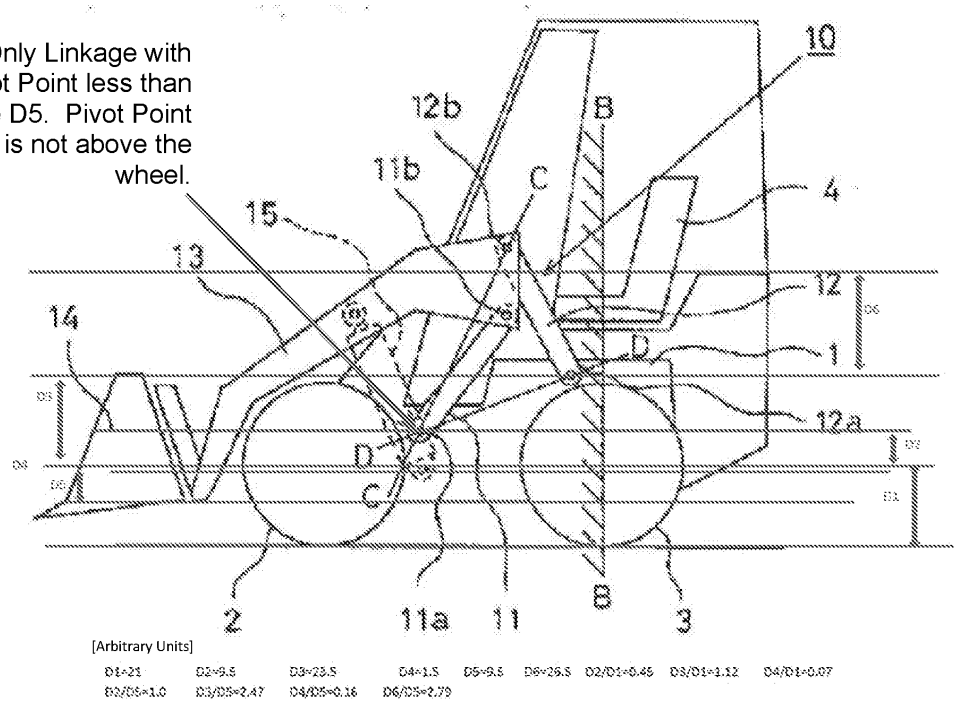


Figure W

The forward linkage is not above the wheel as recited in claim 67. Further, in the Dingo 322 machine, the entire area defined by twice D5 is below the wheels as shown in Figure X:

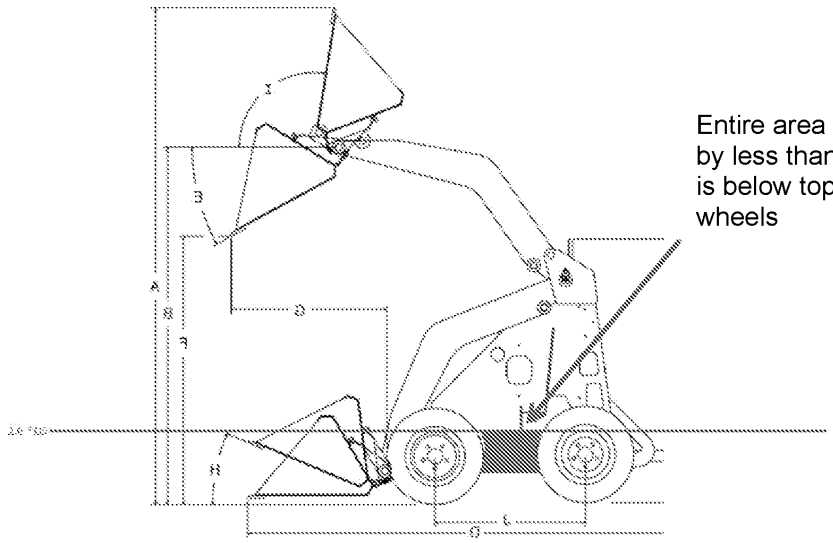


Figure X

Dingo 322 is not able to position a linkage pivot point that is above the wheels and is spaced between the rotational axis and a distance that is less than twice D5. For at least these reasons, dependent claim 67 is further patentable over the cited references.

3. Claims 31-37 are Not Obvious

Inasmuch as independent claim 31 recites a compact tool carrier having an engine bracket spaced from the rear end of the mainframe and having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and that the loader is not directly attached to the mainframe, independent claim 31 and claims 32-37 are patentable over the Dingo 322 Parts Catalog and the Dingo 322 Operator's Manual in view of Komatsu for the reasons set forth above relating to independent claim 1. The Vermeer Brochure cited to reject dependent claim 37 (Ground 2 rejection) does not cure the deficiencies of Dingo 322 and Komatsu noted above.

4. Claims 38-44 are Not Obvious

Independent claim 38 is directed to a compact tool carrier for standing or walk-behind operator control. The compact tool carrier has a longitudinal axis and a mass of less than about 1500 kg and comprises:

a loader being adapted to carry a tool, the loader comprising:

a first loader arm;

a second loader arm; and

a single cross-member that extends from the first loader arm to the second loader arm;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear of the mainframe, the first loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm;

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing operation; and

an operator platform for standing operation of the operator controls of the control station.

Independent claim 38 recites a compact tool carrier having an engine bracket spaced from the rear end of the mainframe and having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and that the loader is not directly attached to the mainframe. Therefore, claim 38 is patentable over Dingo 322 Parts Catalog and Dingo 322 Operator's Manual in view of Komatsu for the reasons set forth above relating to independent claim 1.

The Vermeer Brochure additionally cited by the Office to reject independent claim 38 discloses a radial lift compact utility loader sold as Vermeer S600 and Vermeer S600TX. The Vermeer Brochure does not cure the deficiencies of Dingo 322 and Komatsu noted above.

Independent claim 38 is further patentable over Dingo 322 in view of Komatsu and in further view of the Vermeer Brochure because the combination of references does not lead one of ordinary skill in the art to arrive at a compact tool carrier having a loader with a single cross-member. The Office admits on page 23 of the Office action that Dingo 322 does not include a *single* cross-member that extends from the first loader arm to the second loader arm as recited in independent claim 38 and instead relies on the Vermeer Brochure which shows a compact utility loader having a single cross-member.

The Office's obviousness rationale is that:

> [I]t would have been obvious . . . to provide a single cross member between the loader arms of Dingo, having sufficient size and strength to permit this single cross member to be the only cross member between Dingo's loader arms as taught by Vermeer Brochure. This would yield the predictable result of simplifying the construction of the loader, and possibly reducing its weight as well.

Page 25 of the Office action.

The Office's rationale is flawed because the loss of strength in the loader caused by elimination of a cross-member between the loader arms cannot be mitigated by merely strengthening the remaining cross-member. As stated in the Hartke Declaration, use of two cross-members allows the loader to behave as a structural "box" in which forces may be distributed side-to-side across the loader. Loss of strength caused by eliminating a cross-member cannot be merely mitigated by increasing the size of the remaining cross-member because the loader is not able to distribute forces laterally along the length of the loader in the same manner. For at least this reason, independent claim 38 and claims 39-44 depending therefrom are patentable over the cited references.

5. Claims 45-49 are Not Obvious

Inasmuch as independent claim 45 recites a compact tool carrier having an engine bracket spaced from the rear end of the mainframe and having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and that the loader is not directly attached to the mainframe, independent claim 45 and claims 46-49 depending therefrom are patentable over Dingo 322 Parts Catalog and Dingo 322 Operator's Manual in view of Komatsu for the reasons set forth above relating to independent claim 1.

The Office states on page 18 of the Office action that Dingo does not teach "first and second linkages pivotally attached to the first and *second* sides of the mainframe" (emphasis added). Claim 45 does not recite first and second linkages pivotally attached to the first and *second* sides of the mainframe. Instead, claim 45 recites "a first linkage pivotally attached to the *first side* of the mainframe" and "a second linkage pivotally attached to the *first side* of the mainframe . . ." For at least this reason the Office has not set forth a *prima facie* case of obviousness of independent claim 45.

Dependent claim 46 recites that the loader includes a first arm, a second arm, and a cross-member that extends from the first arm to the second arm, the cross-member being disposed forward of the first linkage pivot point, the second linkage pivot point, and the actuator pivot point. The Office states that:

> Dingo has two arms and a cross-member that extends between them and is disposed forward of the first and second linkage pivot point.

Page 19 of the Office action.

As noted above, independent claim 45 from which claim 46 depends recites first and second linages attached to the *first side* of the mainframe. Dingo 322 does not include two linkages that are attached to the first side of the mainframe. The Office's statement on page 46 of the Office action is incorrect.

The Office further states that:

> For the cross-member to be disposed forward of the actuator pivot point (at the mainframe) would have been obvious as taught by Komatsu to better effect the vertical lift.

Page 19 of the Office action.

Claim 46 does not recite that the cross-member is disposed forward of the actuator pivot point "at the mainframe" as stated by the Office. Claim 45 from which claim 46 depends recites "an actuator pivotally attached to the first side of the mainframe and *pivotally attached to the* ***loader arm*** *at an actuator pivot point*." Komatsu does not disclose that that the cross-member is disposed forward of the actuator pivot point formed between the actuator and *the loader arm*.

Komatsu discloses three different embodiments of the "lifting cylinder 15" in Figures 2-4 (para. [0020]) of Komatsu. These are the only Figures of Komatsu that show a cross-member. The specification itself does not make reference to the cross-members. As shown in Figures 2 and 4, the actuator is connected directly to the cross-member itself and not connected to the loader arm as recited in independent claim 45 from which claim 46 depends:

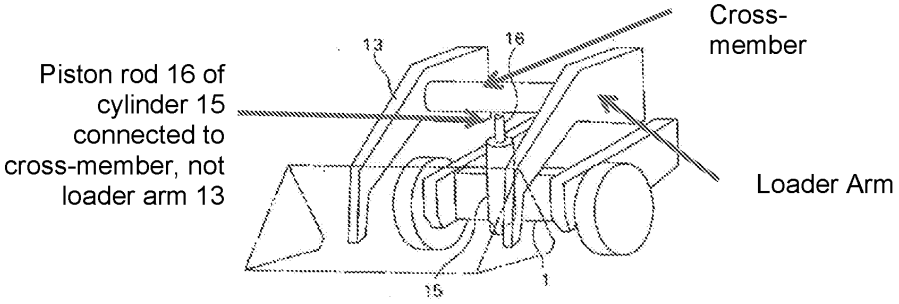


Figure 2 of Komatsu

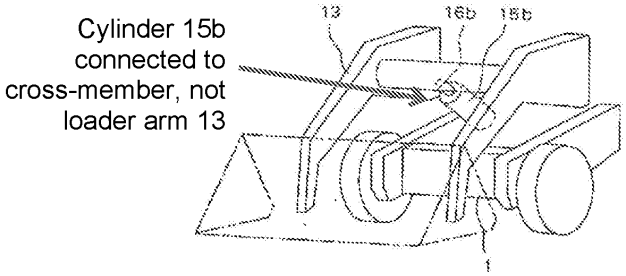


Figure 4 of Komatsu

In Figure 3 of Komatsu, the connection made by the piston arms 16a is not shown. Therefore, it is not evident whether the piston arms 16a connect to the loader arm 13 or to the cross-member:

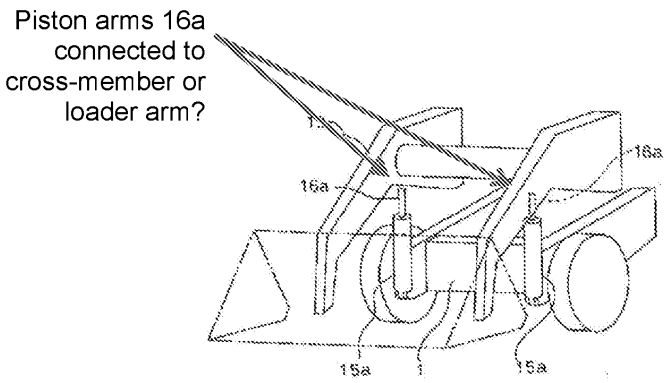


Figure 3 of Komatsu

Even if, *arguendo*, the lifting cylinder was connected to the loader arm, **Figure 3 does not show or otherwise indicate that the cross-member is disposed forward of the connection between the actuator and the loader arm,** as recited in claim 46. Further, claim 46 has been amended to recite that the cross-member is disposed *fully* forward of the actuator pivot point. At best, the cross-member would be aligned with the actuator pivot point. For at least these reasons, dependent claim 46 as amended is additionally patentable over the cited references.

6. Claims 50-54 are Not Obvious

Inasmuch as independent claim 50 recites a compact tool carrier having an engine bracket spaced from the rear end of the mainframe and having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and that the loader is not directly attached to the mainframe, independent claim 50 and claims 51-54 depending therefrom are patentable over the Dingo 322 Parts Catalog and the Dingo 322 Operator's Manual in view of Komatsu for the reasons set forth above relating to independent claim 1.

7. Claims 55-63 and New Claims 68-69 are Not Obvious

Independent claim 55 is directed to a compact tool carrier for standing or walk-behind operator control. The compact tool carrier has a longitudinal axis and a mass of less than about 1500 kg and comprises:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

a drive mechanism comprising tracks for propelling the compact tool carrier over a supporting surface, the drive mechanism having a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4, both D2 and D4 being less than D1 and being less than 1.5 D5; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

Independent claim 55 recites a compact tool carrier having an engine bracket spaced from the rear end of the mainframe and having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and that the loader is not directly attached to the mainframe. Therefore, claim 55 and claims 56-63 are patentable over the Dingo 322 Parts Catalog and the Dingo 322 Operator's Manual in view of Komatsu (Ground 1) for the reasons set forth above relating to independent claim 1. Regarding the Vermeer Brochure (Ground 3), the Vermeer Brochure does not cure the deficiencies of Dingo 322 and Komatsu.

Independent claim 55 further recites that the distance D2 between the rotational axis and the pivot point at which the linkage is attached to the mainframe and the distance D4 between the rotational axis and the pivot point at which the actuator is attached to the mainframe are **less than 1.5 times** the distance D5 between the rotational axis and the bottom of the first side of the mainframe. As noted above with regard to independent claim 15, the space that is between the rotational axis and twice D5 in Dingo 322 (1) is so small in size that it cannot accommodate movement of a linkage and actuator that have pivot points in the mainframe within this area; (2) is occupied by the hydraulic components of Dingo 322; and (3) is adapted to accommodate over-the-tire tracks that are sold by Toro that inhibit placement of pivot points within the area. Because independent claim 55 further limits the available area to locate the pivot points to less than 1.5 D5, independent claim 55 and claims 56-63 depending therefrom are patentable over the cited references.

New claim 68 recites that the pivot point at which the actuator is attached to the first side of the mainframe is **above the rotational axis**. With reference to Figure 1 of Komatsu provided above (see dependent claim 66), the pivot point formed between the

actuator and the mainframe is **below** the rotational axis. For this reason dependent claim 68 is further patentable over the cited references.

New claim 69 recites that the pivot point at which the linkage is attached to the mainframe is above the tracks or wheels. Because claim 69 depends from claim 55, this linkage pivot point must also be less than 1.5 D5. As shown in Figure W above, the only linkage having a distance between the rotational axis and the pivot point formed in the mainframe that is less than 1.5 D5 is the forward linkage and the forward linkage pivot point formed with the mainframe is **not above the wheel** as recited in claim 69. For at least this reason, dependent claim 69 is further patentable over the cited references.

8. New Claims 71-73 are Not Obvious

New independent claim 71 includes the recitations of claim 1 and further recites that the drive mechanism includes a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface. With reference to Figure 2 of the '386 Patent, at least a portion of the tracks 34 angle downward from the drive sprocket 22 toward the front end of the mainframe 10.

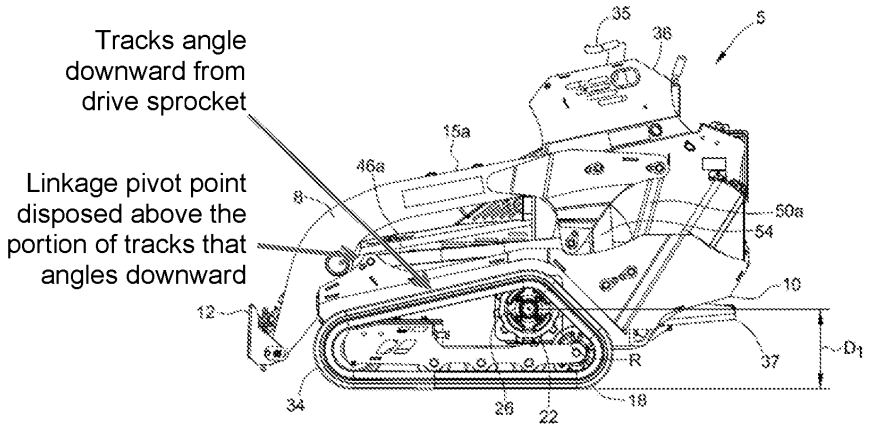


Fig. 2 of the Application

The **linkage pivot point is disposed above the portion of the tracks that angles downward** from the drive sprocket toward the front end of the mainframe. By angling the tracks downward and having a linkage pivot point above this portion, the linkage pivot point may be clear of the tracks but yet relatively low, which lowers the profile of the compact tool carrier and improves the stability.

One of ordinary skill in the art would not arrive at a compact tool carrier having tracks with a portion of the tracks angling downward with a linkage pivot point being above the portion of the tracks that angles downward based on Dingo 322 or Komatsu. Figure 9 of Komatsu is the only embodiment which includes tracks. The tracks are over-the-tire tracks and do not include an angular portion.

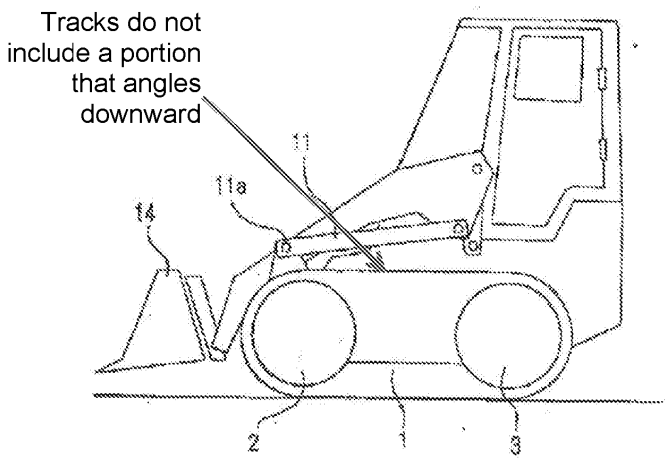


Fig. 9 of Komatsu

In regard to Dingo 322, Dingo 322 is adapted to operate with over-the-tire tracks. The tracks also do not include a portion that angles downward.



Figure W

For at least these reasons, one of ordinary skill in the art would not arrive at a compact tool carrier having tracks that angle downward from the drive sprocket toward the front end of the mainframe with the linkage pivot point being disposed above the portion of the tracks that angles downward. Therefore, independent claim 71 and claims 72-73 depending therefrom are patentable over the cited references.

9. New Claims 74-77 are Not Obvious

New independent claim 74 includes the recitations of claim 1 and further recites that the drive mechanism includes a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface. With reference to Figure 2 of the '386 Patent, at least a portion of the tracks 34 angle downward from the drive sprocket 22 toward the front end of the mainframe 10.

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Kubota North America Corporation et al

Ex. 2035
Page 188 of 549

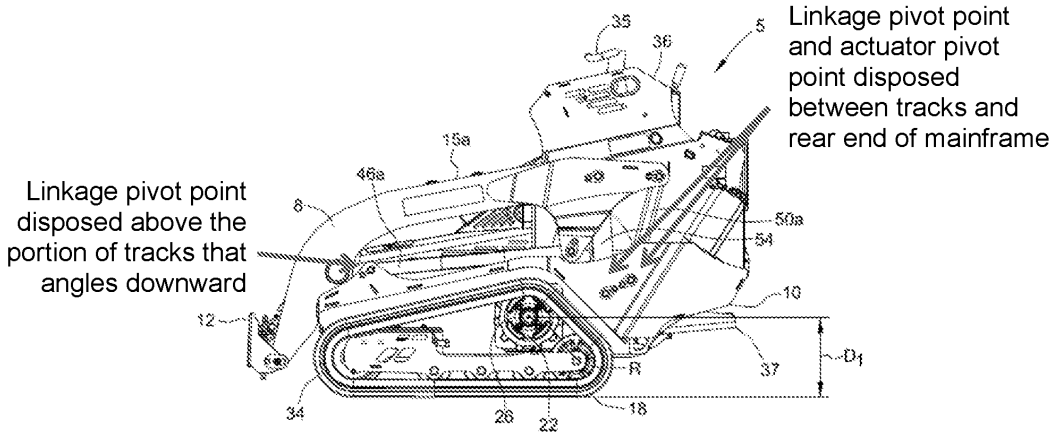


Fig. 2 of the Application

The compact tool carrier also includes a second linkage that is pivotally attached to the first side of the mainframe at a second linkage pivot point and pivotally attached to the loader arm. Each of the first linkage pivot point, second linkage pivot point, and actuator pivot point are (1) **disposed above the portion of the tracks that angles downward** from the drive sprocket toward the front end of the mainframe or (2) **disposed between the tracks and the rear end of the mainframe**. This allows each of the pivot points to be clear of the tracks and yet be relatively low.

As noted above in regard to claim 71, neither Komatsu nor Dingo 322 would lead one of ordinary skill in the art to develop a compact tool carrier having a tracks with a portion that angles downward. Further, neither reference would lead one of ordinary skill in the art to arrange the first linkage pivot point, second linkage pivot point, and actuator pivot point such that each pivot point is (1) **disposed above the portion of the tracks that angles downward** from the drive sprocket toward the front end of the mainframe or (2) **disposed between the tracks and the rear end of the mainframe**.

Significantly, each embodiment of Komatsu would involve pivot points that are *below* the tracks. The embodiment of Figure 7 includes the highest pivot points. Even in this embodiment, the actuator pivot point would be above the tracks.

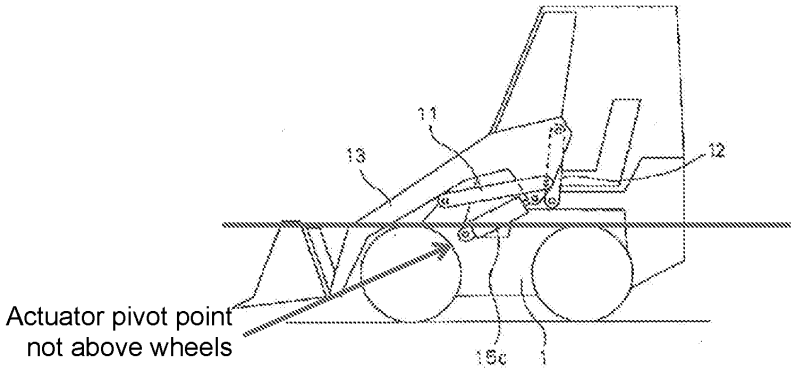


Figure 7 of Komatsu

Further, Komatsu would not lead one of ordinary skill in the art to position any of the pivot points between the tracks and the rear end of the mainframe as Komatsu expressly discloses that the pivot points should be forward of the center of the rear wheel (e.g., para. [0008]) to allow side egress by the operator. One of ordinary skill of the art would not arrange any of the pivot points to be between the tracks and the rear of the mainframe.

For at least these reasons, independent claim 74 and claims 75-77 depending therefrom are patentable over the cited references.

10. New Claims 78-79 are Not Obvious

New independent claim 78 includes the recitations of claim 1discussed above that distinguish the Dingo and Komatsu references. Claim 78 further recites that the drive mechanism includes a drive sprocket and tracks for propelling the compact tool carrier over a supporting surface. **The tracks are spaced from the rear end of the mainframe**. Independent claim 78 also recites an operator platform that **extends from the mainframe and is forward of the rear end of the mainframe**. By spacing the tracks from the rear end of the mainframe, the drive mechanism that rotates the drive sprocket (e.g., hydraulic motor) may be moved forward. This provides clearance to move the operator platform forward from the rear of the mainframe, which allows the mainframe to form a protective pocket around the operator.

Under the interpretation of the Office (see page 5 of the Office action), the operator platform of Dingo 322 is part of the mainframe. Claim 78 precludes this interpretation because the operator platform "extends from the mainframe". Further, the operator platform of Dingo 322 is not forward of the rear end of the mainframe. For at least these reasons, independent claims 78 and claim 79 depending therefrom are patentable over the cited references.

11. New Claims 80-82 are Not Obvious

New independent claim 80 includes the limitations of claim 1 discussed above that distinguish Dingo 22 and Komatsu. Claim 80 further recites that the drive mechanism includes tracks with the distance D2 between the rotational axis and the pivot point at which the linkage is attached to the mainframe being **less than twice the distance D5** between the rotational axis and the bottom of the mainframe and that **this pivot point is above the tracks**. As shown below, the only linkage of Komatsu that is less than twice D5 is **not positioned above the wheels** of the drive mechanism:

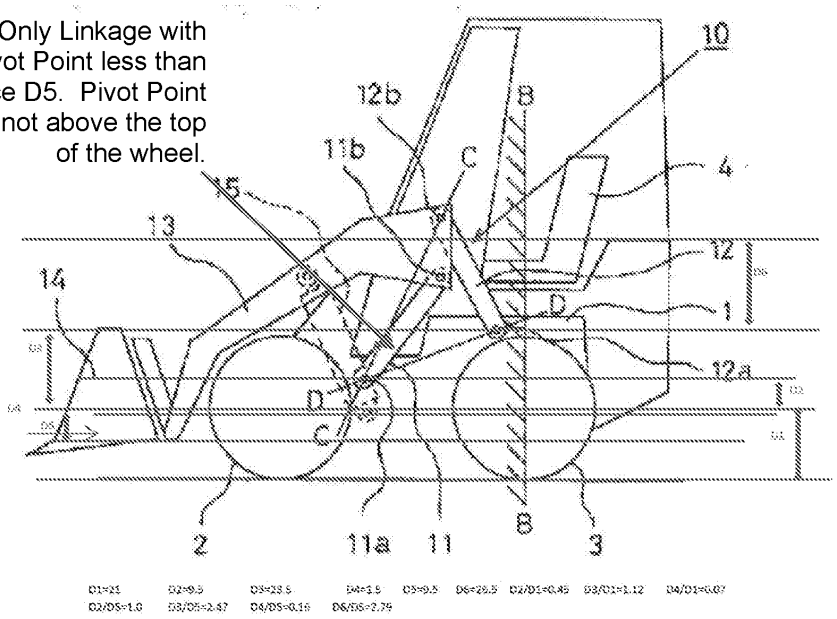


Figure X

Further, in the Dingo 322 machine, the entire area defined by twice D5 is below the wheels as shown in Figure Q:

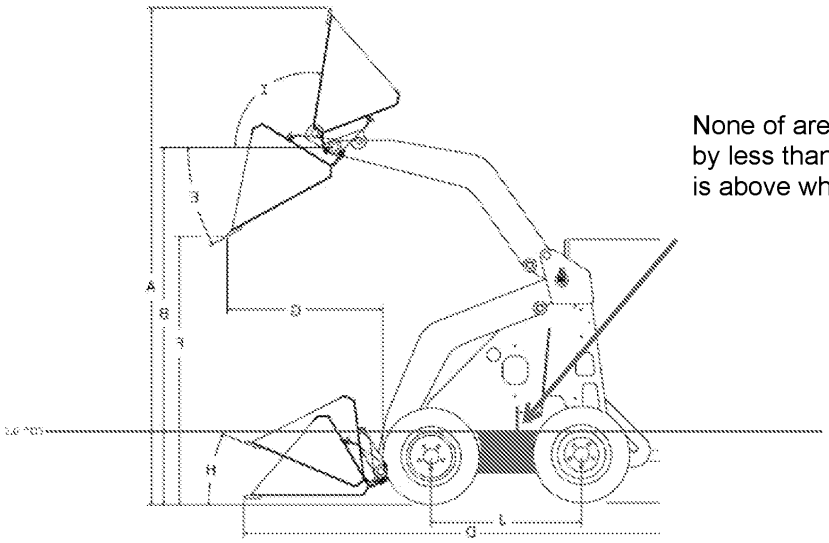


Figure Y

For at least these reasons, independent claim 80 and claims 81-82 depending therefrom are further patentable over the cited references.

12. New Claims 83-85 are Not Obvious

New independent claim 83 includes the limitations of claim 1 discussed above that distinguish Dingo 322 and Komatsu. Claim 83 further recites that the drive mechanism includes tracks with the distance D4 between the rotational axis and the pivot point at which the actuator is attached to the mainframe being **less than twice the distance D5** between the rotational axis and the bottom of the mainframe and that **this actuator pivot point is above the rotational axis**. With reference to Figure 1 of Komatsu, the pivot point formed between the actuator and the mainframe is **below** the rotational axis.

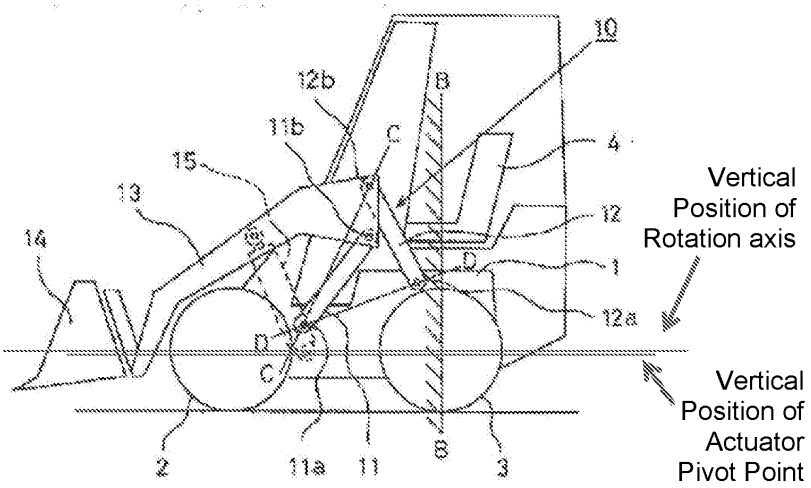


Figure 1 of Komatsu

For at least this reason, independent claim 83 and claims 84-85 depending therefrom are patentable over the cited references.

13. New Claims 86-87 are Not Obvious

New independent claim 86 includes limitations of claim 1 discussed above that distinguish Dingo 322 and Komatsu. Claim 86 further recites that the loader is moveable between a down position and a vertically raised position and that the compact tool carrier includes a drive mechanism comprising tracks or wheels and having a rotational axis. **The pivot point at which the actuator is pivotally attached to the first side of the mainframe is above the rotational axis**. With reference to Figure 3 of the application, the compact tool carrier includes an attachment plate for removably attaching a tool to the compact tool carrier with **at least a portion of the attachment plate being forward of the drive mechanism**.

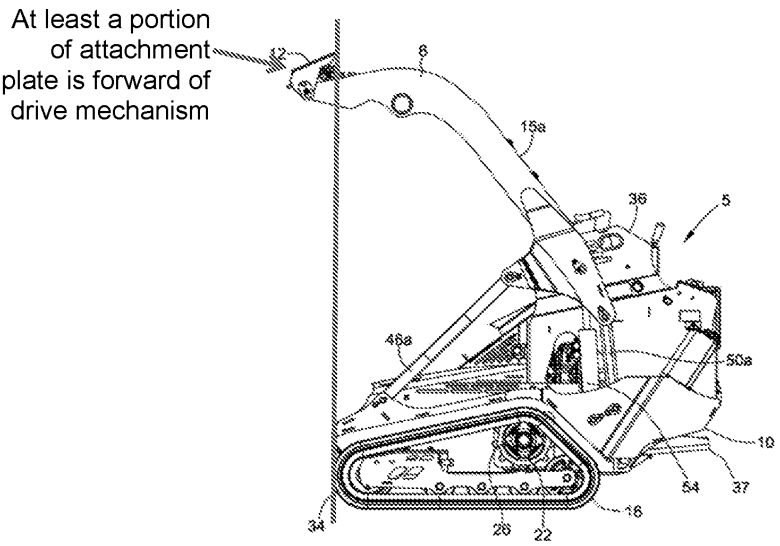


Fig. 3 of the Application

Figure 7 is the only embodiment of Komatsu in which the pivot point at which the actuator is attached to the mainframe is above the rotational axis. As noted above, when the loader of Figure 7 of Komatsu is used on the Dingo 322 machine, the loader has a relatively small reach of 9.6 inches. As shown below, under the combination proposed by the Office, the attachment plate is not forward of the wheels when the loader of Figure 7 of Komatsu is used on the Dingo 322 machine.

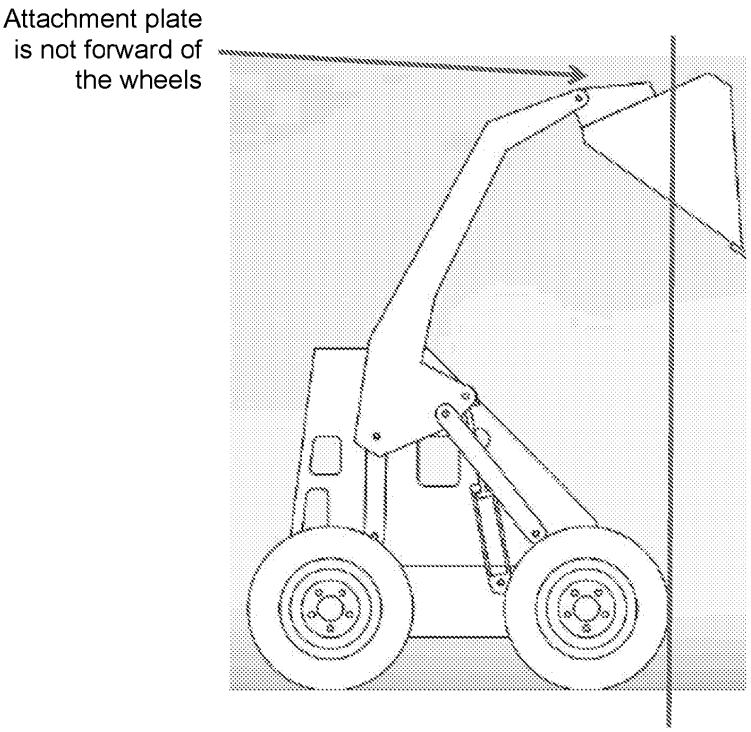


Figure Z: Loader of Figure 7 of Komatsu on Dingo 322

For at least this reason, independent claim 86 and claim 87 depending therefrom are patentable over the cited references.

III. CONCLUSION

The Patent Owner respectfully requests reconsideration and allowance of all pending claims. The undersigned request a telephone call from the Examiner if a call might expedite allowance.

The Patent Owner herewith submits Declarations from Louis Hartke, Matt Hutchinson and Scott Prost-Domasky (including the unexecuted copies for clarity), an Interview Summary and an Information Disclosure Statement.

The Patent Owner authorizes the Commissioner to charge any fees which may be due in connection with this Amendment to Deposit Account No. 012384 in the name of Armstrong Teasdale LLP.

Respectfully submitted,

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Kubota North America Corporation et al

Ex. 2035
Page 196 of 549

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

DECLARATION OF SCOTT PROST-DOMASKY UNDER 37 C.F.R. 1.132

I, Scott Prost-Domasky, declare and state as follows:

1. I am a structural analysis consultant with Analytical Processes/Engineered Solutions, Inc. in St. Louis, Missouri.

2. I received a Bachelor of Science degree in Aerospace Engineering from the University of Arizona in 1986. I received a Master's of Science Degree in Aerospace Engineering from the University of Southern California in 1988. I received a PhD in Mechanical Engineering from Washington University in 1995. I am a registered Professional Engineer in the State of Missouri.

3. I have 28 years of experience in advanced engineering concepts. I routinely develop and apply finite element methods (FEM/FEA) to structural analysis of linear and nonlinear mechanical systems and develop stress analysis modeling techniques.

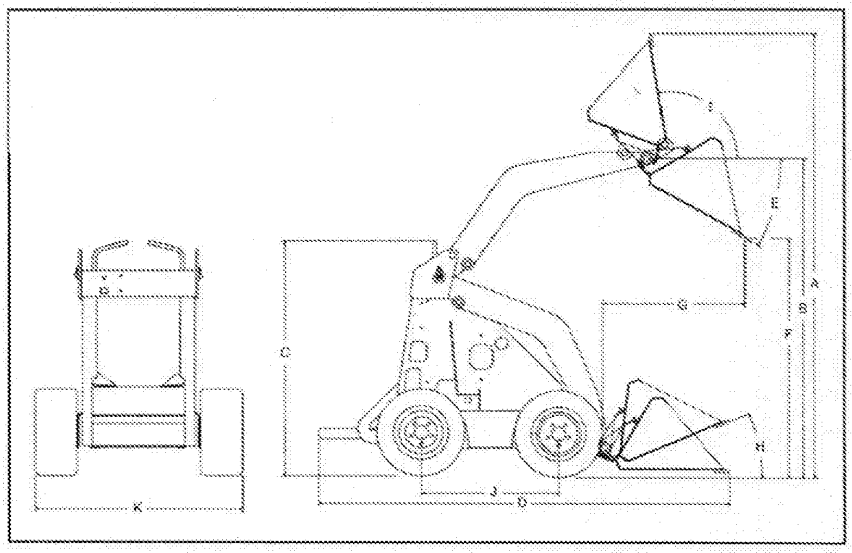
4. I have reviewed the "Toro Wheeled Compact Utility Loader Service Manual" ("Dingo 322 Service Manual") that describes and illustrates service for the Toro Dingo 322 Compact Utility Loader. The Dingo 322 Service Manual sets forth the specifications for Dingo 322 on page 2/1-2 shown below.

SPECIFICATIONS

Dimensions

A. Overall operating height, fully raised / 91.2" (2317mm)
B. Hinge pin height, fully raised / 66.0" (1676mm)
C. Overall height / 48.7" (1237mm)
D. Overall length / 82.2" (2088mm)
E. Dump angle / 34°
F. Dump height / 47.0" (1194mm)
G. Reach, fully raised / 26.0" (660mm)
H. Bucket rollback, ground position / 19°
I. Bucket rollback, fully raised / 97°
J. Wheelbase / 28.0" (711mm)
K. Overall width / 40.5" (1029mm)
X. Ground Clearance, front / 5.8" (147mm)
X. Ground Clearance, rear / 5.8" (147mm)
X. Reach, maximum / 28.0" (711mm)
X. Bucket rollback, carry position / 20°

X. = Dimension not shown



Page 2/1-2 of the Dingo 322 Service Manual

5. I have reviewed JP 11-140900 to Komatsu ("Komatsu") as translated in English. Komatsu describes and shows 6 embodiments of a loader arrangement of a skid steer. The first embodiment is shown in Figures 1 and 5 that show the loader in lowered and raised positions, respectively (collectively referred to as "Figure 1/5"). The remaining embodiments are shown in Figures 6-10 of Komatsu.

6. I modeled the loader arrangement of Figures 1/5 of Komatsu on Dingo 322. I also modeled the loader arrangement of Figures 6-10 of Komatsu on Dingo 322. The loader arrangements were modeled by scaling the loader to a size in which the

bucket of the loader was level with the supporting surface in the lowered positon of the loader. Each model included the same loader arm, linkages, and actuator (including the pivot points thereof) of the respective embodiment of Komatsu on the Dingo 322 mainframe. Each model included the bucket and attachment plate of the Dingo 322 machine attached to the respective loader of Komatsu. Because Figure 8 of Komatsu did not include a cylinder, a cylinder location was assumed to provide maximum lift height.

7. Each of the loader arrangements of Figures 1/5, 6 and 8-10 of Komatsu on Dingo 322 when at its fullest height are shown below. The fullest height of the loader arrangement occurs when the loader is unable to extend further vertically upon further extension of the actuator. To measure the height of the loader when fully extended, the distance from the bottom of the wheels to the hinge pin was measured. This measurement was scaled up by use of the 28.0" wheelbase dimension provided in the specifications of Dingo 322 set forth on Page 2/1-2 of the Dingo 322 Service Manual copied above. The heights from the ground to the hinge pin for each of Figures 1/5, 6 and 8-10 on Komatsu are shown below:

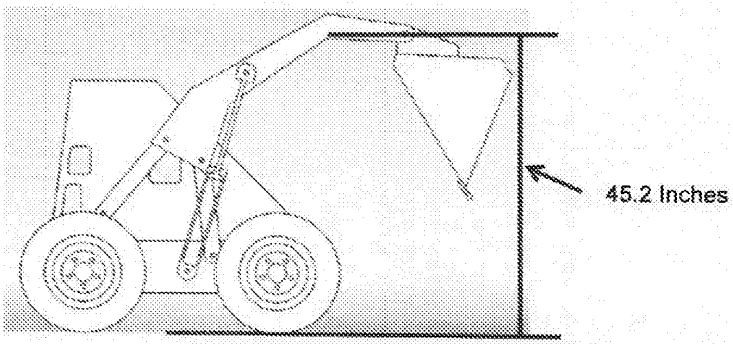


Figure 1: Loader of Figures 1/5 of Komatsu on Dingo 322 in Fully Extended Position

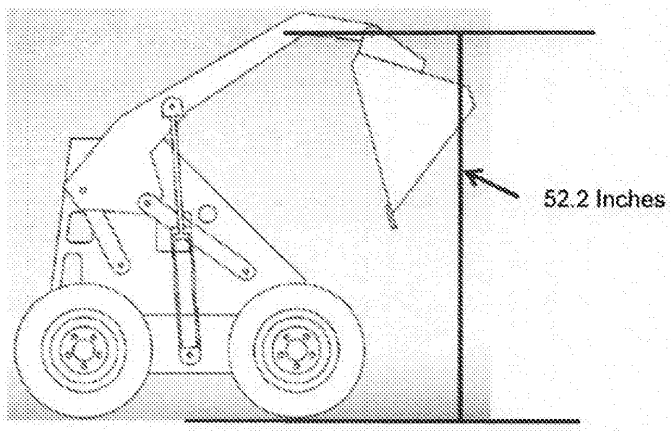


Figure 2: Loader of Figure 6 of Komatsu on Dingo 322 in Fully Extended Position

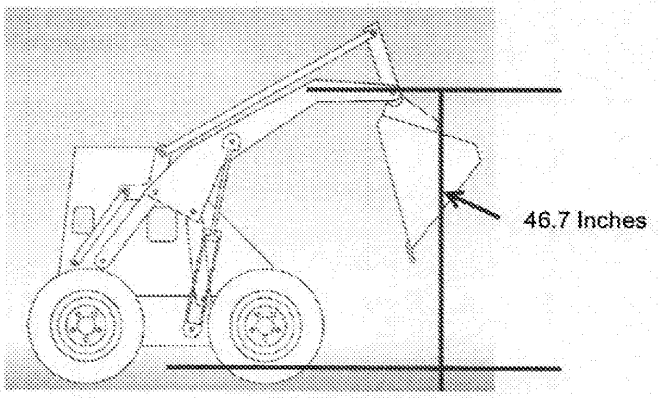


Figure 3: Loader of Figure 8 of Komatsu on Dingo 322 in Fully Extended Position

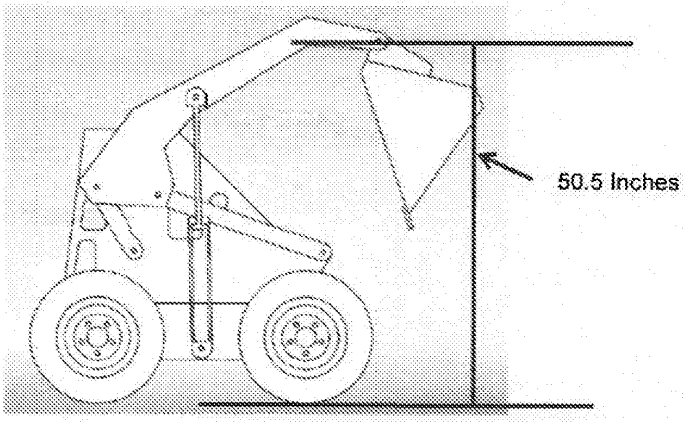


Figure 4: Loader of Figure 9 of Komatsu on Dingo 322 in Fully Extended Position

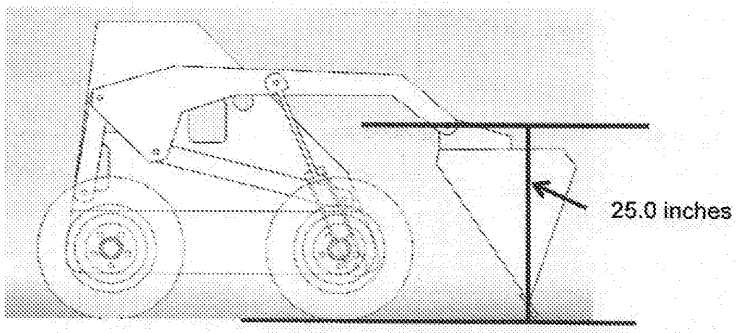


Figure 5: Loader of Figure 10 of Komatsu on Dingo 322 in Fully Extended Position

The highest hinge pin height of the embodiments of Figures 1/5, 6 and 8-10 of Komatsu on Dingo 322 would be the 52.4 inch hinge pin height when the loader of Figure 6 of Komatsu is used (Figure 2).

8. The loader arrangement of Figure 7 of Komatsu on Dingo 322 at its fullest height is shown below.

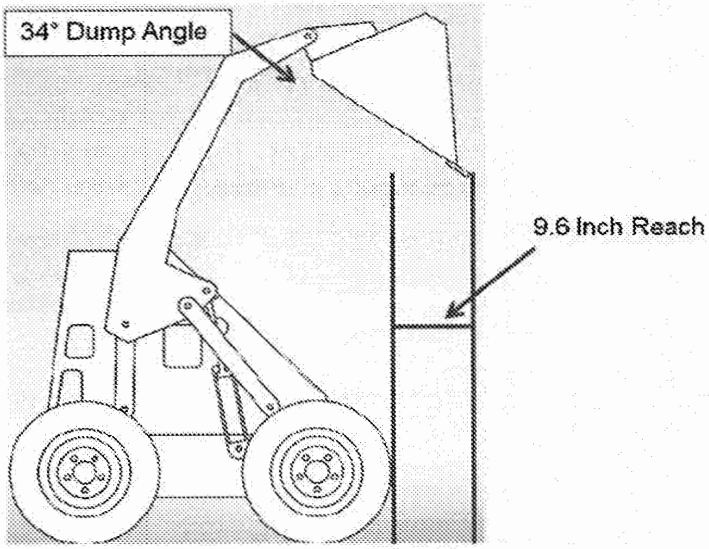


Figure 6: Loader of Figure 7 of Komatsu on Dingo 322 in Fully Extended Position

I measured the reach of the loader of Figure 7 of Komatsu on Dingo 322 at its fullest height. To measure the reach, the distance from the front of the wheels to the front end of the bucket was measured. The reach was measured when the bucket was angled down from the horizontal plane by 34° which was the same angle used in the "Specifications" set forth in Page 2/1-2 of the Dingo 322 Service Manual copied above. The reach of the loader of Figure 7 of Komatsu on Dingo 322 was 9.6 inches.

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the instant application or any patent issued thereon.

Scott Prost-Domasky

Scott Prost-Domasky

6 Dec 2018

Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
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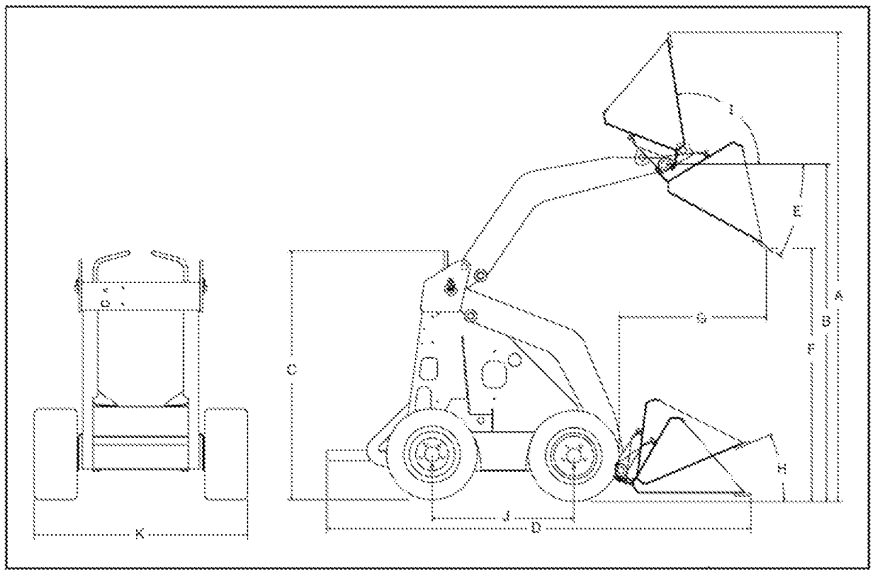
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I. Bucket rollback, fully raised / 97°
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X. = Dimension not shown



Page 2/1-2 of the Dingo 322 Service Manual

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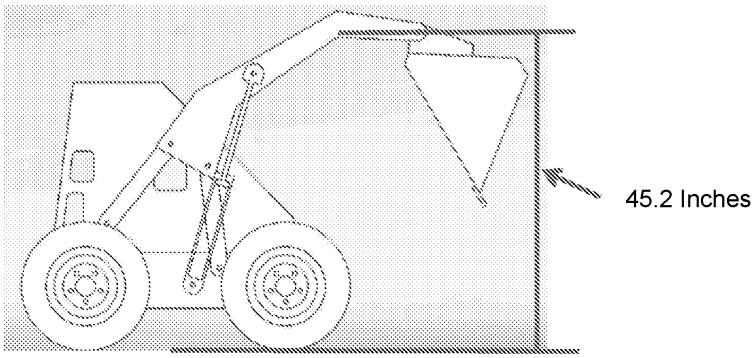


Figure 1: Loader of Figures 1/5 of Komatsu on Dingo 322 in Fully Extended Position

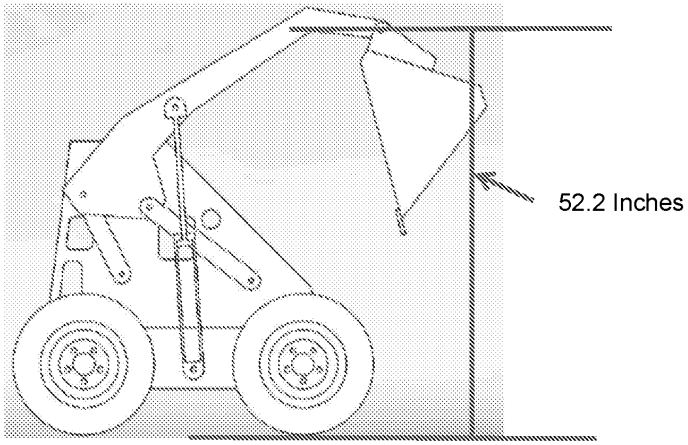


Figure 2: Loader of Figure 6 of Komatsu on Dingo 322 in Fully Extended Position

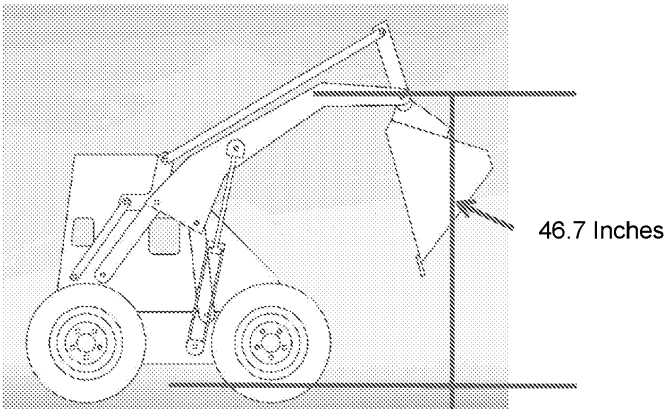


Figure 3: Loader of Figure 8 of Komatsu on Dingo 322 in Fully Extended Position

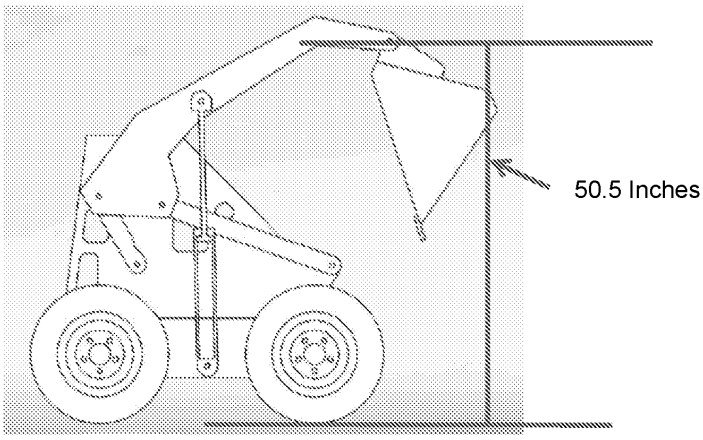


Figure 4: Loader of Figure 9 of Komatsu on Dingo 322 in Fully Extended Position

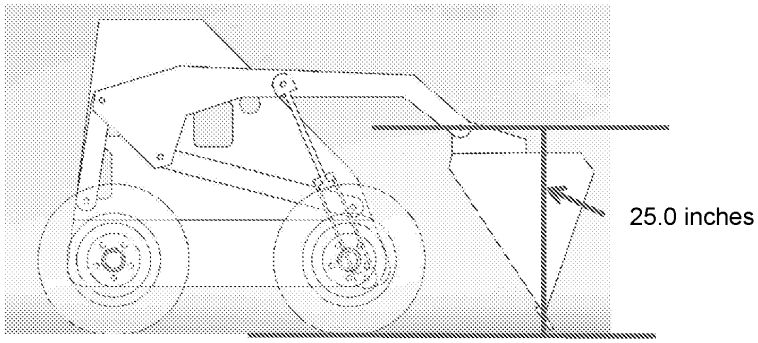


Figure 5: Loader of Figure 10 of Komatsu on Dingo 322 in Fully Extended Position

The highest hinge pin height of the embodiments of Figures 1/5, 6 and 8-10 of Komatsu on Dingo 322 would be the 52.4 inch hinge pin height when the loader of Figure 6 of Komatsu is used (Figure 2).

8. The loader arrangement of Figure 7 of Komatsu on Dingo 322 at its fullest height is shown below.

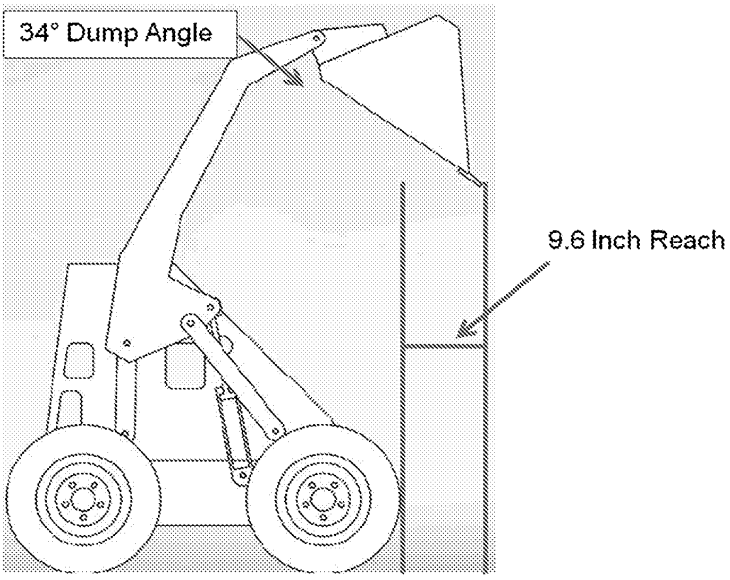


Figure 6: Loader of Figure 7 of Komatsu on Dingo 322 in Fully Extended Position

I measured the reach of the loader of Figure 7 of Komatsu on Dingo 322 at its fullest height. To measure the reach, the distance from the front of the wheels to the front end of the bucket was measured. The reach was measured when the bucket was angled down from the horizontal plane by 34° which was the same angle used in the "Specifications" set forth in Page 2/1-2 of the Dingo 322 Service Manual copied above. The reach of the loader of Figure 7 of Komatsu on Dingo 322 was 9.6 inches.

9. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the instant application or any patent issued thereon.

Scott Prost-Domasky _____ Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

DECLARATION OF LOUIS HARTKE UNDER 37 C.F.R. 1.132

I, Louis Hartke, declare and state as follows:

1. I am an inventor of the subject matter recited in the claims of U.S. Patent No. 9,321,386 ("the '386 Patent") and the presently pending claims of Reexamination Control Nos. 90/014,109 and 90/014,124.

2. I received a Bachelor of Science degree in Agricultural and Biosystems Engineering from North Dakota State University in 1999.

3. I have 19 years of experience in the field of product development, design, manufacturing and engineering including 6 years as a Senior Project Engineer in the area of rental machines including compact utility loaders. I am currently employed by Vermeer Manufacturing Company as a Senior Project Engineer.

4. As an inventor of the '386 Patent, I have read and understand the '386 Patent and the claims thereof and the presently pending claims of Reexamination Control No. 90/014,109 and 90/014,124.

5. I have reviewed the document entitled "Dingo 322, Dingo Compact Utility Loader, Operator's Manual", the document entitled "Dingo 322 Compact Utility Loader, Parts

Catalog" (collectively "Dingo 322"), JP 11-140900 to Komatsu ("Komatsu"), and the brochure entitled "Vermeer S600/S600TX" ("the S600 Brochure").

6. The mainframe of the Dingo 322 compact tool carrier was specifically designed to accommodate a radial lift loader and would not be able to support a vertical lift loader. Dingo 322 connects the loader arms to the mainframe high on the machine and lacks sufficient structure toward the lower portion of the mainframe to support a vertical lift loader. Thus, I do not find it obvious to modify the radial lift loader of Dingo 322 to include vertical lift like that of Komatsu before February 20, 2015, the date that we filed our first patent application describing our invention. Nor would others working on designing and developing equipment in this industry at that time. In fact, I don't believe Dingo 322 can successfully be modified to have a vertical lift loader.

7. Use of any of the vertical lift loader arrangements of Komatsu on the Dingo 322 machine would render Dingo 322 unsuitable for its intended purpose as a compact utility loader. The embodiments of Figures 1[1], 6 and 8-10 of Komatsu would only achieve a hinge pin height (i.e., vertical reach as measured to the hinge pin at which the bucket pivots) of about 52 inches and a dump height of 33 inches when used on Dingo 322. A dump height of 33 inches is inadequate to dump a load into standard receptacles in its field of endeavor (e.g., landscaping use) such as dumpsters, pick-up trucks and the like. A hinge pin height of 52 inches is insufficient to unload a pallet from most trucks and is incompatible with other attachments (e.g., augers used for forming holes) that require relatively high ground clearance.

   Table 1 below shows the published hinge pin heights of various compact utility loaders. The hinge pin heights were taken from published brochures of the manufacturers or were listed on the manufacture's website.

[1] Figures 1 and 5 of Komatsu show the same embodiment in lowered and raised positons, respectively.

Model	Introduction Year	Hinge Pin Height (In.)
Bobcat MT52	2003	71.3
Bobcat MT55	2004	71.2
Bobcat MT85	2015	80.9
Boxer 427	2005	70
Boxer 532DX	2008	76
Boxer 950HD	2016	95
Ditch Witch SK500	2003	81
Ditch Witch SK650	2006	81
Ditch Witch SK850	2014	83
Ditch Witch SK1050	2016	83
Ditch Witch SK1550	2017	94.5
Toro Dingo 322	1999	66
Toro Dingo TX420	2000	90.1
Toro Dingo TX525	2006	65.8
Toro Dingo TX1000	2015	81
Vermeer S600TX	2005	80
Vermeer S400TX	2007	69
Vermeer S450TX	2012	72
Vermeer CTX 50	2015	72
Vermeer CTX100	2016	88

Table 1. Sampling of Hinge Pin Heights of Commercial Compact Utility Loaders

The maximum hinge pin height of about 52 inches of the embodiments of Figures 1, 6 and 8-10 of Komatsu as used on Dingo 322 is at least 14 inches less than the lowest hinge pin height of the compact utility loaders of Table 1.

The embodiment of Figure 7 of Komatsu would only achieve a reach when the loader is fully raised of about 9.6 inches. A reach of about 9.6 inches is inadequate to dump a load into a dumpster or pick-up truck. The reduced reach does not allow a load to be placed at or near the middle of a truck bed to distribute the load and reduces the ability to reach loads (e.g., pallets) that are spaced from an edge (e.g., truck edge).

Table 2 below shows the published reach at full height of various compact utility loaders. These parameters were taken from published brochures of the manufacturers or were listed on the manufacture's website. The reach for the Vermeer machines was physically measured internally by Vermeer employees.

Model	Introduction Year	Reach, Fully Raised (In.)
Bobcat MT52	2003	20.3
Bobcat MT55	2004	20.3
Bobcat MT85	2015	18.6
Toro Dingo 322	1999	26
Toro Dingo TX420	2000	21.8
Toro Dingo TX525	2006	21.8
Toro Dingo TX1000	2015	24.5
Vermeer S600TX	2005	27.3
Vermeer S400TX	2007	21.8
Vermeer S450TX	2012	19.3

Model	Introduction Year	Reach, Fully Raised (In.)
Vermeer CTX 50	2015	19.7
Vermeer CTX100	2016	22.6

Table 2. Sampling of Reach at Full Height of Commercial Compact Utility Loaders

The reach of about 9.6 inches of the loader of Figure 7 of Komatsu as used on Dingo 322 is about 10 inches less than the lowest reach of the compact utility loaders of Table 2 (i.e., is about 50% of the reach of the compact utility loaders of Table 2).

Each of the embodiments of Komatsu would not enable Dingo 322 to operate for its intended use as a compact utility loader.

8. The field of endeavor of the '386 Patent is unpredictable. Small changes to pivot points, weight distribution, and the like in vertical lift loaders cause significant changes in the lift profile and lift capacity of the machine. The unpredictable nature of these changes is exaggerated in compact utility loaders because of the relatively small mass of the machine and restrictions on where components may be placed.

9. When developing the compact utility loader claimed in the '386 Patent, I observed unpredictability in the behavior of compact utility loaders. During development of the compact utility loader claimed in the '386 Patent, several loader arrangements were attempted that were unsuccessful. The lift profile of the initial prototype of a compact utility loader having a loader that was not directly attached to the mainframe and instead attached by a linkage and actuator arrangement is shown in Figure 1A.

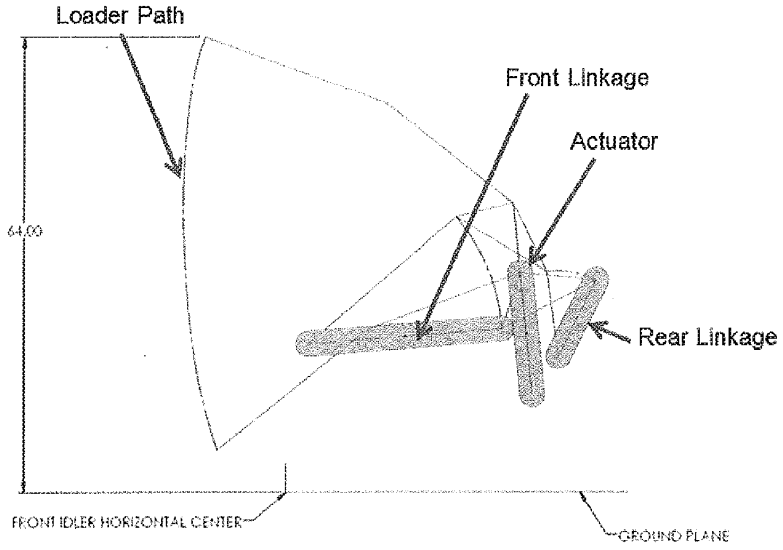


Figure 1A: Lift Path of the First Prototype

The loading profile of the first prototype is shown in Figure 1B[2]:

[2] In Figures 1B, 2B and 3B the lift capacity is the lower curve, the front linkage loading is the middle curve, and the rear linkage loading is the highest curve.

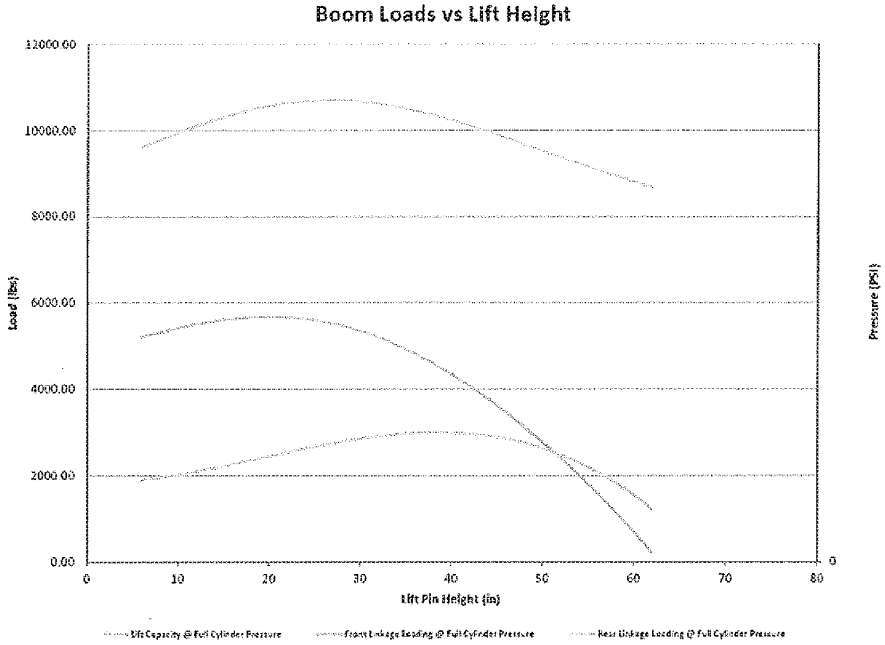


Figure 1B: Loading Profile of the First Prototype

To improve the stability of the first prototype of the compact utility loader, the mainframe was lengthened in a second prototype. The lift profile of this second prototype is shown in Figure 2A:

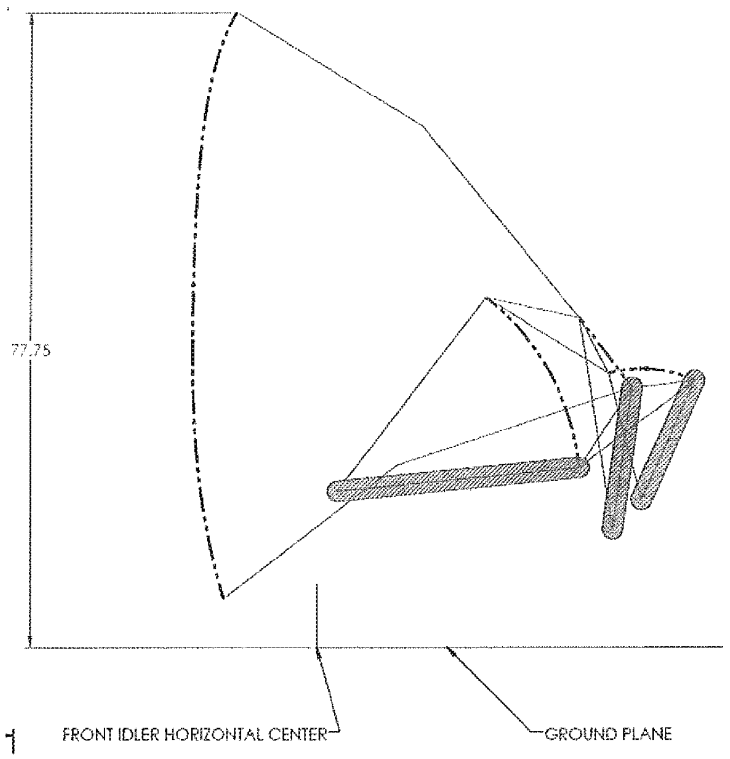


Figure 2A: Lift Profile of the Second Prototype

The linkages and actuators from the smaller initial prototype were scaled up for the second prototype. Scaling-up proved unsuccessful as shown in the lift profile of Figure 2B below.

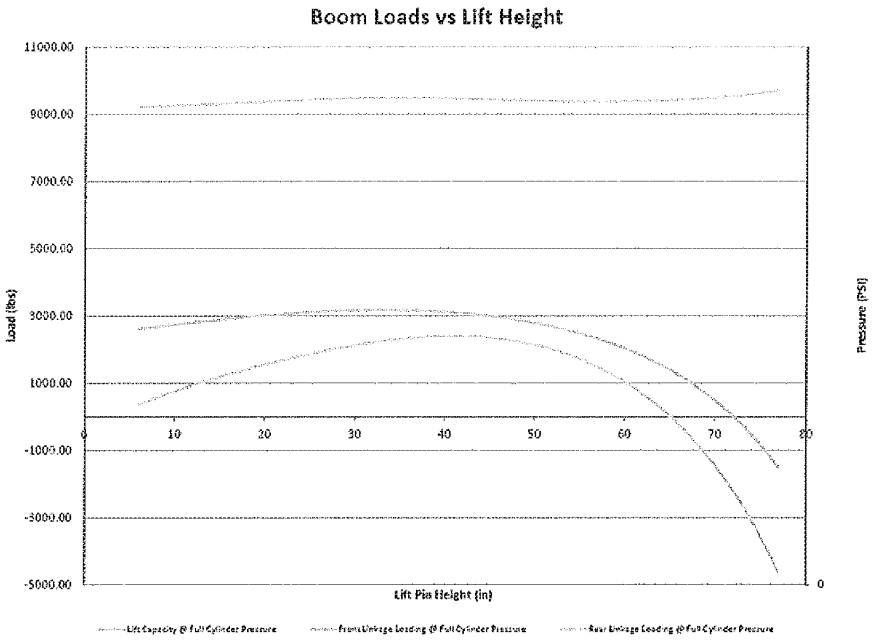


Figure 2B: Loading Profile of the Second Prototype

As shown in Figure 2B, the second prototype would not be able to support a load during initial lifting and at its full extension as shown by the lift capacity curve (e.g., at less than about 5 inches of hinge pin height and beyond about 65 inches). Mathematical modeling and free-body diagram construction indicated that the second prototype would only be able to lift a load of 192 pounds when the loader was lifted from the supporting surface which is nearly insufficient to even lift the weight of the bucket when empty.

In a third prototype, the pivot point of the actuator in the mainframe was moved **slightly rearward** as shown in Figure 3A:

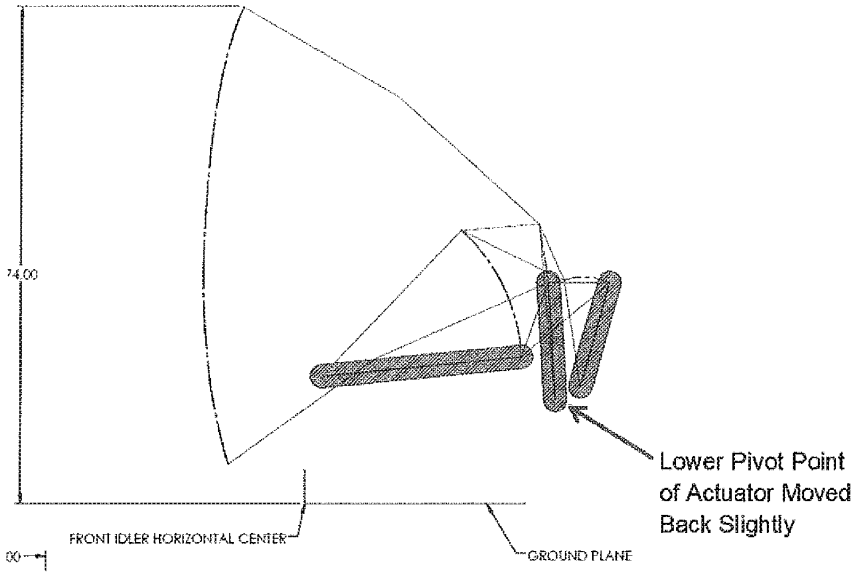


Figure 3A: Lift Profile of an Embodiment of the '386 Patent

This resulted in a much improved loading profile shown in Figure 3B:

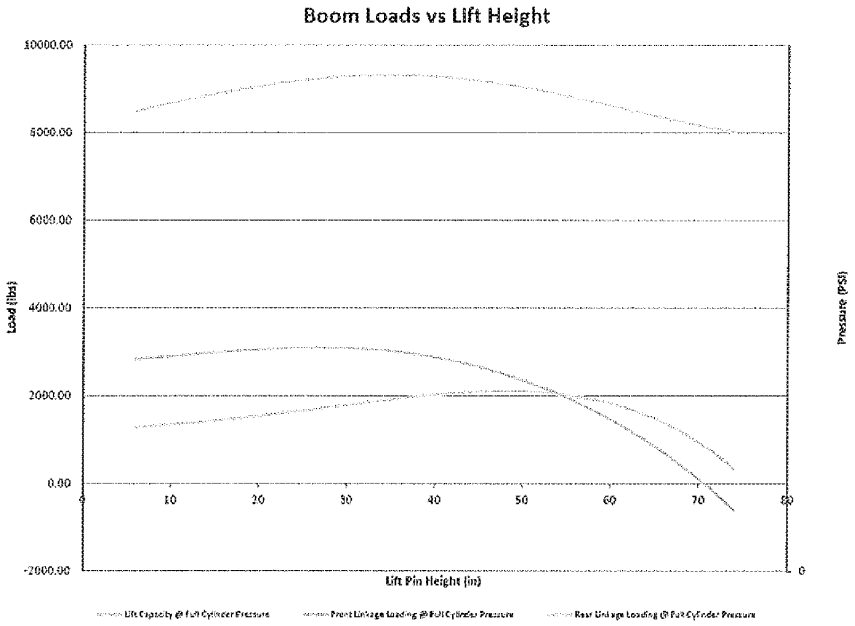


Figure 3B: Loading Profile of Third Prototype

The lift profile of Figure 3A was incorporated into Vermeer's CTX50 commercial compact utility loader.

In my experience, development of a compact tool carrier having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and in which the loader is not directly attached to the mainframe was unpredictable.

10. When developing the compact tool carrier that led to the '386 Patent, state of the art tools were used including solid modeling software from Solidworks, finite element analysis software from ANSYS, in-house programming for evaluation of loading and force analysis, stress coating, strain gauging and cycle test stands. Despite resorting to these state of the art tools, prototypes failed or were not capable of operation (e.g., were unable to lift a target load).

11. When developing the invention as set forth in claim 1 of the '386 Patent, I was highly skeptical as to whether it would be possible to develop a compact utility loader having a loader that was not directly attached to the mainframe (i.e., a vertical lift compact utility loader) as set forth in claim 1 of the '386 Patent. I did not believe the compact design of a compact utility loader could sufficiently support and absorb the stresses of a vertical lift loader.

12. I am familiar with terminology used by Vermeer and others to describe compact utility loaders and the components thereof. I develop commercial compact utility loaders and regularly attend trade shows in which compact utility loaders are featured. I regularly review industry standards that relate to compact utility loaders and review patent literature related to compact utility loaders. As a person who has worked on designing and developing equipment in this industry, I consider the "mainframe" of a compact utility loader to be the body of the machine that supports the loader. Because the triangular gussets and operator platform of Dingo 322 do not support the loader, the gussets and platform are not part of the mainframe.

13. Because the field of endeavor of the '386 Patent is unpredictable, many failures were experienced during development of the loader arrangement of claim 1 of the '386 Patent. For example, catastrophic fracture of the loader arm occurred (Figure 4).

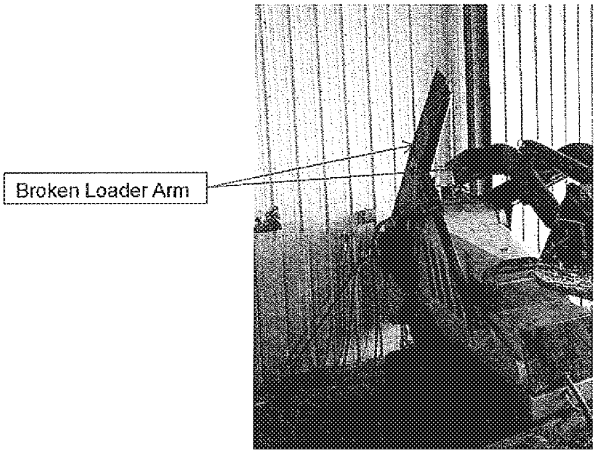


Figure 4

This failure occurred because of indirect attachment of the loader arm to the mainframe in this prototype. Changes in stiffness and in the load transfer characteristics of the vertical lift loader relative to a simpler radial boom configuration were not fully understood and appreciated during initial development.

During testing to develop the loader of claim 1 of the '386 Patent, breakage (Figure 5) and bending (Figure 6) of pivot pin retainers were experienced.



Figure 5

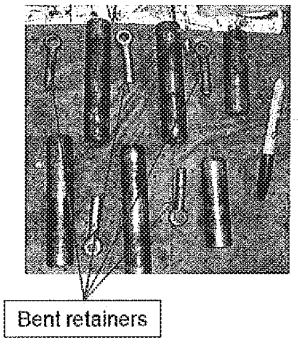


Figure 6

These failures were caused by differences in (1) the relative movement of the vertical lift components, (2) differences in the load transfer characteristics of the vertical lift components, and (3) the use of additional pinned joints which is a characteristic of a vertical lift loader as compared to a radial lift loader. These failures occurred in part because even small changes to pivot points, weight distribution, and the like in vertical lift machines cause significant and unpredictable changes in the lift profile of the machine.

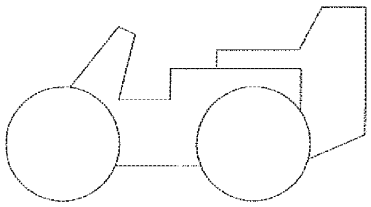
14. The mainframes of Komatsu and Dingo 322 are dissimilar. People developing equipment in this industry do not consider the protective cage in which the operator sits in the loader of Komatsu (and of full sized skid steers in general) to form part of the mainframe because the protective cage does not support the loader.



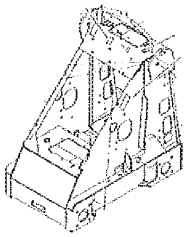
Protective Cage does not Support Loader

Figure 7

The Komatsu mainframe shown below is elongated and does not extend toward the top of the machine. The mainframe of Dingo 322 is more angular and extends upward toward the top of the machine.



Komatsu Mainframe



Dingo 322 Mainframe

Persons working on designing and developing equipment in this industry would not consider the mainframes of Komatsu and Dingo 322 to be similar in design.

15. A principal consideration in the development of compact utility loaders is to develop machines that are able to lift heavier loads without adding excessive weight to the machine and while maintaining a small footprint (i.e., length and width of the machine). The tip capacity of the loader is the industry standard to express the ability of the machine to lift a load. Tip capacity is measured by determining the highest load that may be applied to the bucket of the machine without tipping the machine forward. As shown in Figure 8[3] below, the industry has incrementally increased lift capacity over the last 20 years.

[3] Figure 8 was prepared by calculating the ratio of the published tipping capacity to the published machine weight for various compact utility loaders. The significant gap between the tip ratio shown for Toro's TX-1000 (the most recent machine shown for Toro and which is vertical lift) and those shown for Vermeer's CTX-100 and CTX-50 machines (also vertical lift) is the result of Vermeer's application of an additional safety factor in the machine specifications that it provides to the public. In addition to the ISO Standard 14397-1:2007 that Toro applies to derive the maximum lift capacity for its machine, Vermeer applies an additional test that results in a further decrease of its maximum lift capacity. If Toro and Vermeer's machines were compared in an "apples to apples" fashion using only the ISO Standard 14397-1:2007 test, Vermeer's maximum lift capacities—and therefore its tip ratios—would be higher. Figure 8 also includes two Bobcat models in which the weight as published included the weight of the bucket. A weight of a standard bucket (about 165 lb) was subtracted from the weight as published to maintain consistency in the data of Figure 8.

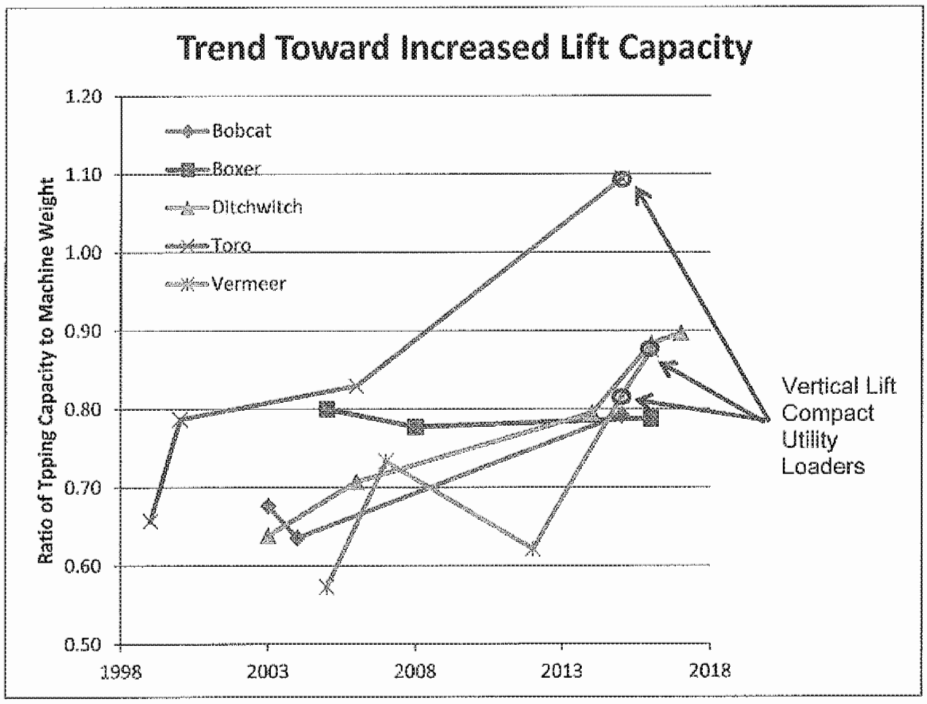


Figure 8

The industry did not turn to vertical lift loaders despite vertical lift loaders being able to increase lift capacity by 32% as noted below.

16. By using a linkage and an actuator to support the loader (i.e., a vertical lift loader) as set forth in claim 1 of the '386 Patent, the lift capacity of an embodiment of the invention was increased by 32% relative to the radial lift S450TX compact tool carrier without increasing the weight of the machine. The lift capacities were measured in accordance with ISO Standard 14397-1:2007 entitled "Earth-moving Machinery - Loaders and backhoe loaders – Part 1: Calculation of rated operating capacity and test method for verifying calculated tipping load."

17. Despite this need for increased lift, the industry did not develop vertical lift compact utility loaders. For example, manufacturers shifted from "walk-behind" machines to

predominantly "ride-on" machines. Manufacturers of ride-on machines are permitted to incorporate an average weight of an operator (165 lb standard) in the tip capacity testing which generally increases the rated lift capacity. Other manufacturers have included "weight kits" that add weight to the back of the machine to increase lift capacity while sacrificing ground clearance (Figure 9).

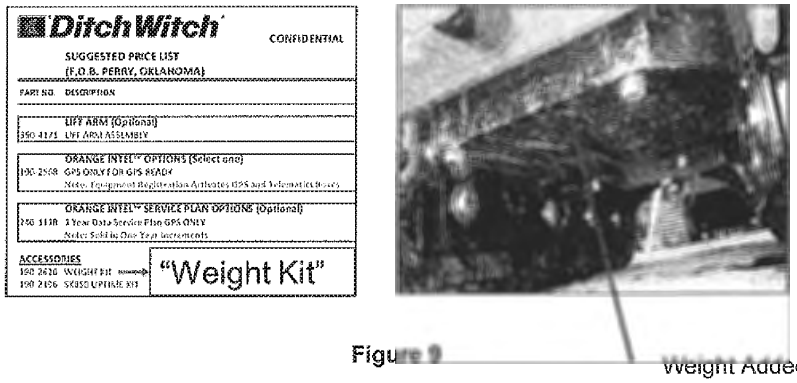


Figure 9 Weight Added toward Rear of Compact Utility Loader

Commercial users have even bolted their own counter-weights near the rear of the machine to increase lift capacity (Figure 10):



Weight Added by Customers

Figure 10

These attempts by others have resulted, at best, in incremental increases in the rated lift capacity of the compact tool carrier.

18. The distances set forth in claim 15 in which the distance between the rotational axis and the pivot points of the linkage and actuator in the mainframe are (1) less than 1.5 times the distance between the rotational axis and the bottom of the compact tool carrier (1.5 D1) and (2) less than twice the distance between the rotational axis and the bottom of the first side of the mainframe (2.0 D5) are significant. These characteristics directly relate to the low profile character of the compact utility loader. A compact utility loader having these distances has relatively low pivot points and/or includes a rotational axis or mainframe that is relatively close to the ground. By lowering the pivot points, the stiffness of the mainframe increases which allows the weight of the mainframe to be reduced. Lowering the pivot points also lowers the center of gravity of the mainframe.

19. The Dingo 322 mainframe lacks sufficient area to position the pivot points of a linkage and actuator such that the distances between the pivot points and the rotational axis are less than twice the distance (2.0 D5) between the rotational axis and the bottom of the mainframe as recited in claim 15. Dingo 322 has a relatively small distance D5 between the bottom of the mainframe and the rotational axis of

the wheels as shown in Figure 11[4] below. Stated differently, Dingo 322 has a *relatively high mainframe* relative to the wheels to increase ground clearance.

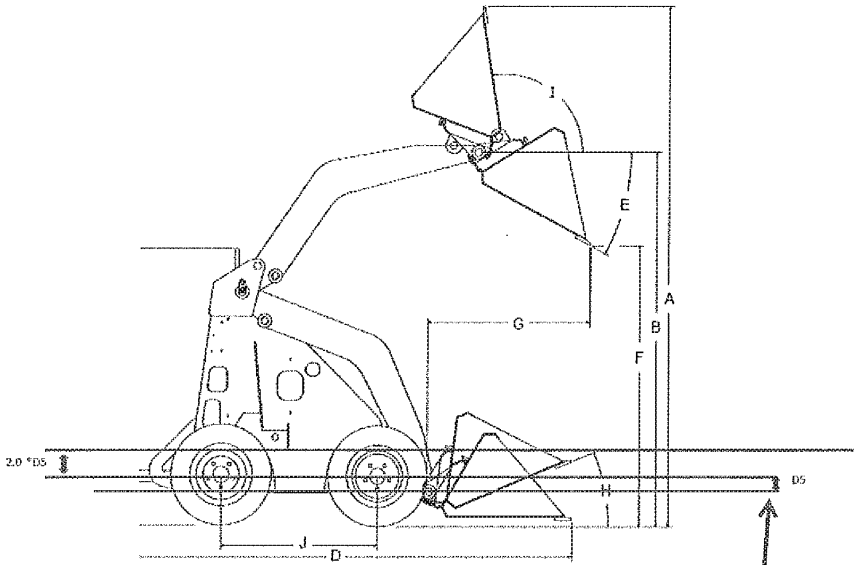


Figure 11

The available space to position the actuator and linkage pivot points such that the distance between the pivot points and the rotational axis is less than 2.0 D5 is small as shown in Figure 12[5]:

[4] The distances on Figure 11 were determined by measuring the distance D5 between the rotational axis of the wheels and the bottom of the mainframe in Dingo 322 as shown on page 2/1-2 of the Dingo 322 Service Manual. The distance from the rotational axis that is twice D5 is also indicated on Figure 11.

[5] Figure 12 was obtained by filling the available space in the mainframe in which the distance between the rotational axis of the wheels is less than 2.0 D5.

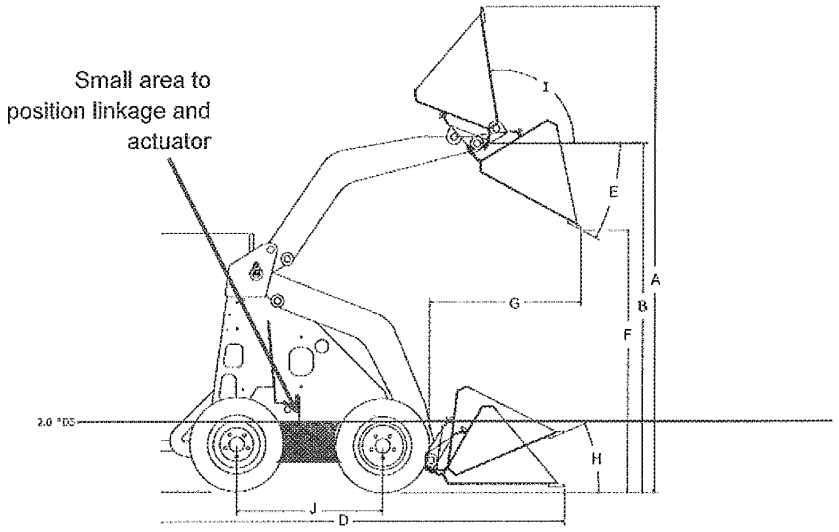


Figure 12: The available space for actuator and linkage pivot points (2.0 D5)

If this was attempted on the Dingo 322 mainframe, the linkage and actuator would not be able to move back and forth as required in a vertical lift loader arrangement. Also, the pivot points cannot be positioned within this area in the Dingo 322 mainframe because the hydraulics of the Dingo 322 machine are positioned throughout the space as further explained below.

20. As disclosed in the Dingo Service Manual, Dingo 322 was available in a "4-Paw" drive system in which each wheel was driven by a hydraulic motor. The Service Manual discloses diesel and gas versions of Dingo 322 that appear to have identical "4-Paw" hydraulic drive systems.

Drive System

Model	220		222	220D, 320D	322	323	
	22311	22317	22300 22304	22302 22303	22305	22312	22318
Chain Drive	X	X	X				
4-Paw				X	X	X	X

Chain Drive Models:
All four wheels are powered. The two rear wheels are individually driven by hydraulic rotor vane motors. Each front wheel is chain driven from the rear wheels via #60H chain.

4-Paw Models:
All four wheels are powered. Each wheel is individually driven by a hydraulic roller vane motor.

Page 2/1-6 of the Dingo Service Manual

A partial view of the 4-Paw Dingo 322 machine is shown on Figure 1262 of the Dingo 322 Service Manual. The distance between the bottom of the mainframe and the rotational axis (D5) and the area encompassed by twice this distance (2.0 D5) in which the pivot points in which a linkage and an actuator are pivotally connected to the mainframe are shown in the annotated figure[6] below:

[6] Distances D5 and 2.0 D5 as shown on annotated Figure 1262 were determined by measuring the distance D5 between the bottom of the mainframe and the rotational axis of the wheels in Figure 1262. Twice D5 was then calculated. Both D5 and 2.0 D5, as determined, are shown on annotated Figure 1262.

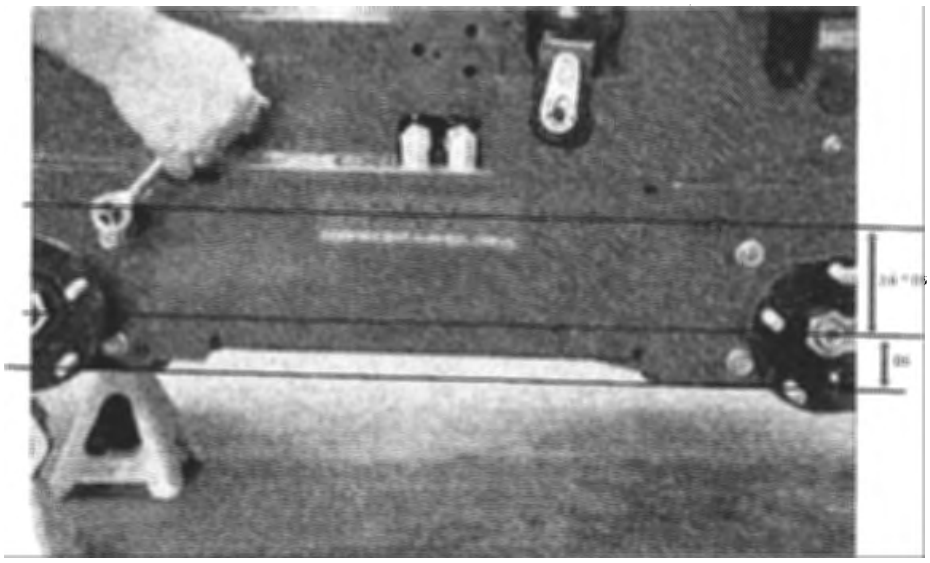


Figure 1262 of the Dingo 322 Service Manual

The area available to position the pivot points is very limited and insufficient to allow a linkage and actuator to swing back and forth as in a vertical lift loader arrangement. Further, this area is **unavailable to position the pivot points** because this portion of Dingo 322 **houses the hydraulics that drive the motors** as show in Figure 0888[7] from the Service Manual:

[7] Figure 0888 was annotated to show 2.0 D5 by positioning the line at the same location as in Figure 1262 above (i.e., as intersecting the top bolt holes at which the cover plate is fastened to the mainframe).

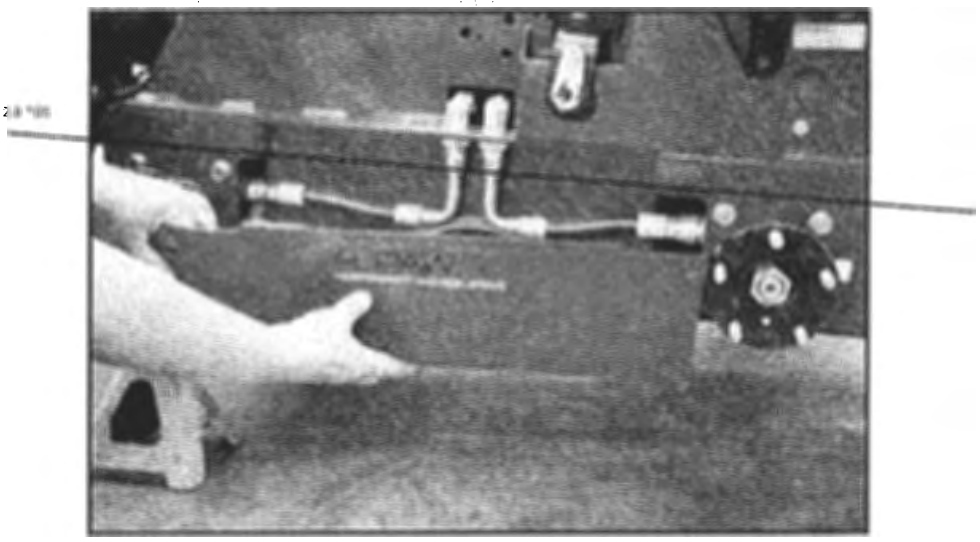


Figure 0888 of the Dingo 322 Service Manual

The pivot points could not be positioned between the rotational axis and twice D5 because of the limited space to do so and because this area houses the hydraulic components beneath the cover plate as shown in Figure 0888. To eliminate the hydraulics that power the motors would render Dingo 322 incapable of its intended

purpose as a compact utility loader or would drastically change the principle of operation of Dingo 322[8].

If Dingo 322 were modified to include an actuator and linkage within twice D5, Dingo 322 would also be rendered unsuitable for its intended purpose to accommodate over-the-tire tracks available for purchase from Toro:

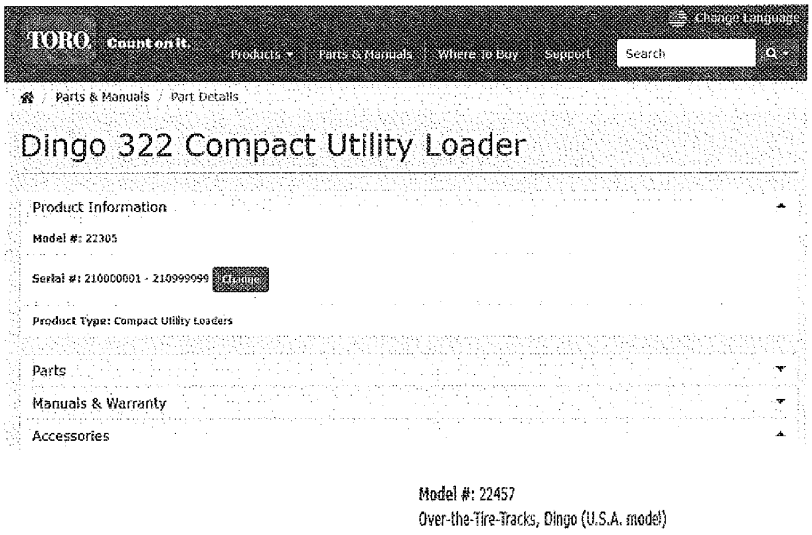


Figure 13 (https://www.toro.com/en/parts/partdetails/?id=23629)

[8] Dingo 322 was *not* available in a chain drive as shown on Page 2/1-6 of the Dingo Service Manual. Even if it had a chain drive, a person working on designing and developing equipment in this industry could not modify Dingo 322 as proposed by the Office because the chain is positioned in the area between the rotational axis and twice D5:



Fig. 0279 (page 4/1-2 of Service Manual).

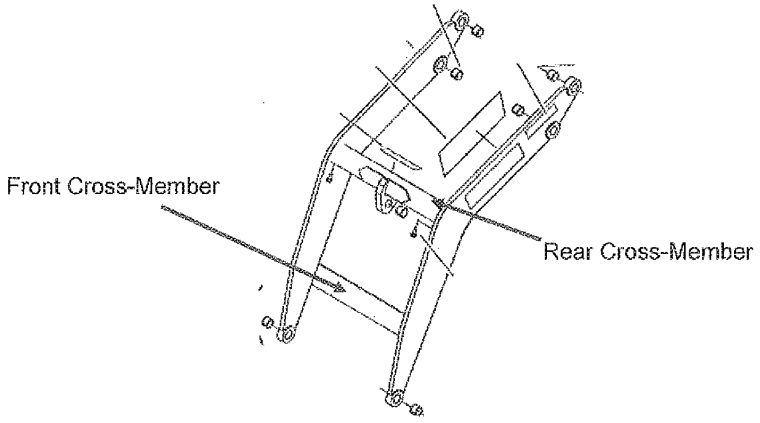
The pivot point location of the actuator and linkage in the mainframe of Dingo 322 cannot be less than twice D5 because Dingo 322 cannot accommodate the over-the-tire tracks for which Dingo 322 was designed for use if the actuator and linkage were positioned in this area:



Figure 14

For these reasons, people designing and developing equipment in this industry would not have modified Dingo 322 to include pivot points in which a linkage and an actuator are pivotally connected to the mainframe that are positioned less than twice the distance between the bottom of the mainframe and the rotational axis (2.0 D5) as recited in claim 15.

21. Those designing and developing equipment in this industry also would not have modified Dingo 322 to have a single cross member as recited in claim 38. With reference to Sheet No. 2 on page 1 of the Dingo Parts Catalog, the Dingo 322 loader includes two cross-members that extend between the two loader arms.



Sheet No. 2 of the Dingo 322 Parts Catalog

As shown in the sketch below, the front and rear cross-members of the Dingo 322 loader allow the loader to behave as a structural "box" in which forces may be distributed side-to-side across the loader.

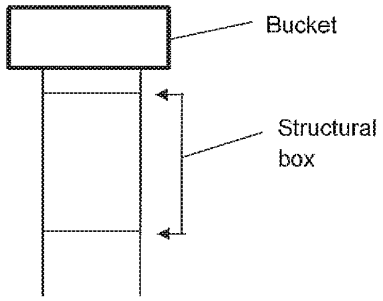


Figure 15

If a cross-member of Dingo 322 were eliminated, the behavior of the loader would change significantly because the loader is less able to laterally communicate or absorb the forces applied to the loader across the loader (i.e., from side-to-side). This loss of strength cannot be mitigated by strengthening the remaining cross-member as the loader would remain less laterally stable. The remaining cross-member of Dingo 322 would be prohibitively heavier with complex transitions which

would negatively affect machine weight, stability and operator visibility through the travel path.

22. With reference to Figure 1[9] of Komatsu, the pivot point formed between the actuator and the mainframe is below the rotational axis and not above the rotational axis as recited in claim 66.

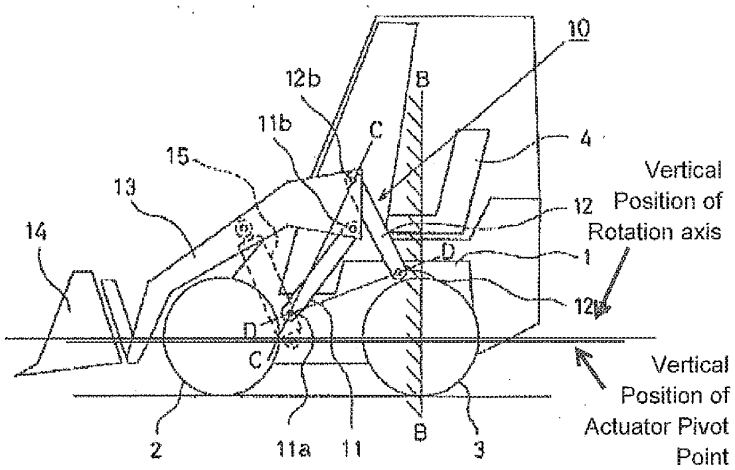


Figure 1 of Komatsu

23. Komatsu does not include a linkage pivot point that is above the wheels and is spaced between the rotational axis and a distance that is less than 2.0 D5 as recited in claim 67. As shown in Figure 16[10] below, the only linkage of Figure 1 of

[9] Figure 1 of Komatsu was annotated by determining the midpoint between the top and bottom of the wheels to find the rotational axis of the wheels. The height of the actuator pivot point is also shown in Figure 1 of Komatsu.

[10] The various ratios of Komatsu shown at the bottom portion of Figure 16 were determined by measuring the respective distances and calculating the ratio (e.g., by measuring the vertical distance D2 between the forward linkage pivot point and the rotational axis and measuring the distance D5 between the rotational axis and the bottom of the mainframe and calculating D2 divided by D5).

Komatsu having a distance between the rotational axis and the pivot point connecting it to the mainframe of less than twice D5 is the forward linkage (D2/D5=1.0 while D3/D5=2.47).

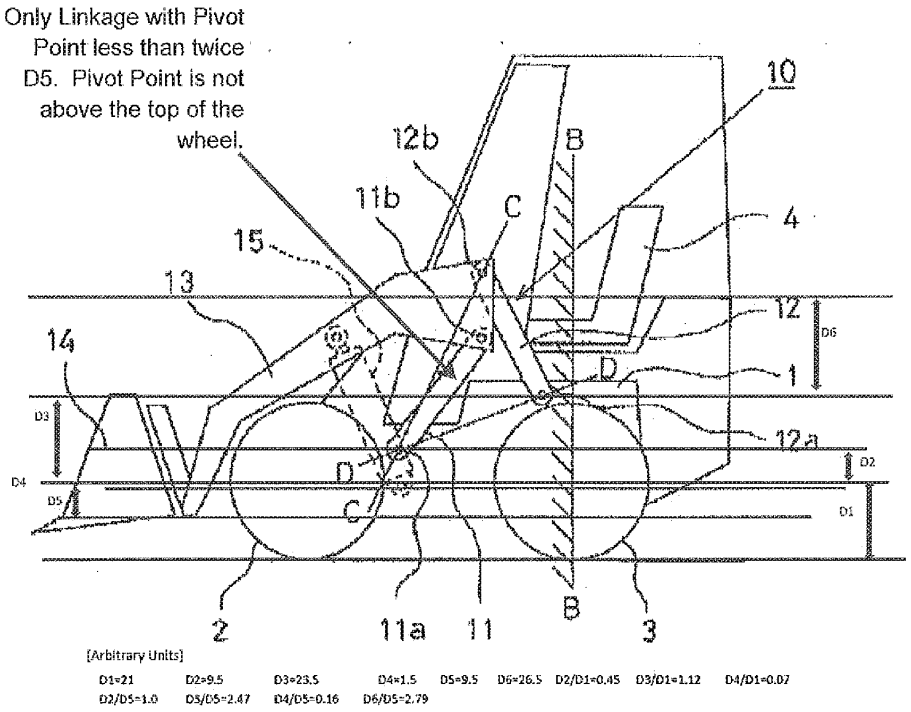


Figure 16

The pivot point between the forward linkage and mainframe is not above the wheel as recited in claim 67.

Further, Dingo 322 is not able to position a linkage pivot point that is above the wheels and is spaced between the rotational axis and a distance that is less than

2.0 D5. In the Dingo 322 machine, the entire area defined by 2.0 D5 is below the wheels as shown in Figure 17[11]:

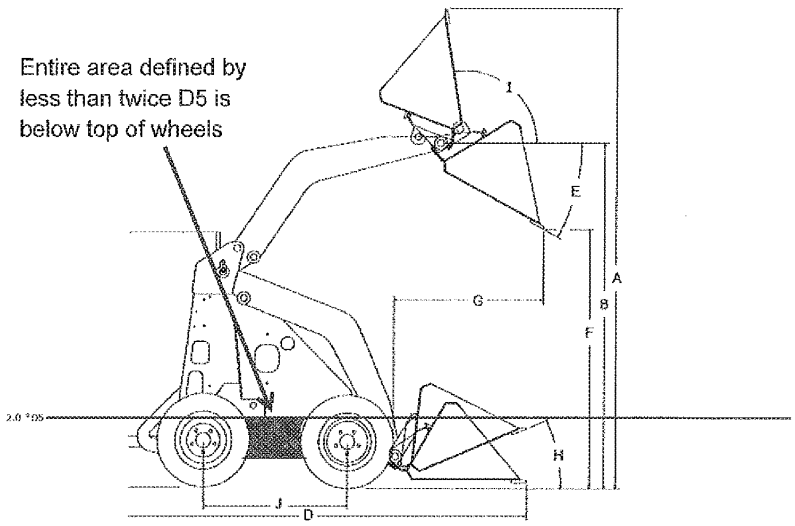


Figure 17

Dingo 322 is not able to position a linkage pivot point that is above the wheels and is spaced between the rotational axis and a distance that is less than 2.0 D5 as recited in claim 67.

24. Komatsu does not include a cross-member that is disposed fully forward of a connection between the actuator and the loader arm as recited in claim 46. Because the connection made by the piston arms 16a of Figure 3 of Komatsu is not shown, it is not evident whether the piston arms 16a connect to the loader arm 13 or to the cross-member:

[11] Figure 17 corresponds to Figure 12 above.

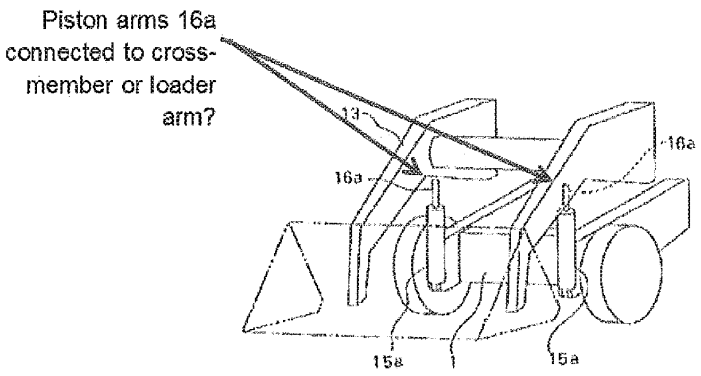


Figure 3 of Komatsu

Even if the piston arms 16a were connected to the loader arm, Figure 3 does not show or otherwise indicate that the cross-member is disposed *fully forward* of a connection between the actuator and the loader arm as recited in claim 46.

25. People working on designing and developing new equipment in this industry would not have arrived at a compact tool carrier having tracks with a portion of the tracks angling downward with a linkage pivot point being above the portion of the tracks that angles downward as recited in claim 71 based on Dingo 322 or Komatsu. Figure 9 of Komatsu is the only embodiment of Komatsu which includes tracks. The tracks are over-the-tire tracks and do not include an angular portion.

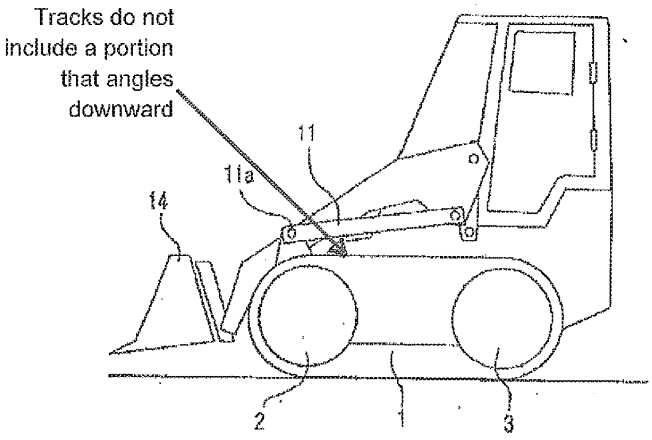


Fig. 9 of Komatsu

In regard to Dingo 322, Dingo 322 is adapted to operate with over-the-tire tracks. The tracks also do not include a portion that angles downward.

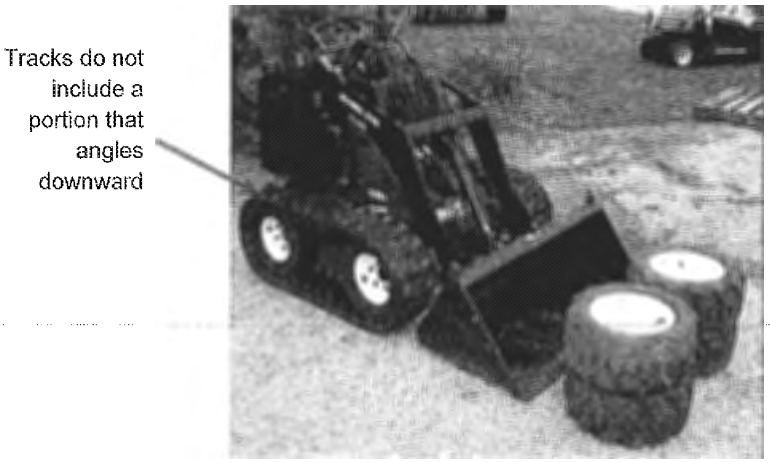


Figure 18

26. People developing equipment in this industry would not have arranged the first linkage pivot point, second linkage pivot point, and actuator pivot point such that

each pivot point is (1) disposed above the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe or (2) disposed between the tracks and the rear end of the mainframe as recited in claim 74. Each embodiment of Komatsu would involve pivot points that are *below* the tracks. Further, Komatsu expressly discloses that the pivot points should be forward of the center of the rear wheel (e.g., para. [0008]) to allow side egress by the operator.

27. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the instant application or any patent issued thereon.

Louis Hartke

12/6/18
Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

DECLARATION OF LOUIS HARTKE UNDER 37 C.F.R. 1.132

I, Louis Hartke, declare and state as follows:

1. I am an inventor of the subject matter recited in the claims of U.S. Patent No. 9,321,386 ("the '386 Patent") and the presently pending claims of Reexamination Control Nos. 90/014,109 and 90/014,124.

2. I received a Bachelor of Science degree in Agricultural and Biosystems Engineering from North Dakota State University in 1999.

3. I have 19 years of experience in the field of product development, design, manufacturing and engineering including 6 years as a Senior Project Engineer in the area of rental machines including compact utility loaders. I am currently employed by Vermeer Manufacturing Company as a Senior Project Engineer.

4. As an inventor of the '386 Patent, I have read and understand the '386 Patent and the claims thereof and the presently pending claims of Reexamination Control No. 90/014,109 and 90/014,124.

5. I have reviewed the document entitled "Dingo 322, Dingo Compact Utility Loader, Operator's Manual", the document entitled "Dingo 322 Compact Utility Loader, Parts

Catalog" (collectively "Dingo 322"), JP 11-140900 to Komatsu ("Komatsu"), and the brochure entitled "Vermeer S600/S600TX" ("the S600 Brochure").

6. The mainframe of the Dingo 322 compact tool carrier was specifically designed to accommodate a radial lift loader and would not be able to support a vertical lift loader. Dingo 322 connects the loader arms to the mainframe high on the machine and lacks sufficient structure toward the lower portion of the mainframe to support a vertical lift loader. Thus, I do not find it obvious to modify the radial lift loader of Dingo 322 to include vertical lift like that of Komatsu before February 20, 2015, the date that we filed our first patent application describing our invention. Nor would others working on designing and developing equipment in this industry at that time. In fact, I don't believe Dingo 322 can successfully be modified to have a vertical lift loader.

7. Use of any of the vertical lift loader arrangements of Komatsu on the Dingo 322 machine would render Dingo 322 unsuitable for its intended purpose as a compact utility loader. The embodiments of Figures 1[1], 6 and 8-10 of Komatsu would only achieve a hinge pin height (i.e., vertical reach as measured to the hinge pin at which the bucket pivots) of about 52 inches and a dump height of 33 inches when used on Dingo 322. A dump height of 33 inches is inadequate to dump a load into standard receptacles in its field of endeavor (e.g., landscaping use) such as dumpsters, pick-up trucks and the like. A hinge pin height of 52 inches is insufficient to unload a pallet from most trucks and is incompatible with other attachments (e.g., augers used for forming holes) that require relatively high ground clearance.

   Table 1 below shows the published hinge pin heights of various compact utility loaders. The hinge pin heights were taken from published brochures of the manufacturers or were listed on the manufacture's website.

[1] Figures 1 and 5 of Komatsu show the same embodiment in lowered and raised positons, respectively.

Model	Introduction Year	Hinge Pin Height (In.)
Bobcat MT52	2003	71.3
Bobcat MT55	2004	71.2
Bobcat MT85	2015	80.9
Boxer 427	2005	70
Boxer 532DX	2008	76
Boxer 950HD	2016	95
Ditch Witch SK500	2003	81
Ditch Witch SK650	2006	81
Ditch Witch SK850	2014	83
Ditch Witch SK1050	2016	83
Ditch Witch SK1550	2017	94.5
Toro Dingo 322	1999	66
Toro Dingo TX420	2000	90.1
Toro Dingo TX525	2006	65.8
Toro Dingo TX1000	2015	81
Vermeer S600TX	2005	80
Vermeer S400TX	2007	69
Vermeer S450TX	2012	72
Vermeer CTX 50	2015	72
Vermeer CTX100	2016	88

Table 1. Sampling of Hinge Pin Heights of Commercial Compact Utility Loaders

The maximum hinge pin height of about 52 inches of the embodiments of Figures 1, 6 and 8-10 of Komatsu as used on Dingo 322 is at least 14 inches less than the lowest hinge pin height of the compact utility loaders of Table 1.

The embodiment of Figure 7 of Komatsu would only achieve a reach when the loader is fully raised of about 9.6 inches. A reach of about 9.6 inches is inadequate to dump a load into a dumpster or pick-up truck. The reduced reach does not allow a load to be placed at or near the middle of a truck bed to distribute the load and reduces the ability to reach loads (e.g., pallets) that are spaced from an edge (e.g., truck edge).

Table 2 below shows the published reach at full height of various compact utility loaders. These parameters were taken from published brochures of the manufacturers or were listed on the manufacture's website. The reach for the Vermeer machines was physically measured internally by Vermeer employees.

Model	Introduction Year	Reach, Fully Raised (In.)
Bobcat MT52	2003	20.3
Bobcat MT55	2004	20.3
Bobcat MT85	2015	18.6
Toro Dingo 322	1999	26
Toro Dingo TX420	2000	21.8
Toro Dingo TX525	2006	21.8
Toro Dingo TX1000	2015	24.5
Vermeer S600TX	2005	27.3
Vermeer S400TX	2007	21.8
Vermeer S450TX	2012	19.3

Model	Introduction Year	Reach, Fully Raised (In.)
Vermeer CTX 50	2015	19.7
Vermeer CTX100	2016	22.6

Table 2. Sampling of Reach at Full Height of Commercial Compact Utility Loaders

The reach of about 9.6 inches of the loader of Figure 7 of Komatsu as used on Dingo 322 is about 10 inches less than the lowest reach of the compact utility loaders of Table 2 (i.e., is about 50% of the reach of the compact utility loaders of Table 2).

Each of the embodiments of Komatsu would not enable Dingo 322 to operate for its intended use as a compact utility loader.

8. The field of endeavor of the '386 Patent is unpredictable. Small changes to pivot points, weight distribution, and the like in vertical lift loaders cause significant changes in the lift profile and lift capacity of the machine. The unpredictable nature of these changes is exaggerated in compact utility loaders because of the relatively small mass of the machine and restrictions on where components may be placed.

9. When developing the compact utility loader claimed in the '386 Patent, I observed unpredictability in the behavior of compact utility loaders. During development of the compact utility loader claimed in the '386 Patent, several loader arrangements were attempted that were unsuccessful. The lift profile of the initial prototype of a compact utility loader having a loader that was not directly attached to the mainframe and instead attached by a linkage and actuator arrangement is shown in Figure 1A.

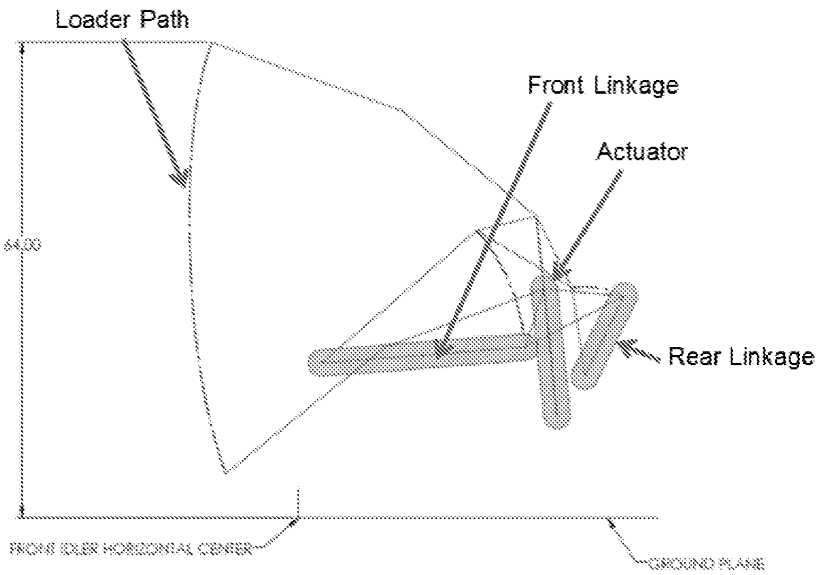


Figure 1A: Lift Path of the First Prototype

The loading profile of the first prototype is shown in Figure 1B[2]:

[2] In Figures 1B, 2B and 3B the lift capacity is the lower curve, the front linkage loading is the middle curve, and the rear linkage loading is the highest curve.

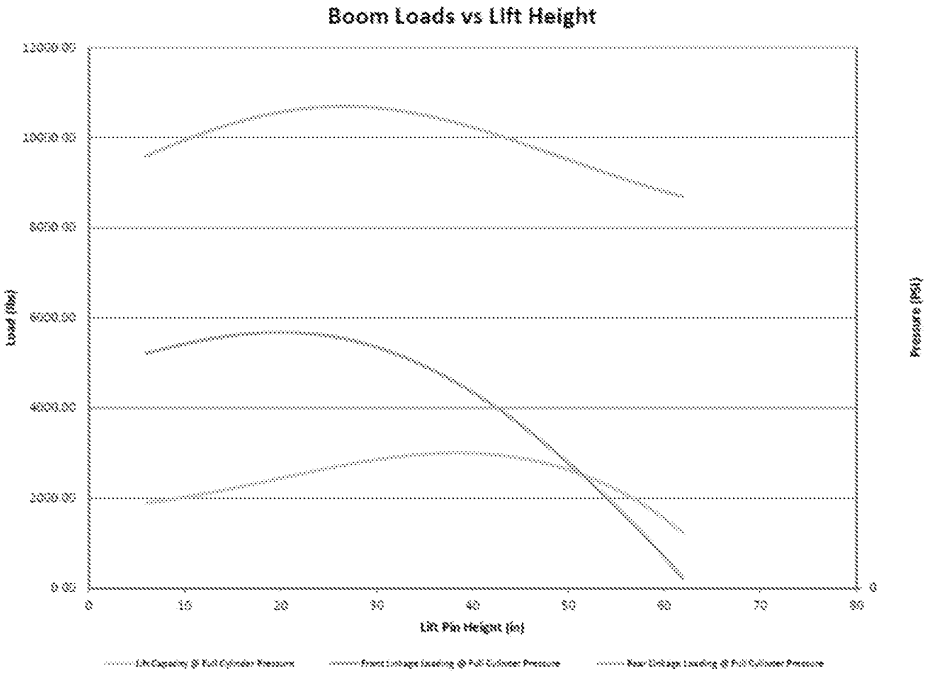


Figure 1B: Loading Profile of the First Prototype

To improve the stability of the first prototype of the compact utility loader, the mainframe was lengthened in a second prototype. The lift profile of this second prototype is shown in Figure 2A:

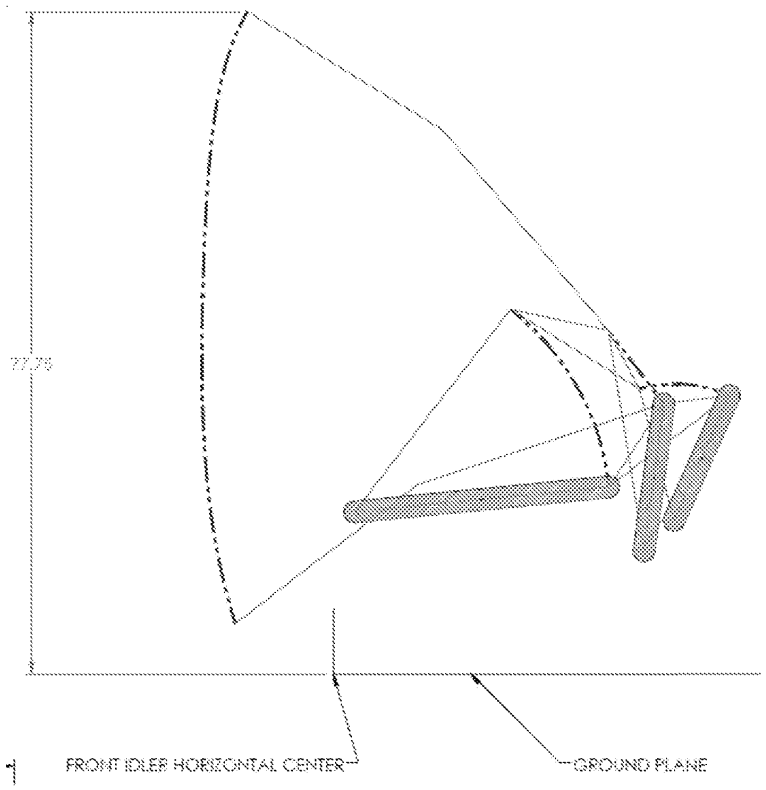


Figure 2A: Lift Profile of the Second Prototype

The linkages and actuators from the smaller initial prototype were scaled up for the second prototype. Scaling-up proved unsuccessful as shown in the lift profile of Figure 2B below.

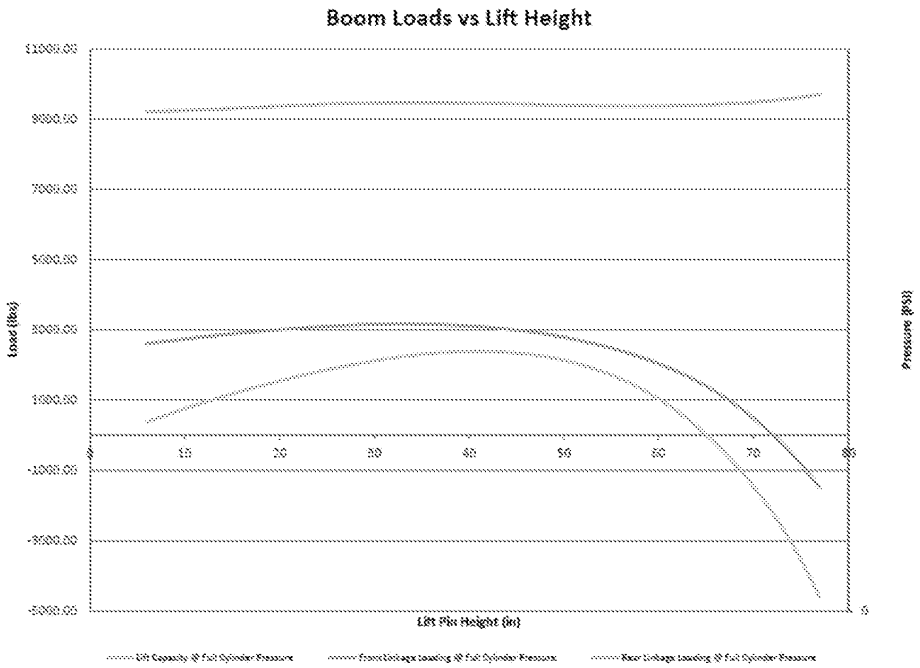


Figure 2B: Loading Profile of the Second Prototype

As shown in Figure 2B, the second prototype would not be able to support a load during initial lifting and at its full extension as shown by the lift capacity curve (e.g., at less than about 5 inches of hinge pin height and beyond about 65 inches). Mathematical modeling and free-body diagram construction indicated that the second prototype would only be able to lift a load of 192 pounds when the loader was lifted from the supporting surface which is nearly insufficient to even lift the weight of the bucket when empty.

In a third prototype, the pivot point of the actuator in the mainframe was moved **slightly rearward** as shown in Figure 3A:

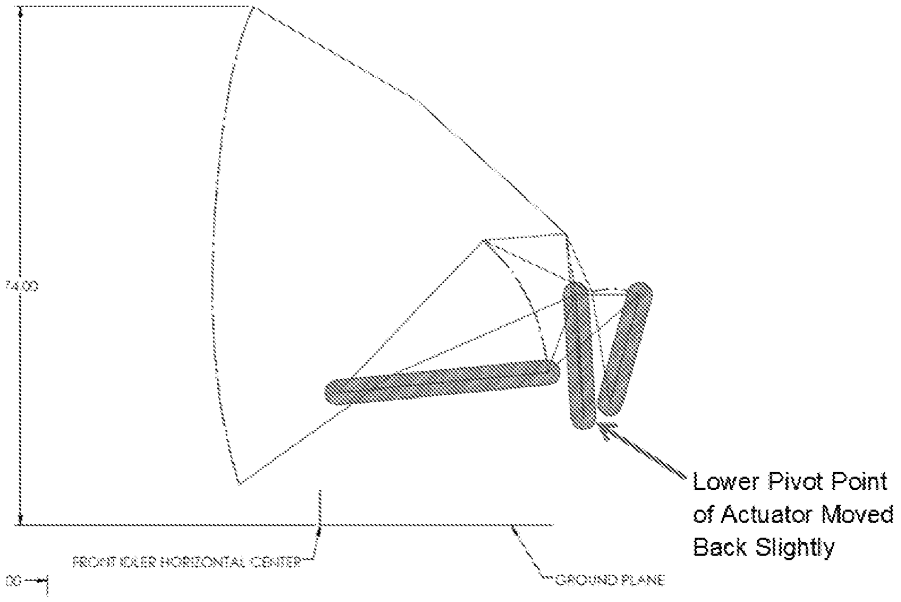


Figure 3A: Lift Profile of an Embodiment of the '386 Patent

This resulted in a much improved loading profile shown in Figure 3B:

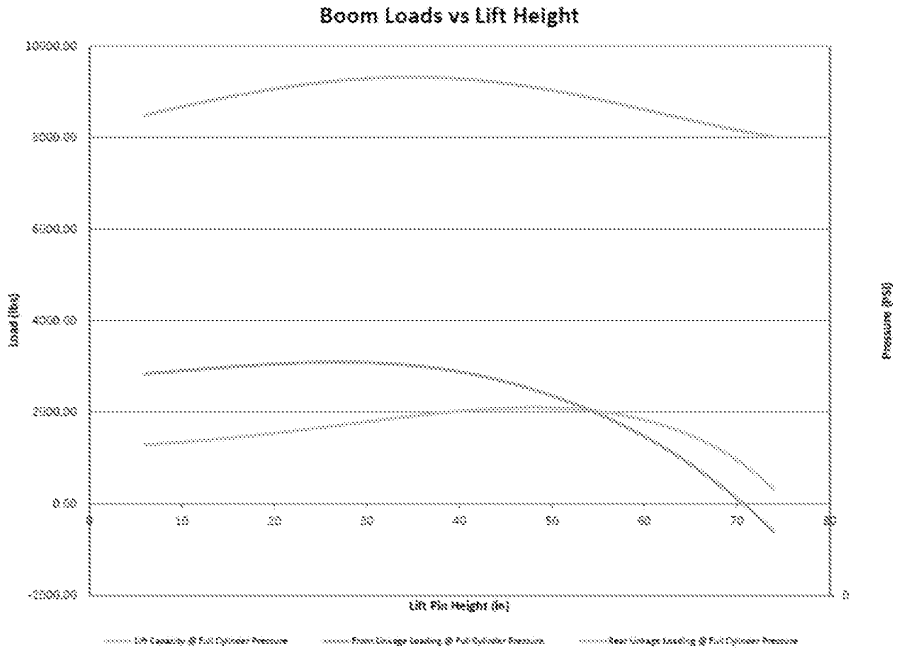


Figure 3B: Loading Profile of Third Prototype

The lift profile of Figure 3A was incorporated into Vermeer's CTX50 commercial compact utility loader.

In my experience, development of a compact tool carrier having a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader and in which the loader is not directly attached to the mainframe was unpredictable.

10. When developing the compact tool carrier that led to the '386 Patent, state of the art tools were used including solid modeling software from Solidworks, finite element analysis software from ANSYS, in-house programming for evaluation of loading and force analysis, stress coating, strain gauging and cycle test stands. Despite resorting to these state of the art tools, prototypes failed or were not capable of operation (e.g., were unable to lift a target load).

11. When developing the invention as set forth in claim 1 of the '386 Patent, I was highly skeptical as to whether it would be possible to develop a compact utility loader having a loader that was not directly attached to the mainframe (i.e., a vertical lift compact utility loader) as set forth in claim 1 of the '386 Patent. I did not believe the compact design of a compact utility loader could sufficiently support and absorb the stresses of a vertical lift loader.

12. I am familiar with terminology used by Vermeer and others to describe compact utility loaders and the components thereof. I develop commercial compact utility loaders and regularly attend trade shows in which compact utility loaders are featured. I regularly review industry standards that relate to compact utility loaders and review patent literature related to compact utility loaders. As a person who has worked on designing and developing equipment in this industry, I consider the "mainframe" of a compact utility loader to be the body of the machine that supports the loader. Because the triangular gussets and operator platform of Dingo 322 do not support the loader, the gussets and platform are not part of the mainframe.

13. Because the field of endeavor of the '386 Patent is unpredictable, many failures were experienced during development of the loader arrangement of claim 1 of the '386 Patent. For example, catastrophic fracture of the loader arm occurred (Figure 4).

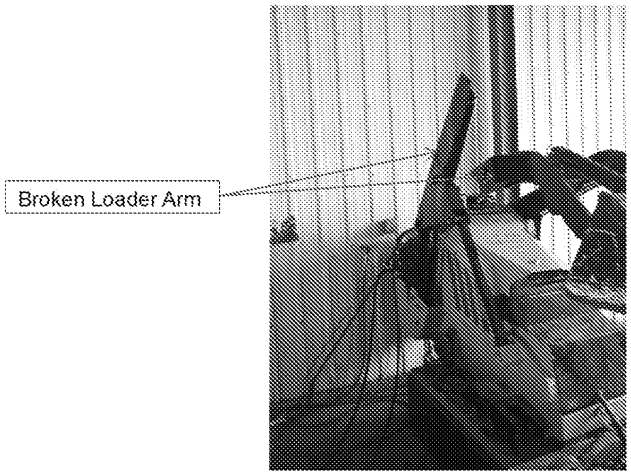


Figure 4

This failure occurred because of indirect attachment of the loader arm to the mainframe in this prototype. Changes in stiffness and in the load transfer characteristics of the vertical lift loader relative to a simpler radial boom configuration were not fully understood and appreciated during initial development.

During testing to develop the loader of claim 1 of the '386 Patent, breakage (Figure 5) and bending (Figure 6) of pivot pin retainers were experienced.

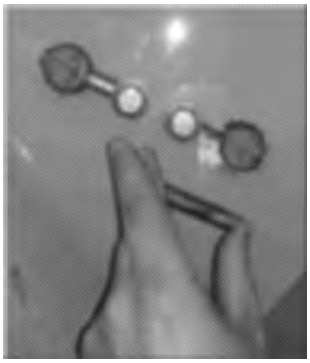


Figure 5



Figure 6

These failures were caused by differences in (1) the relative movement of the vertical lift components, (2) differences in the load transfer characteristics of the vertical lift components, and (3) the use of additional pinned joints which is a characteristic of a vertical lift loader as compared to a radial lift loader. These failures occurred in part because even small changes to pivot points, weight distribution, and the like in vertical lift machines cause significant and unpredictable changes in the lift profile of the machine.

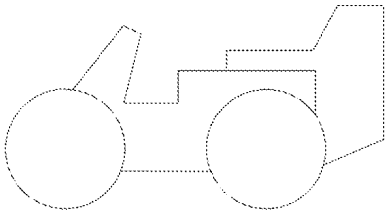
14. The mainframes of Komatsu and Dingo 322 are dissimilar. People developing equipment in this industry do not consider the protective cage in which the operator sits in the loader of Komatsu (and of full sized skid steers in general) to form part of the mainframe because the protective cage does not support the loader.



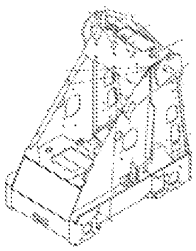
Protective Cage does not Support Loader

Figure 7

The Komatsu mainframe shown below is elongated and does not extend toward the top of the machine. The mainframe of Dingo 322 is more angular and extends upward toward the top of the machine.



Komatsu Mainframe



Dingo 322 Mainframe

Persons working on designing and developing equipment in this industry would not consider the mainframes of Komatsu and Dingo 322 to be similar in design.

15. A principal consideration in the development of compact utility loaders is to develop machines that are able to lift heavier loads without adding excessive weight to the machine and while maintaining a small footprint (i.e., length and width of the machine). The tip capacity of the loader is the industry standard to express the ability of the machine to lift a load. Tip capacity is measured by determining the highest load that may be applied to the bucket of the machine without tipping the machine forward. As shown in Figure 8[3] below, the industry has incrementally increased lift capacity over the last 20 years.

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[3] Figure 8 was prepared by calculating the ratio of the published tipping capacity to the published machine weight for various compact utility loaders. The significant gap between the tip ratio shown for Toro's TX-1000 (the most recent machine shown for Toro and which is vertical lift) and those shown for Vermeer's CTX-100 and CTX-50 machines (also vertical lift) is the result of Vermeer's application of an additional safety factor in the machine specifications that it provides to the public. In addition to the ISO Standard 14397-1:2007 that Toro applies to derive the maximum lift capacity for its machine, Vermeer applies an additional test that results in a further decrease of its maximum lift capacity. If Toro and Vermeer's machines were compared in an "apples to apples" fashion using only the ISO Standard 14397-1:2007 test, Vermeer's maximum lift capacities—and therefore its tip ratios—would be higher. Figure 8 also includes two Bobcat models in which the weight as published included the weight of the bucket. A weight of a standard bucket (about 165 lb) was subtracted from the weight as published to maintain consistency in the data of Figure 8.

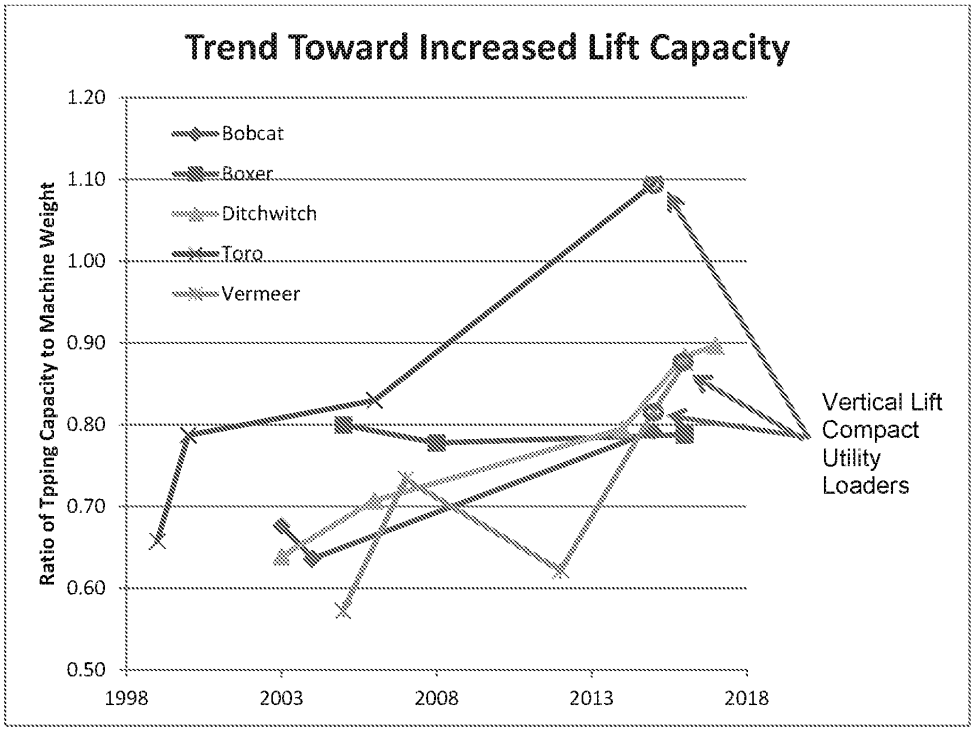


Figure 8

The industry did not turn to vertical lift loaders despite vertical lift loaders being able to increase lift capacity by 32% as noted below.

16. By using a linkage and an actuator to support the loader (i.e., a vertical lift loader) as set forth in claim 1 of the '386 Patent, the lift capacity of an embodiment of the invention was increased by 32% relative to the radial lift S450TX compact tool carrier without increasing the weight of the machine. The lift capacities were measured in accordance with ISO Standard 14397-1:2007 entitled "Earth-moving Machinery - Loaders and backhoe loaders -- Part 1: Calculation of rated operating capacity and test method for verifying calculated tipping load."

17. Despite this need for increased lift, the industry did not develop vertical lift compact utility loaders. For example, manufacturers shifted from "walk-behind" machines to

predominantly "ride-on" machines. Manufacturers of ride-on machines are permitted to incorporate an average weight of an operator (165 lb standard) in the tip capacity testing which generally increases the rated lift capacity. Other manufacturers have included "weight kits" that add weight to the back of the machine to increase lift capacity while sacrificing ground clearance (Figure 9).

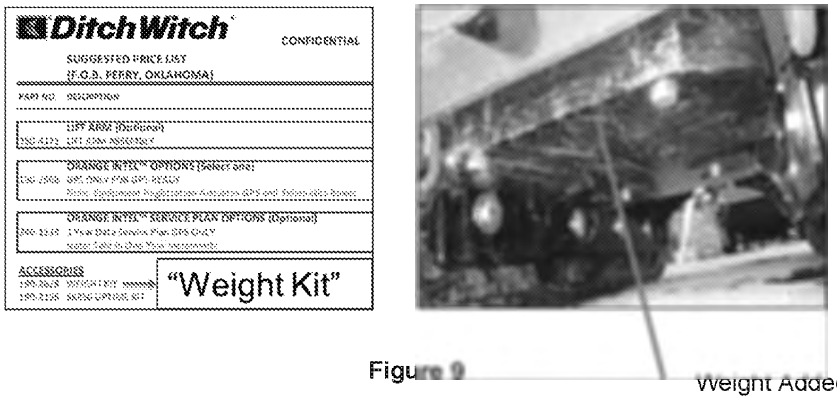


Figure 9 Weight Added toward Rear of Compact Utility Loader

Commercial users have even bolted their own counter-weights near the rear of the machine to increase lift capacity (Figure 10):



Weight Added by Customers

Figure 10

These attempts by others have resulted, at best, in incremental increases in the rated lift capacity of the compact tool carrier.

18. The distances set forth in claim 15 in which the distance between the rotational axis and the pivot points of the linkage and actuator in the mainframe are (1) less than 1.5 times the distance between the rotational axis and the bottom of the compact tool carrier (1.5 D1) and (2) less than twice the distance between the rotational axis and the bottom of the first side of the mainframe (2.0 D5) are significant. These characteristics directly relate to the low profile character of the compact utility loader. A compact utility loader having these distances has relatively low pivot points and/or includes a rotational axis or mainframe that is relatively close to the ground. By lowering the pivot points, the stiffness of the mainframe increases which allows the weight of the mainframe to be reduced. Lowering the pivot points also lowers the center of gravity of the mainframe.

19. The Dingo 322 mainframe lacks sufficient area to position the pivot points of a linkage and actuator such that the distances between the pivot points and the rotational axis are less than twice the distance (2.0 D5) between the rotational axis and the bottom of the mainframe as recited in claim 15. Dingo 322 has a relatively small distance D5 between the bottom of the mainframe and the rotational axis of

the wheels as shown in Figure 11[4] below. Stated differently, Dingo 322 has a *relatively high mainframe* relative to the wheels to increase ground clearance.

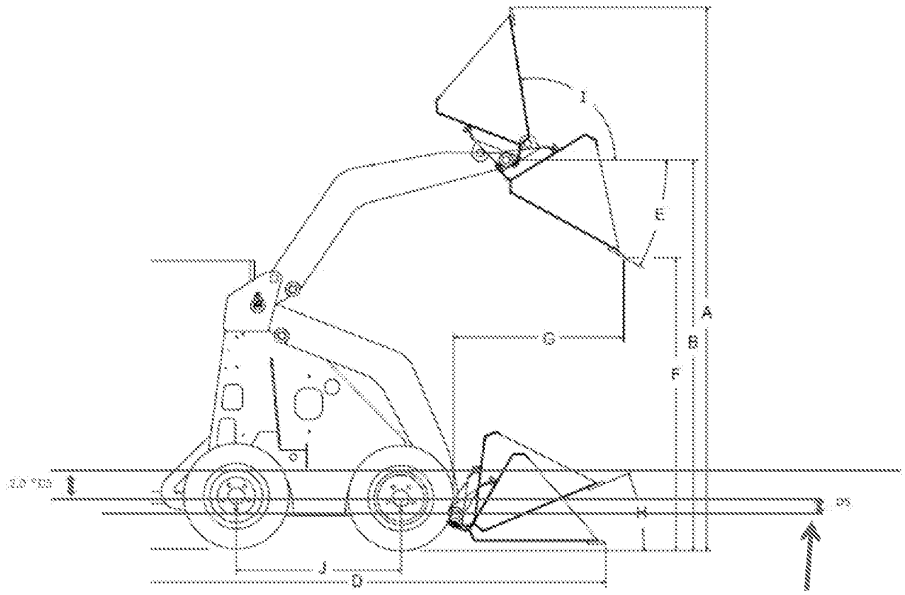


Figure 11

The available space to position the actuator and linkage pivot points such that the distance between the pivot points and the rotational axis is less than 2.0 D5 is small as shown in Figure 12[5]:

[4] The distances on Figure 11 were determined by measuring the distance D5 between the rotational axis of the wheels and the bottom of the mainframe in Dingo 322 as shown on page 2/1-2 of the Dingo 322 Service Manual. The distance from the rotational axis that is twice D5 is also indicated on Figure 11.

[5] Figure 12 was obtained by filling the available space in the mainframe in which the distance between the rotational axis of the wheels is less than 2.0 D5.

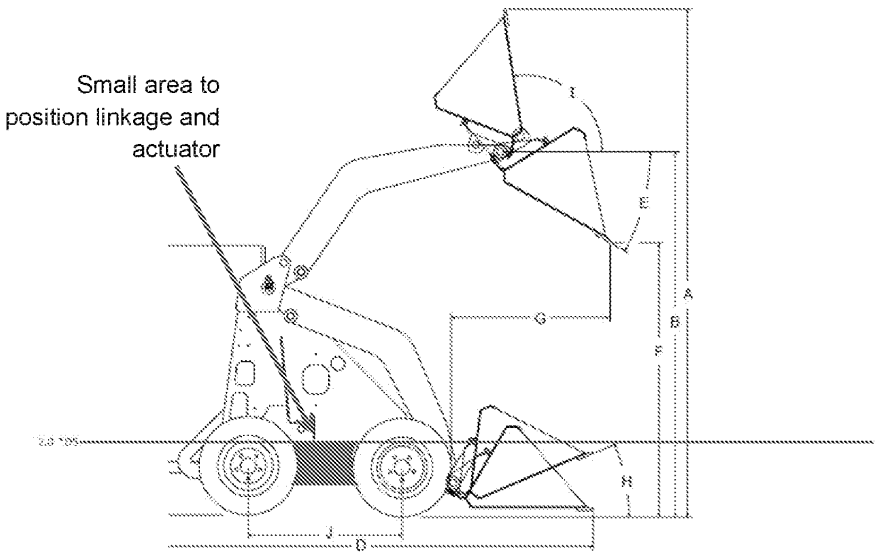


Figure 12: The available space for actuator and linkage pivot points (2.0 D5)

If this was attempted on the Dingo 322 mainframe, the linkage and actuator would not be able to move back and forth as required in a vertical lift loader arrangement. Also, the pivot points cannot be positioned within this area in the Dingo 322 mainframe because the hydraulics of the Dingo 322 machine are positioned throughout the space as further explained below.

20. As disclosed in the Dingo Service Manual, Dingo 322 was available in a "4-Paw" drive system in which each wheel was driven by a hydraulic motor. The Service Manual discloses diesel and gas versions of Dingo 322 that appear to have identical "4-Paw" hydraulic drive systems.

Drive System

Model	220		222	220D, 320D	322	323	
	22311	22317	22300 22304	22302 22303	22305	22312	22319
Chain Drive	X	X	X				
4-Paw				X	X	X	X

Chain Drive Models:
All four wheels are powered. The two rear wheels are individually driven by hydraulic rotor vane motors. Each front wheel is chain driven from the rear wheels via #60H chain.

4-Paw Models:
All four wheels are powered. Each wheel is individually driven by a hydraulic roller vane motor.

Page 2/1-6 of the Dingo Service Manual

A partial view of the 4-Paw Dingo 322 machine is shown on Figure 1262 of the Dingo 322 Service Manual. The distance between the bottom of the mainframe and the rotational axis (D5) and the area encompassed by twice this distance (2.0 D5) in which the pivot points in which a linkage and an actuator are pivotally connected to the mainframe are shown in the annotated figure[6] below:

[6] Distances D5 and 2.0 D5 as shown on annotated Figure 1262 were determined by measuring the distance D5 between the bottom of the mainframe and the rotational axis of the wheels in Figure 1262. Twice D5 was then calculated. Both D5 and 2.0 D5, as determined, are shown on annotated Figure 1262.



Figure 1262 of the Dingo 322 Service Manual

The area available to position the pivot points is very limited and insufficient to allow a linkage and actuator to swing back and forth as in a vertical lift loader arrangement. Further, this area is **unavailable to position the pivot points** because this portion of Dingo 322 **houses the hydraulics that drive the motors** as show in Figure 0888[7] from the Service Manual:

[7] Figure 0888 was annotated to show 2.0 D5 by positioning the line at the same location as in Figure 1262 above (i.e., as intersecting the top bolt holes at which the cover plate is fastened to the mainframe).

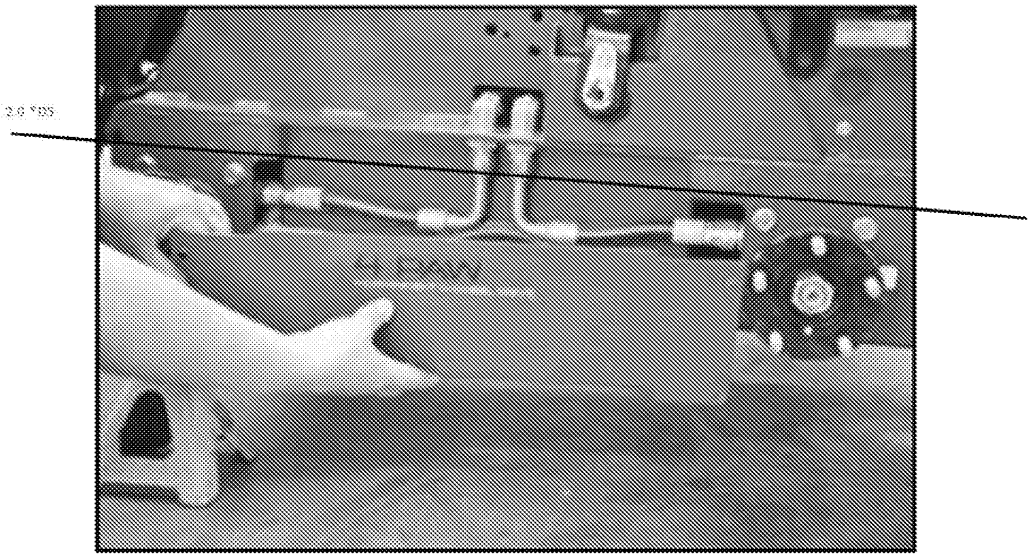


Figure 0888 of the Dingo 322 Service Manual

The pivot points could not be positioned between the rotational axis and twice D5 because of the limited space to do so and because this area houses the hydraulic components beneath the cover plate as shown in Figure 0888. To eliminate the hydraulics that power the motors would render Dingo 322 incapable of its intended

purpose as a compact utility loader or would drastically change the principle of operation of Dingo 322[8].

If Dingo 322 were modified to include an actuator and linkage within twice D5, Dingo 322 would also be rendered unsuitable for its intended purpose to accommodate over-the-tire tracks available for purchase from Toro:

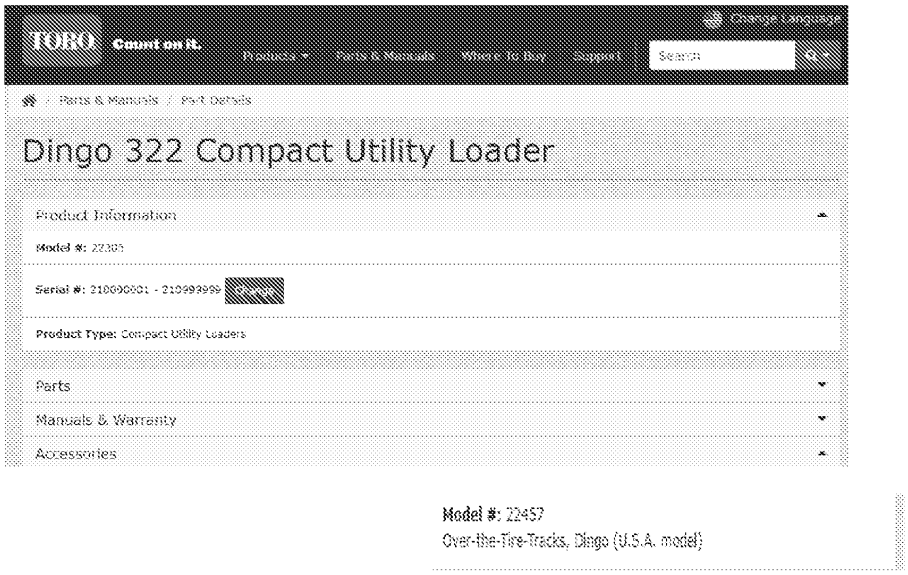


Figure 13 (https://www.toro.com/en/parts/partdetails/?id=23629)

[8] Dingo 322 was *not* available in a chain drive as shown on Page 2/1-6 of the Dingo Service Manual. Even if it had a chain drive, a person working on designing and developing equipment in this industry could not modify Dingo 322 as proposed by the Office because the chain is positioned in the area between the rotational axis and twice D5:



Fig. 0279 (page 4/1-2 of Service Manual).

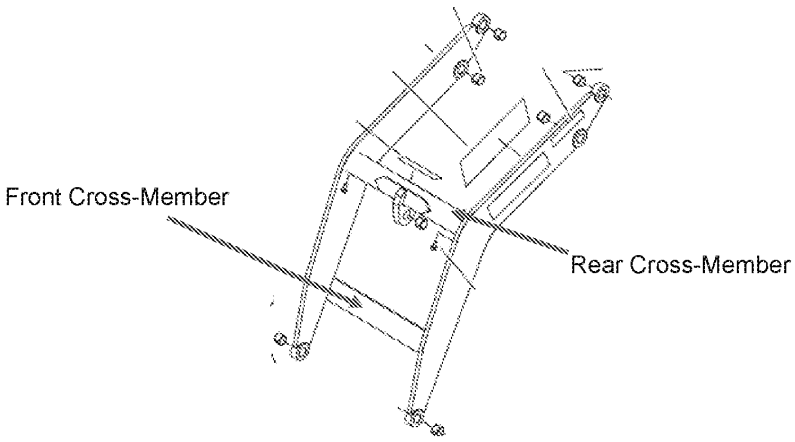
The pivot point location of the actuator and linkage in the mainframe of Dingo 322 cannot be less than twice D5 because Dingo 322 cannot accommodate the over-the-tire tracks for which Dingo 322 was designed for use if the actuator and linkage were positioned in this area:



Figure 14

For these reasons, people designing and developing equipment in this industry would not have modified Dingo 322 to include pivot points in which a linkage and an actuator are pivotally connected to the mainframe that are positioned less than twice the distance between the bottom of the mainframe and the rotational axis (2.0 D5) as recited in claim 15.

21. Those designing and developing equipment in this industry also would not have modified Dingo 322 to have a single cross member as recited in claim 38. With reference to Sheet No. 2 on page 1 of the Dingo Parts Catalog, the Dingo 322 loader includes two cross-members that extend between the two loader arms.



Sheet No. 2 of the Dingo 322 Parts Catalog

As shown in the sketch below, the front and rear cross-members of the Dingo 322 loader allow the loader to behave as a structural "box" in which forces may be distributed side-to-side across the loader.

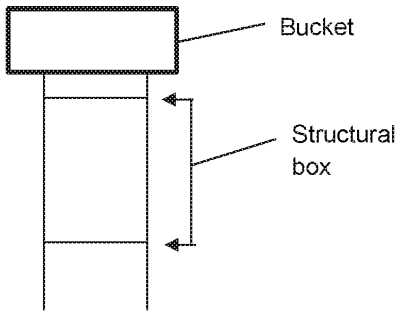


Figure 15

If a cross-member of Dingo 322 were eliminated, the behavior of the loader would change significantly because the loader is less able to laterally communicate or absorb the forces applied to the loader across the loader (i.e., from side-to-side). This loss of strength cannot be mitigated by strengthening the remaining cross-member as the loader would remain less laterally stable. The remaining cross-member of Dingo 322 would be prohibitively heavier with complex transitions which

would negatively affect machine weight, stability and operator visibility through the travel path.

22. With reference to Figure 1[9] of Komatsu, the pivot point formed between the actuator and the mainframe is below the rotational axis and not above the rotational axis as recited in claim 66.

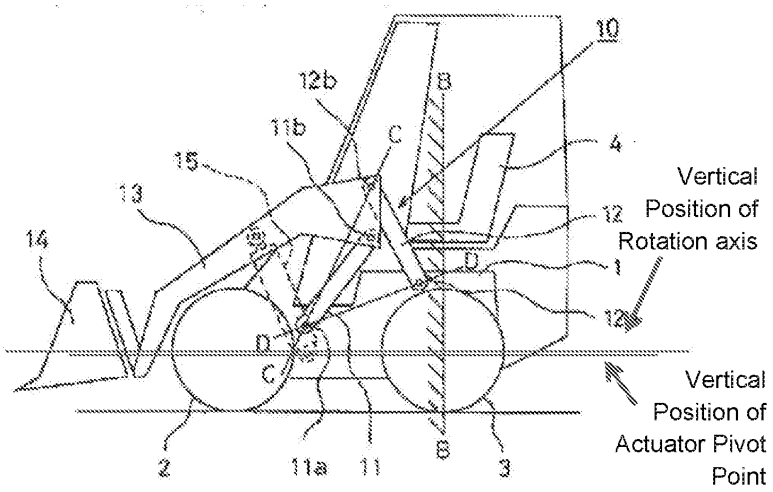


Figure 1 of Komatsu

23. Komatsu does not include a linkage pivot point that is above the wheels and is spaced between the rotational axis and a distance that is less than 2.0 D5 as recited in claim 67. As shown in Figure 16[10] below, the only linkage of Figure 1 of

---

[9] Figure 1 of Komatsu was annotated by determining the midpoint between the top and bottom of the wheels to find the rotational axis of the wheels. The height of the actuator pivot point is also shown in Figure 1 of Komatsu.

[10] The various ratios of Komatsu shown at the bottom portion of Figure 16 were determined by measuring the respective distances and calculating the ratio (e.g., by measuring the vertical distance D2 between the forward linkage pivot point and the rotational axis and measuring the distance D5 between the rotational axis and the bottom of the mainframe and calculating D2 divided by D5).

Komatsu having a distance between the rotational axis and the pivot point connecting it to the mainframe of less than twice D5 is the forward linkage (D2/D5=1.0 while D3/D5=2.47).

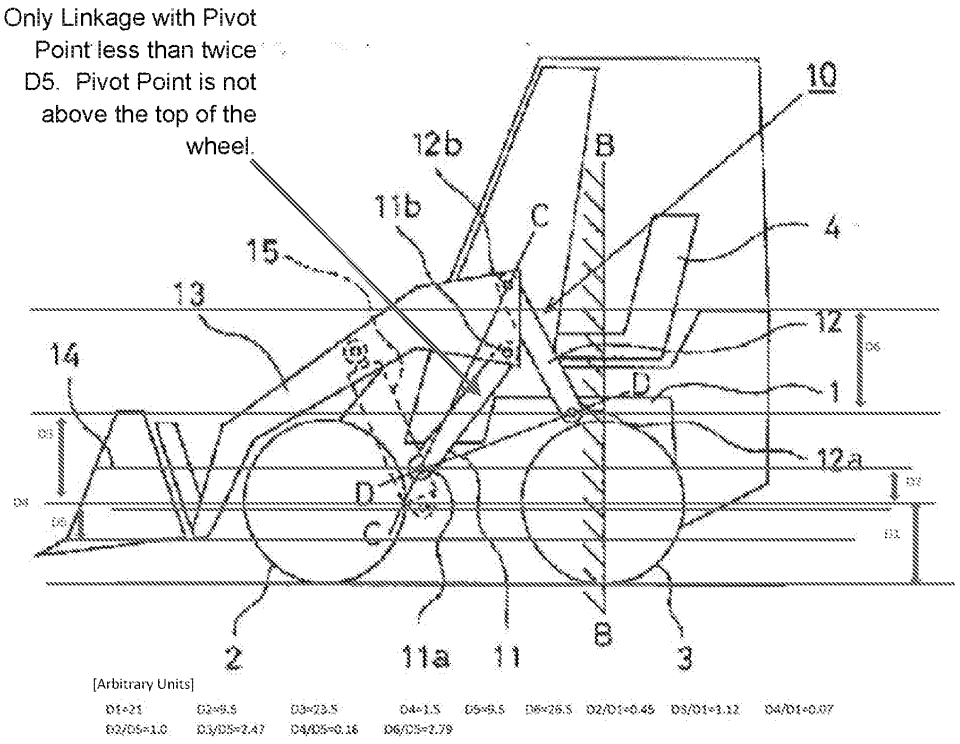


Figure 16

The pivot point between the forward linkage and mainframe is not above the wheel as recited in claim 67.

Further, Dingo 322 is not able to position a linkage pivot point that is above the wheels and is spaced between the rotational axis and a distance that is less than

2.0 D5. In the Dingo 322 machine, the entire area defined by 2.0 D5 is below the wheels as shown in Figure 17[11]:

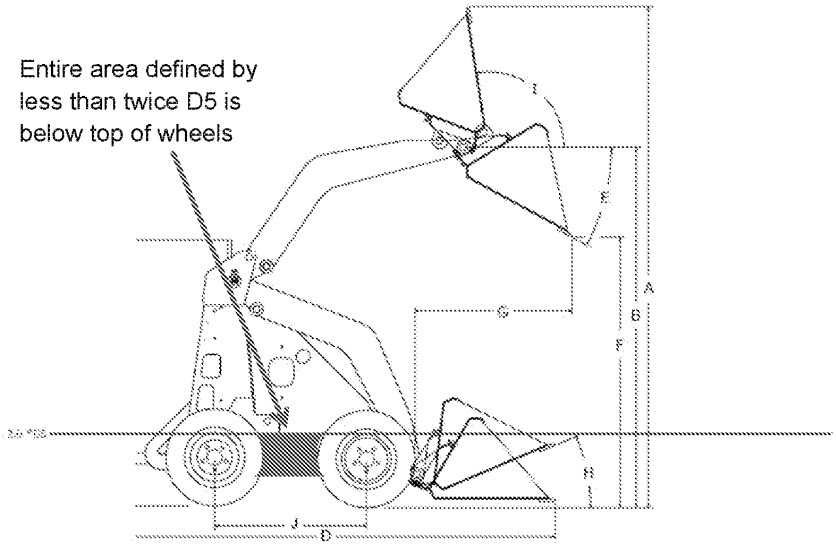


Figure 17

Dingo 322 is not able to position a linkage pivot point that is above the wheels and is spaced between the rotational axis and a distance that is less than 2.0 D5 as recited in claim 67.

24. Komatsu does not include a cross-member that is disposed fully forward of a connection between the actuator and the loader arm as recited in claim 46. Because the connection made by the piston arms 16a of Figure 3 of Komatsu is not shown, it is not evident whether the piston arms 16a connect to the loader arm 13 or to the cross-member:

[11] Figure 17 corresponds to Figure 12 above.

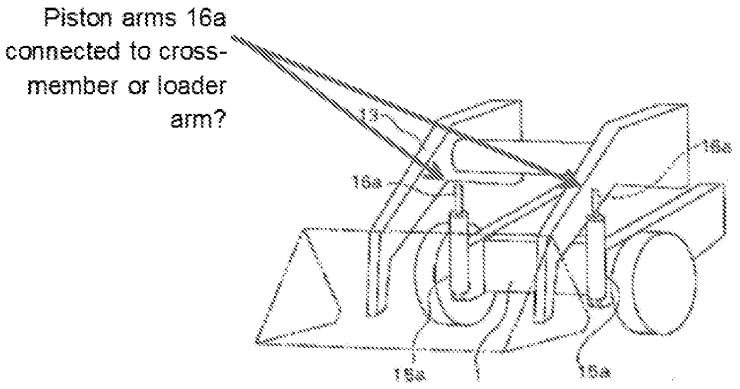


Figure 3 of Komatsu

Even if the piston arms 16a were connected to the loader arm, Figure 3 does not show or otherwise indicate that the cross-member is disposed *fully forward* of a connection between the actuator and the loader arm as recited in claim 46.

25. People working on designing and developing new equipment in this industry would not have arrived at a compact tool carrier having tracks with a portion of the tracks angling downward with a linkage pivot point being above the portion of the tracks that angles downward as recited in claim 71 based on Dingo 322 or Komatsu. Figure 9 of Komatsu is the only embodiment of Komatsu which includes tracks. The tracks are over-the-tire tracks and do not include an angular portion.

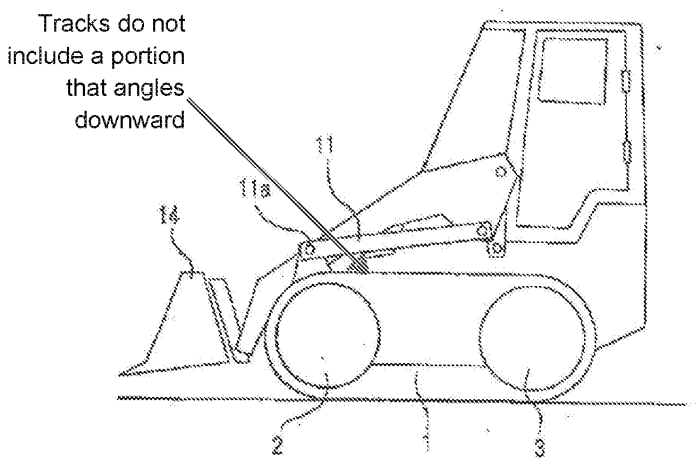


Fig. 9 of Komatsu

In regard to Dingo 322, Dingo 322 is adapted to operate with over-the-tire tracks. The tracks also do not include a portion that angles downward.

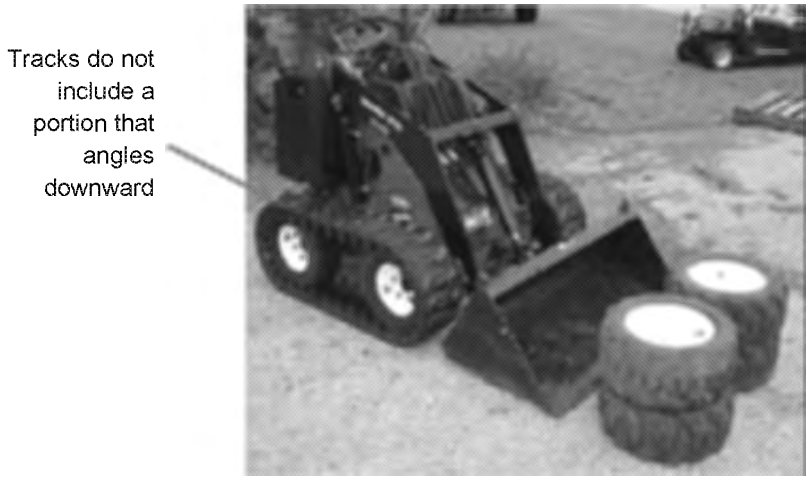


Figure 18

26. People developing equipment in this industry would not have arranged the first linkage pivot point, second linkage pivot point, and actuator pivot point such that

each pivot point is (1) disposed above the portion of the tracks that angles downward from the drive sprocket toward the front end of the mainframe or (2) disposed between the tracks and the rear end of the mainframe as recited in claim 74. Each embodiment of Komatsu would involve pivot points that are *below* the tracks. Further, Komatsu expressly discloses that the pivot points should be forward of the center of the rear wheel (e.g., para. [0008]) to allow side egress by the operator.

27. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the instant application or any patent issued thereon.

Louis Hartke _____ Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al.
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

Art Unit: 3993

DECLARATION OF MATTHEW HUTCHINSON UNDER 37 C.F.R. 1.132

I, Matthew Hutchinson, declare and state as follows:

1. I am a Product Manager at Vermeer Manufacturing Company ("Vermeer"). I manage the Tree Care, Rental and Landscape product groups at Vermeer. Previously, I was a Project Engineer in the Rental Product Group at Vermeer.

2. As an inventor of U.S. Patent No. 9,321,386 ("the '386 Patent"), I have read and understand the '386 Patent and the claims thereof and the presently pending claims of Reexamination Control Nos. 90/014,109 and 90/014,124.

3. As Product Manager of the Rental Product Group at Vermeer, I oversee development and marketing of compact utility loaders, including vertical lift compact utility loaders in which the loader is not directly attached to the mainframe as recited in claim 1 of the '386 Patent and radial lift compact utility loaders in which the loader is directly attached to the mainframe.

4. The compact utility loader of claim 1 of the '386 Patent has been a commercial success. Since their introduction into the market in 2015, vertical lift compact utility loaders have taken market share from radial lift vertical loaders. In 2015, vertical lift compact utility loaders made up 11% of all compact utility loader unit sales of Vermeer (see Figure 1). Vertical lift has continued to take market share from radial

lift. In 2018, vertical lift compact utility loaders made up *37%* of all compact utility loader unit sales of Vermeer.

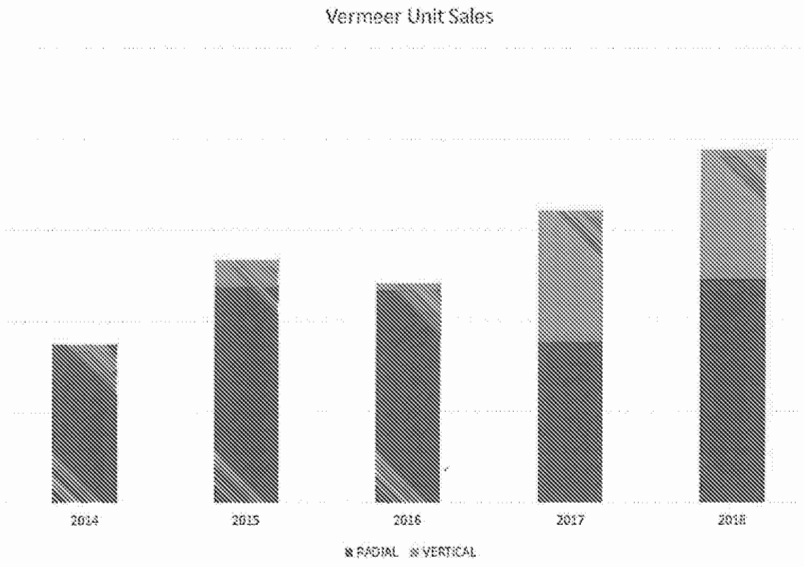


Figure 1

5. As Product Manager at Vermeer, it is my responsibility to closely monitor customer demand and to determine which features are driving sales. The benefits directly attributable to the vertical lift design of the compact utility loaders (sold as Vermeer models CTX50 and CTX100), including increased lift capacity in a compact design, have been very well received by customers and have driven the sales of these products. The trend toward vertical lift compact utility loaders shown above in Figure 1 results from the advantages of the vertical-lift design, rather than price discounts, special offers, advertising or other factors not related to vertical lift.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both,

under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the instant application or any patent issued thereon.

Matthew Hutchinson

12/6/18
Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventors: Brad Thomas et al. Art Unit: 3993
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under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the instant application or any patent issued thereon.

Matthew Hutchinson _____ Date

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Kubota North America Corporation et al

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
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Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

December 6, 2018

INTERVIEW SUMMARY

The undersigned counsel for the Patent Owner and inventor Louis Hartke thank the Examiner and Conferees for the in-person interview of October 24, 2018.

Mr. Hartke presented a model of an embodiment of a compact utility loader of U.S. Patent No. 9,321,386 ("the '386 Patent) and a model of a radial lift compact utility loader, and discussed differences in mainframe design. Mr. Hartke also answered questions from the Examiner and Conferees regarding design considerations.

Counsel e-mailed a presentation to the Examiners that was discussed during the interview. The Office states on page 2 of the Office's Interview Summary that the presentation is available on the image file wrapper in each of the two merged proceedings, but the presentation does not currently appear on either image file wrapper when viewed by the Patent Owner. The Patent Owner therefore attaches the presentation for reference by the Examiner and Conferees.

Counsel discussed the previous Patent Office proceedings in the '386 Patent and in related applications. The status of litigation involving the '386 Patent was discussed. Differences between skid steers and compact utility loaders were discussed.

Counsel and Mr. Hartke discussed how the need to increase lift capacity without sacrificing compact design has driven compact utility loader design. Those of skill in the art have resorted to many other methods for increasing lift capacity (e.g., ride-on machines rather

than walk-behind machines, use of weights toward the rear of the machine, moving pivot points rearward, and the like) but not vertical lift. It was discussed why those of skill in the art have not resorted to vertical lift despite vertical lift resulting in a 32% increase in lift capacity. Mr. Hartke attributed the 32% increase in lift capacity to use of vertical lift itself, not solely to the particular arrangement of the pivot points.

The Examiner and Conferees noted that evidentiary data and declarations that support patentability may be submitted by Patent Owner and would be considered. The Examiner and Conferees also stated that they would be open to a reasonable extension of time to gather such data and make such declarations.

The Patent Owner agreed to present further arguments and evidence in favor of patentability in the Office action response.

Respectfully submitted,

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(314) 621-5070

Response to September 6, 2018 Office Action

Reexamination of U.S. Patent No. 9,321,386
Reexamination Control Nos. 90/014,109 and 90/014,124

October 24, 2018

Louis Hanke (inventor), Mike Vander Molen (Reg. No. 57,274)
Mike Munsell (Reg. No. 43,820)

Order of Presentation

- Background on industry's strong desire to increase CUL lift capacity
- Skilled artisans would never attempt to combine the Komatsu and Dingo 322 references
- Significant incompatibilities actually prevented Toro, Vermeer and others from combining Komatsu with the Dingo 322
- Extensive objective evidence of non-obviousness proves that the claimed invention is not obvious

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Previous Proceedings

- US 14/691,649 issued as US 9,321,386 on April 26, 2016
  - Yasuda/Bares Combination
  - Examiner Dean Kramer
- *Vermeer Corporation v. The Toro Company*, Case No. 4:17-cv-00076-CRW-HCA (S.D. IA), filed February 28, 2017
- Reexamination Control No. 90/013,915

  -Vermeer S450TX/Mustang Combination

  -Examiner William Doerrler (Conferees Gay Spahn and Jeffrey Gellner)

  - Five new independent claims granted

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Kubota North America Corporation et al
Ex. 2035
Page 283 of 549

Previous Proceedings

- US 15/062,801 issued as US 9,975,750 on May 22, 2018
  - Ulinski/Vermeer S450TX Combination
  - Vermeer S450TX/Mustang Combination
  - Examiner Dean Kramer

- Reexamination Control Nos. 90/014,109 and 90/014,124
  - Dingo 322/Komatsu Combination
  - Examiner Russell Stormer

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Kubota North America Corporation et al
Ex. 2035
Page 284 of 549

Previous Proceedings

- Reexamination Control No. 90/014,148
  - US 9,975,750
  - Examiner Russell Stormer
- U.S. Patent Application No. 15/704,685
  - Examiner Dean Kramer
  - Allowable Subject Matter

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Compact Utility Loaders are Not Skid Steers



- Size
- Weight
- Engine Location
- Operating Capacity
- Loader Arm Location
- Pivot Attachment Location
- Mainframe Stress / Strain Loading
- Operator Position / Visibility
- Center of Gravity Considerations
- Safety Issues
- Use Cases

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Significant Difference in Scale



47% More Weight
than Dingo 322



Vermeer

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Significant Difference in Scale

https://www.youtube.com/watch?v=ekNiGv6KCZY

Lift Capacity Drives CUL Design

- **Customers want the most lift capacity possible from a small, compact machine.**
- **Companies recognize that increasing lift capacity distinguishes their machines and increases sales:**



Moore has also seen a shift in the size of skid loaders. "There is definitely a slight shift upward," he acknowledges. "Customers are looking for just a little more horsepower, a little more load capacity and machine performance."

The trick is to instill more performance while maintaining a compact package. "The true definition of a skid steer is a compact, powerful and yet nimble machine in most

Vermeer

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Lift Capacity Drives CUL Design



"I loved the SK755 but wished it had a bit more lift capacity. When the SK850 came out just 2 years later in 2015, I traded in my SK755 with a little over 600 hours on it for the new SK850 and I took a "bath" on the trade in. … **I wanted the little bit of extra lift** but felt a bit robbed by what they gave me for my low hour machine that was in excellent condition."

"When the SK1050 was introduced last year in 2016, I found out that it had the same exact physical specs as my machine but had more lifting capacity because of a weight kit that they added to it. . . . . I then found out that for around $1,200 (parts and labor), I could have the same weight kit added to my SK850 at my local Ditch Witch dealer. I had the weight kit added and I basically have the 1050 without the 1050 decal. . . . **The reason I keep getting more capacity when available is because it's a big deal to me to get the longest logs possible** carried out of yards so that my K-boom log truck can be efficient (will carry up to 22' logs) when hauling to the local log mills."

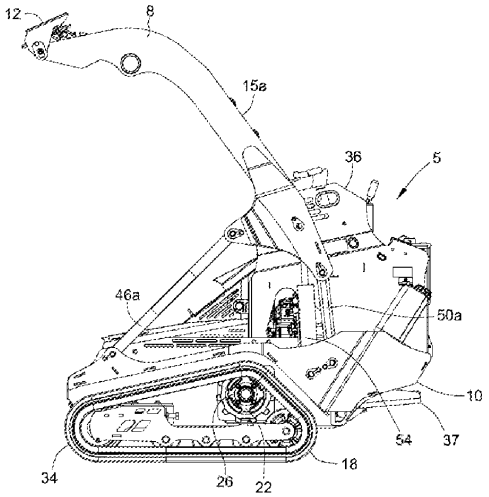
"**I'd like to get the new SK1550 for the extra capacity (longer logs) and lift height when loading but the over all size of the machine and its weight go up considerably** as does the price! For now, I'm going to be happy with my '1050.'"

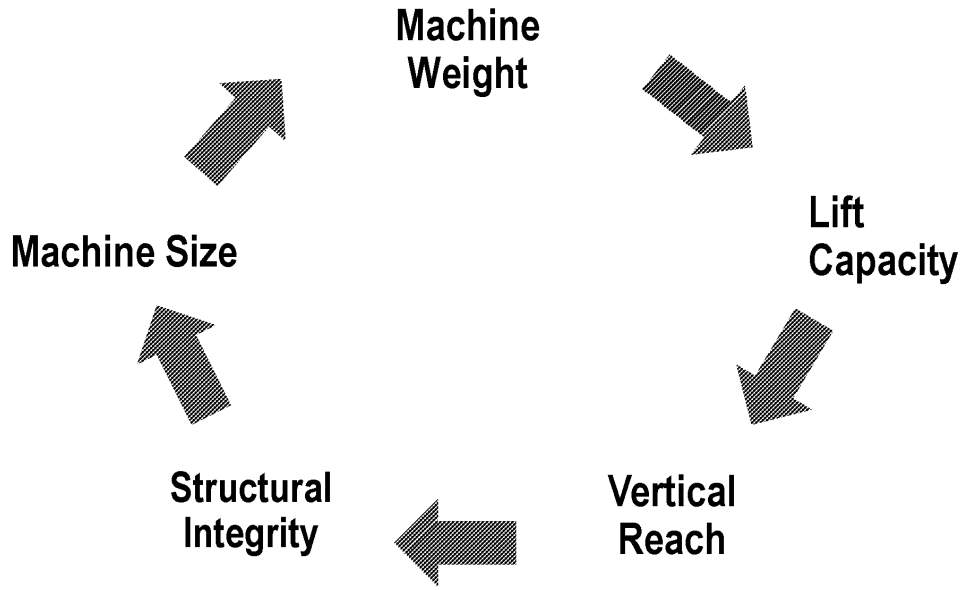
- http://www.treebuzz.com/forum/threads/which-to-choose-mini-skid-steer.32683/page-17

Vermeer

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CUL Design Involves Difficult Trade-offs





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Industry Efforts to Increase Lift Capacity

- **For many years, the industry has been working hard to increase lift capacity.**
- **Various improvements over time:**
  - Transitioned to ride-on machines to add operator weight
  - Shifted liquids to the rear of the machine
  - Relocated loader arm pins as far back as possible
  - Developed “weight kits” that could be bolted to the back of a machine
  - Redesigned bucket to shift weight farther aft on the machine
  - Increased overall weight of machine
- **Each of these solutions yielded only *incremental* increases in lift capacity**

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Since Introduction, No Vertical Lift CUL

- ***The Important Question***: If mere routine experimentation would have yielded a vertical lift CUL with more than 32% increased lift capacity, why didn't anyone develop such a machine in the many years since introduction into the market?
- Implementing vertical lift on a CUL was not obvious or routine.
  - It was the result of extensive research and development work that culminated in a novel CUL with remarkable performance.
  - Toro was right when it admitted in its own patent application that developing a vertical lift CUL was "*difficult or impossible*"

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No Motivation to Combine and No Expectation of Success

No Skilled Artisan Would Turn to Dingo 322

- Dingo 322 mainframe not designed to accommodate additional stresses/strains of vertical lift system
- Machine would be top-heavy and unstable
- Weight not distributed properly from front to back

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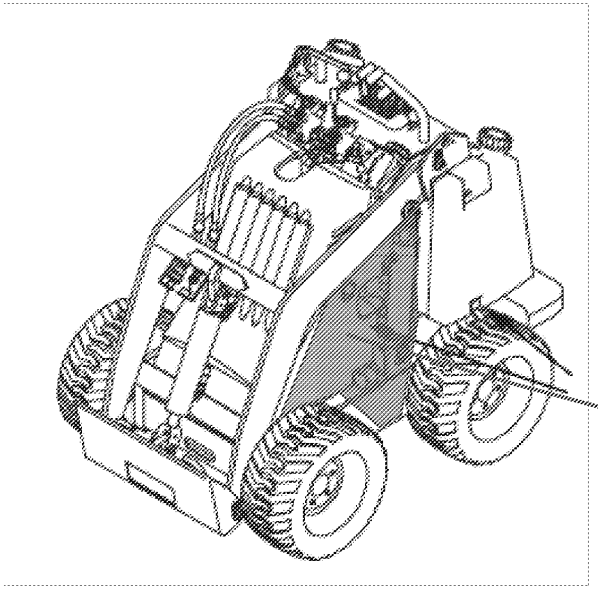
No Skilled Artisan Would Turn to Dingo 322

- Scaling down the Komatsu loader to fit the Dingo 322 mainframe would not work
- Dingo 322 lacks sufficient space to position linkages and actuator
- Vermeer and Toro designed an entirely new machine

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No Skilled Artisan Would Turn to Dingo 322

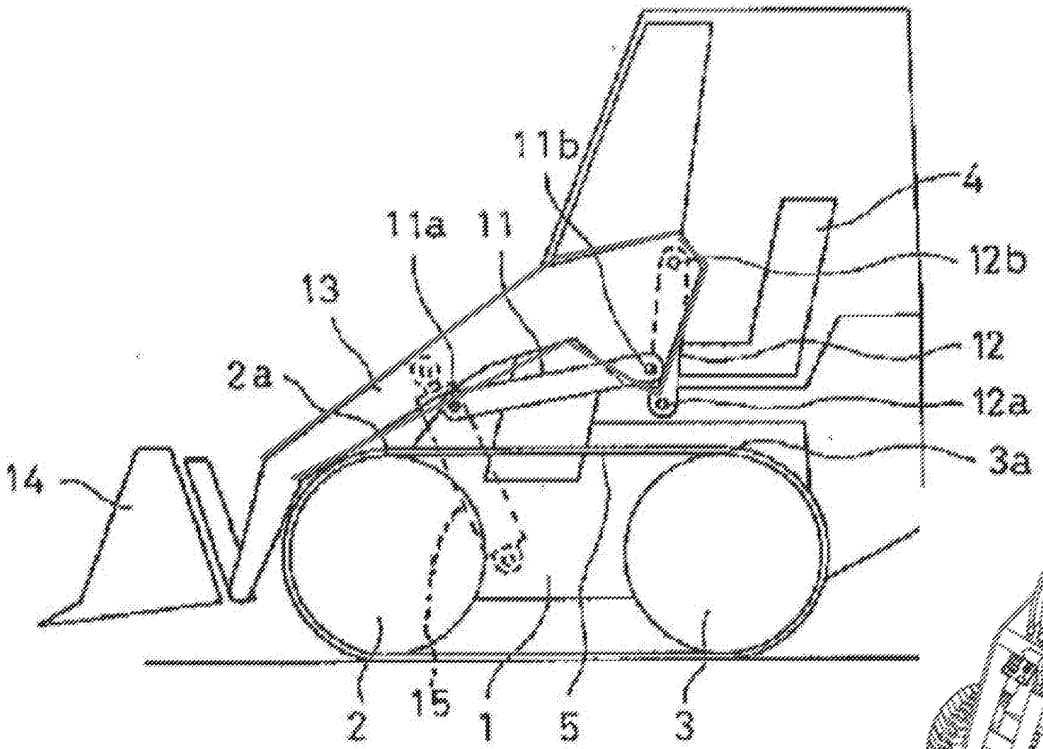
- Window in Mainframe to Position Linkages and Actuator was considered too small for vertical lift



Small Area to Position two Linkages and Actuator that swing back and forth

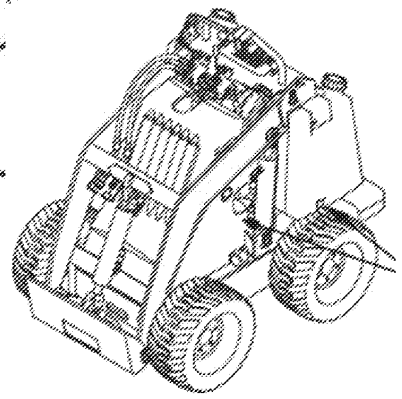
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No Motivation to Combine and No Expectation of Success with Komatsu



US 2016/0244937 (Toro application):

"The use of such high lift loader arms on a compact utility loader has been considered ***difficult if not impossible*** due to size . . . "



Vermeer

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No Motivation to Combine and No Expectation of Success with Komatsu

- Komatsu does not teach using vertical lift to increase lift capacity
- Komatsu addressed issues with **side** egress on full size skid loader machines
- This is not a problem that applies to CUL machines – no skilled artisan would turn to Komatsu to increase lift capacity

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Toro Acknowledged there was No Expectation of Success

(19) **United States**
(12) **Patent Application Publication**
Azure et al.

(10) **Pub. No.: US 2016/0244937 A1**
(43) **Pub. Date: Aug. 25, 2016**

(54) **UTILITY LOADER WITH HIGH LIFT LOADER ARMS AND UNIFYING HAND GRIP FOR DUAL TRACTION CONTROL LEVERS**

(71) Applicant: **The Toro Company**, Bloomington, MN (US)

(72) Inventors: **John P. Azure**, Bloomington, MN (US); **Joseph C. Knipp**, Elko, MN (US); **James A. Knetsger**, New Hope, MN (US); **David A. Murray**, Eagan, MN (US)

(21) Appl. No. **15/047,861**

(22) Filed: **Feb. 18, 2016**

Related U.S. Application Data

(60) Provisional application No. 62/118,854, filed on Feb. 20, 2015.

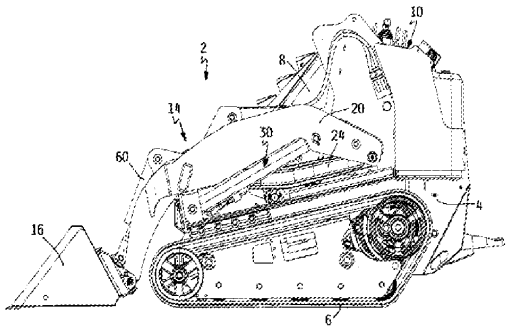
Publication Classification

(51) **Int. Cl.**
E02F 3/34 (2006.01)
E02F 9/20 (2006.01)

(52) **U.S. Cl.**
CPC *E02F 3/3414* (2013.01); *E02F 9/2004* (2013.01)

(57) **ABSTRACT**

A compact utility loader is operated by a standing operator at the rear of a frame. A loader arm assembly comprises a scissors linkage on either side of the frame nesting around the prime mover. Each scissors linkage has an upper loader arm that is pivoted at its rear end to rears ends of a pair of lower loader arms such that the pivot connections to the upper loader arm move upwardly and forwardly relative to the frame during elevation of the loader arm assembly to provide a high lift capability. The frame is self-propelled by a differential drive and steering system that is operated by dual levers. A hand grip extends between and unifies the operation of the levers to permit the operator to move easily move the levers in the ways that are needed to provide either straight motion of the frame or turns of the frame.



[0007] Finally, the vertical reach of the loader arms on compact utility loaders is somewhat limited. While high lift loader arms are known on full size skid steer loaders as disclosed in U.S. Pat. No. 5,542,814, the use of such high lift loader arms on a compact utility loader has been considered difficult if not impossible due to size and durability constraints. Accordingly, it would be a further advance in the art to provide a way of safely and durably providing high lift loader arms on compact utility loaders to extend the vertical reach of such loaders. For example, this would allow a compact utility loader to dump debris or materials at higher elevations than previously, thus allowing the use of larger trucks to accept such debris or materials for transport.

Vermeer

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Toro and Vermeer Did Not Combine Komatsu with Dingo 322

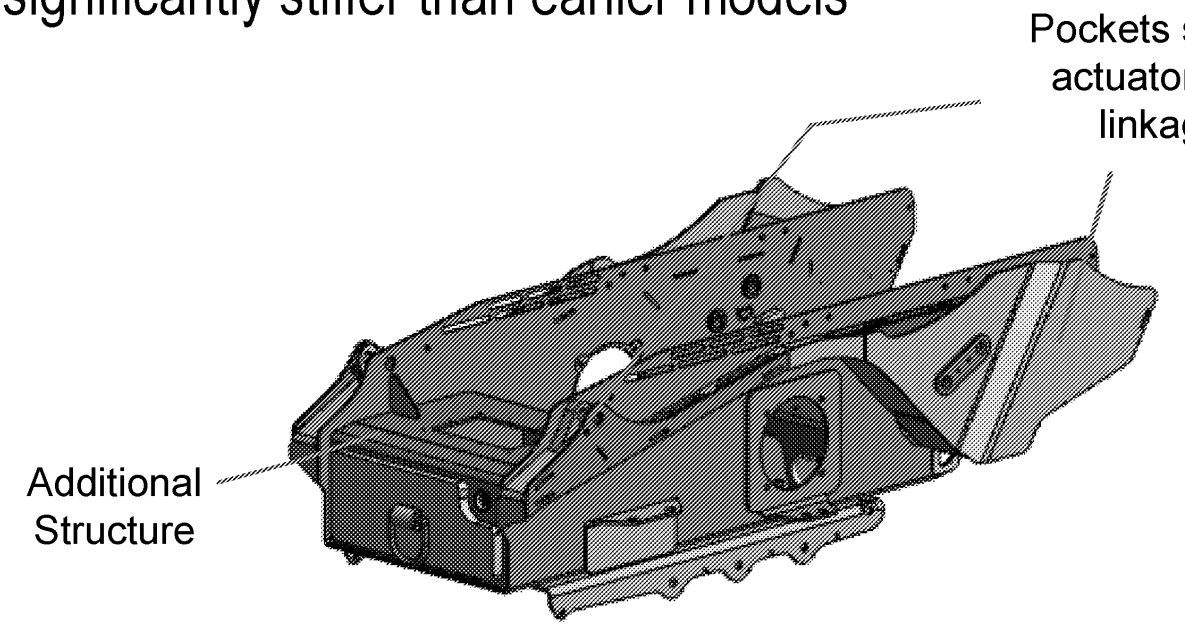
Products Eventually Developed Do Not Combine Komatsu and Dingo 322

- **The first vertical lift CULs on the market were developed by Vermeer and Toro**
- **Neither was the result of combining Komatsu and Dingo 322**
  - Different mainframe design
    - Required to accommodate increased forces of vertical lift system
    - Space for necessary linkages and actuators
    - Ensures visibility / safety for operator
  - Different linkage geometry required in light of:
    - Possible attachment points on mainframe
    - Bucket path
    - CG shift and tipping considerations
    - Linkage and pin structural stresses/strains
    - Placement of engine, drive system, operator, etc.

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Vermeer Redesigned Mainframe

- Vermeer developed a unique vertical lift mainframe
- The lower portion of the CTX50 (‘386 Patent) mainframe is significantly stiffer than earlier models



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New Pivot Point Locations

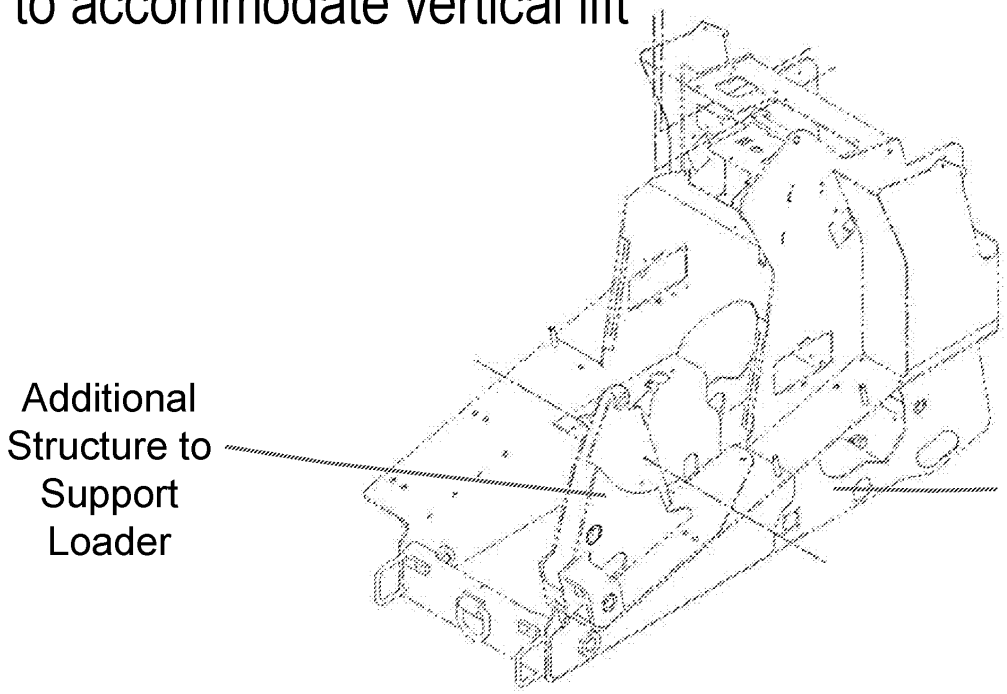
Toro Redesigned Mainframe

TX 1000

Dingo 322

Toro Redesign Mainframe

- Toro redesigned mainframe to include additional structure to accommodate vertical lift



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Different Engine Location

New Pivot Point Locations

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Many Failures Encountered

More than "routine experimentation"

Many Failures Encountered

More than "routine experimentation"

Many Failures Encountered

More than "routine experimentation"

Many Failures Encountered

More than "routine experimentation"

Differences between the Proposed Dingo/Komatsu Combination and the Claimed Invention

At Least Two Limitations Are Missing from the Dingo/Komatsu Combination

1. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

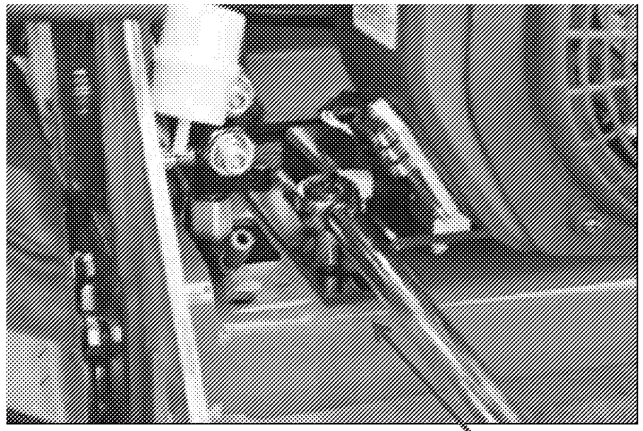
an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm; and

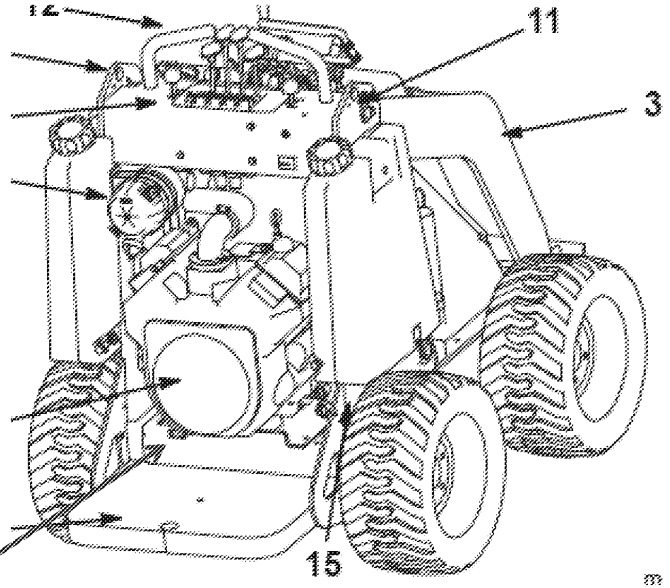
a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

Vermeer

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Dingo 322 Engine Bracket Not Spaced From Rear of Mainframe





Engine mounted to rear of Mainframe

Vermeer

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“Mainframe” Does not Include Operator Platform or Gussets

- Claims provide different terms for Mainframe and Operator Platform (compare Claims 1 and 9)

- Figs 4-7 depict Mainframe (but no Operator Platform)

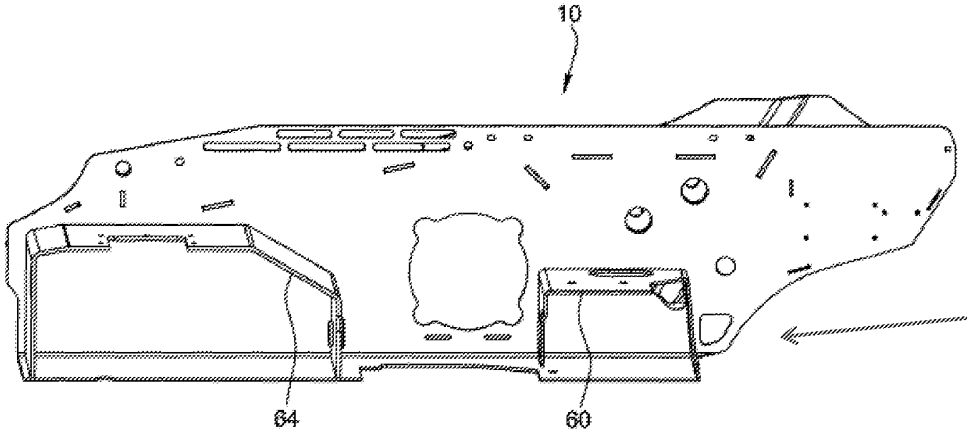


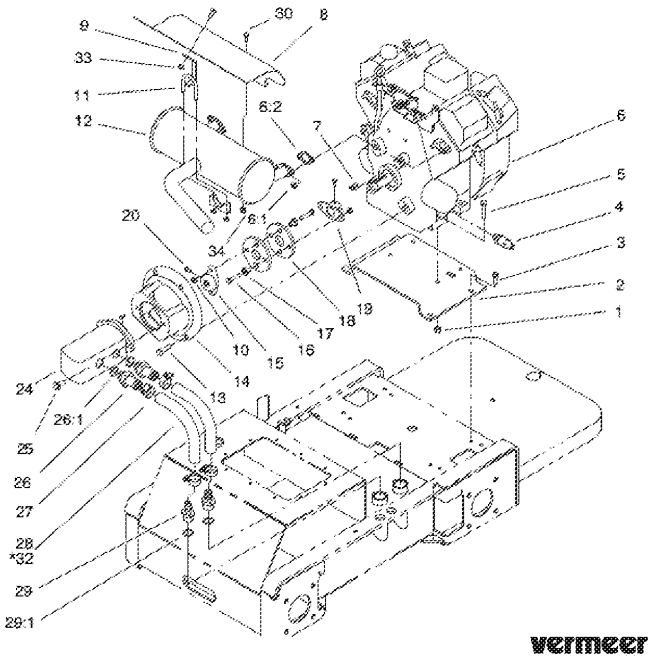
FIG. 6

No Operator Platform or related attachment componentry shown

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“Mainframe” Does not Include Operator Platform or Gussets

- Gussets are not shown in some views of the mainframe in the Dingo 322 Parts Catalog



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Komatsu – Fig. 1

Objective Evidence of Non-obviousness

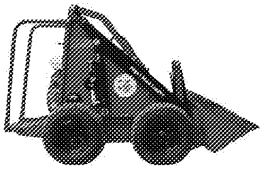
Objective Evidence of Non-obviousness

- Long Felt Need
- Attempts by Others
- Unexpected Results
- Commercial Success

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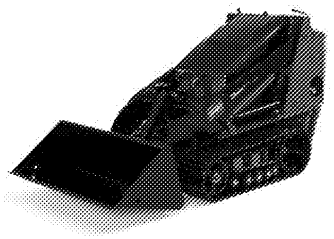
Long Felt Need

- Compact Tool Carriers have been commercially available for over 30 years



Riga'l Dingo 500
- Developed by regional Australian Manufacturer in 1986
- 250 lb. Rated Operator Capacity

- A consistent problem for Compact Tool Carriers has been the need for increased **lift capacity**



TX420
- First tracked compact utility loader developed in 2000
- 500 lb. Rated Operator Capacity

Vermeer

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Long Felt Need

- Trade Journals and Customers Recognize the Need:



Home // Equipment // Earthmoving - Compact // Super Size Your Skid Steer

Super Size Your Skid Steer

As skid steers have increased in size, so has their ability to lift loads and power high-capacity hydraulic attachments. Yet, there are potential drawbacks to upsizing.

Moore has also seen a shift in the size of skid loaders. "There is definitely a slight shift upward," he acknowledges. "Customers are looking for just a little more horsepower, a little more load capacity and machine performance."

The trick is to instill more performance while maintaining a compact package. "The true definition of a skid steer is a compact, powerful and yet nimble machine in most

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Attempts to Solve the Problem

- Manufacturers have attempted to increase their advertised lift capacity in numerous ways:
  - Welding weights to back of machine
  - Shifting fuel to the rear to counterbalance loads
  - Redesigned buckets to move loads more rearward

- Each of these modifications had only minimal effects:
  - Only small increase in capacity
  - Detrimental on machine weight and capability

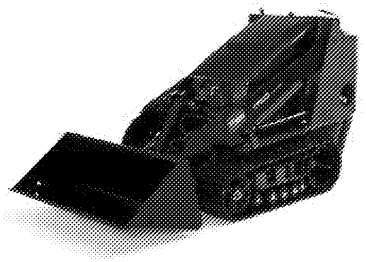
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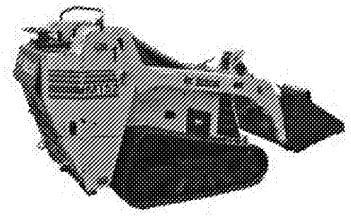
Attempts to Solve the Problem

- Since 2000, domestic market shifted from walk-behind to predominantly ride-on machines
- The added weight from the operator allowed for an increase in lift capacity

	MFG	MODEL	TIP	Design	Boom	HP
2000	Toro	TX420	1480	Walk Behind	Radial	20
	Bobcat	MT50	1500	Walk Behind	Radial	20
	Ditchwitch	SK500	1450	Walk Behind	Radial	25
	Vermeer	S600	1200	Ride On	Radial	25
2005	Vermeer	S600TX	1450	Ride On	Radial	26.5
	Bobcat	MT52	1600	Walk Behind	Radial	23
	Toro	TX525	1580	Walk Behind	Radial	24
	Ditchwitch	SK650	1860	Ride On	Radial	31.5
	Boxer	532DX	2100	Ride On	Radial	32
	Vermeer	S800TX	2400	Ride On	Radial	35
2010	Ditchwitch	SK850	2465	Ride On	Radial	37
	Vermeer	S450TX	1430	Ride On	Radial	25
	Boxer	950HD	2734	Ride On	Radial	48
	Bobcat	MT85	2458	Ride On	Radial	25
	Vermeer	CTX50	1715	Ride On	Vertical	25
2015	Toro	TX1000	3071	Ride On	Vertical	25
	Vermeer	CTX100	2958	Ride On	Vertical	40
	Ditchwitch	SK1050	3035	Ride On	Radial	37
2017	Ditchwitch	SK1550	4451	Ride On	Radial	44

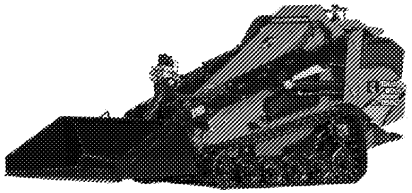
**Models listed in chronological order based on Introduction to the market*





All models now ride on
To incorporate weight of operator in
Tip capacity testing (165 lbs. ISO std)





Vermeer

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Attempts by Others

- Ditch Witch models include “weight kits”, which add weight to the back of the machine to increase lift capacity
- This added weight sacrifices ground clearance, showing the importance of lift capacity compared to other features

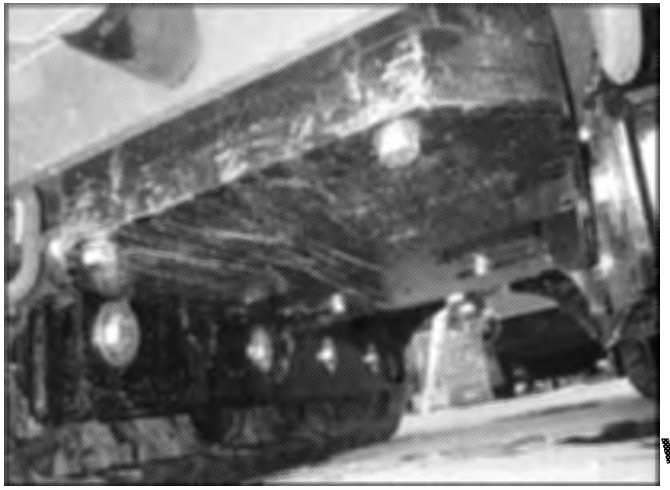
Ditch Witch

CONFIDENTIAL

SUGGESTED PRICE LIST
(F.O.B. PERRY, OKLAHOMA)

PART NO.	DESCRIPTION
	LIFT ARM (Optional)
350-4171	LIFT ARM ASSEMBLY
	ORANGE INTEL™ OPTIONS (Select one)
190-2568	GPS ONLY FOR GPS-READY
	Note: Equipment Registration Activates GPS and Telematics Boxes
	ORANGE INTEL™ SERVICE PLAN OPTIONS (Optional)
240-1118	1 Year Data Service Plan GPS ONLY
	Note: Sold in One Year Increments
ACCESSORIES	
190-2628	WEIGHT KIT
190-2196	SK850 UPTIME KIT

“Weight Kit”



Vermeer

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Attempts to Solve the Problem

- For years, customers have added their own counter weights to increase lift capacity
- But, this increases machine weight and provides minimal increased lift capacity

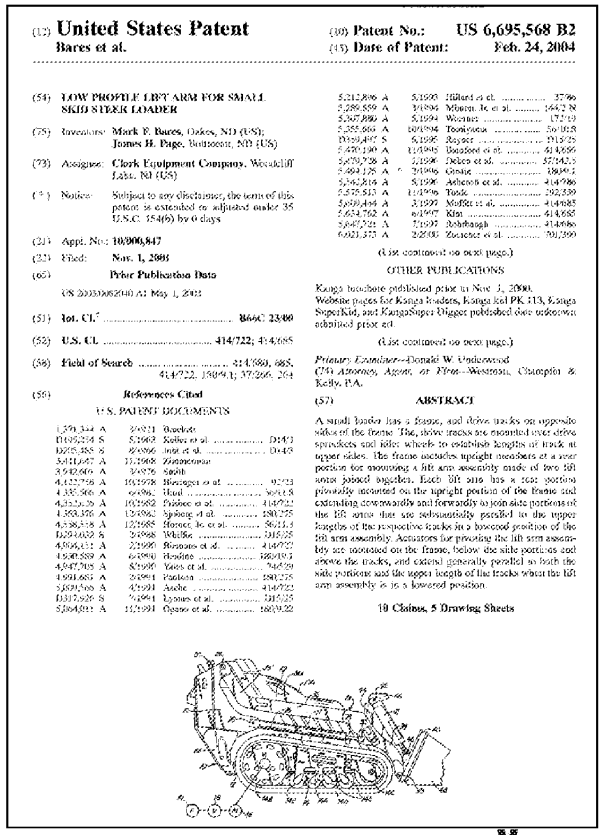


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Attempts to Solve the Problem

- Prior art patents teach moving the pivot points closer to the operator to increase lift capacity

The far rear pivot of the lift arms permits using a longer arm on the same length machine. This increases the lift capacity for the same size actuator and there is a longer arc of movement. This means that the bucket or tool moves more vertically as it initially raises, rather that having a pronounced arcuate path that causes the bucket to move forward a significant amount as it starts to lift.



(12) **United States Patent**
Bares et al.

(10) **Patent No.: US 6,695,568 B2**
(45) **Date of Patent: Feb. 24, 2004**

(54) **LOW PROFILE LIFT ARM FOR SMALL SKID STEER LOADER**

(75) Inventors: **Mark E. Bares**, Dakes, ND (US); **James H. Page**, Belmont, ND (US)

(73) Assignee: **Clark Equipment Company**, Woodcliff Lake, NJ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days

(21) Appl. No.: **10/000,847**

(22) Filed: **Nov. 1, 2001**

(65) **Prior Publication Data**

US 2003/0082040 A1 May 1, 2003

(51) **Int. Cl.**[7] **B66C 23/00**

(52) **U.S. Cl.** **414/722**; 414/685

(58) **Field of Search** 414/680, 685, 414/722, 730/94.1; 37/266, 264

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Website pages for Kanga Loaders, Kanga Kid PK 313, Kanga SuperKid, and KangaSuper Digger published date unknown prior art

(List continued on next page.)

Primary Examiner—Donald W. Underwood
(74) *Attorney, Agent, or Firm*—Westman, Champlin & Kelly, P.A.

(57) **ABSTRACT**

A small loader has a frame, and drive tracks on opposite sides of the frame. The drive tracks are mounted over drive sprockets and idler wheels to establish lengths of track at upper sides. The frame includes upright members at a rear portion for mounting a lift arm assembly inside of two lift arms joined together. Each lift arm has a rear portion pivotally mounted on the upright portion of the frame and extending generally forwardly and generally along side portions of the lift arms that are substantially parallel to the upper lengths of the respective tracks in a lowered position of the lift arm assembly. Actuators for pivoting the lift arm assembly are mounted on the frame, below the side portions and above the tracks, and extend generally parallel to both the side portions and the upper length of the tracks when the lift arm assembly is in a lowered position.

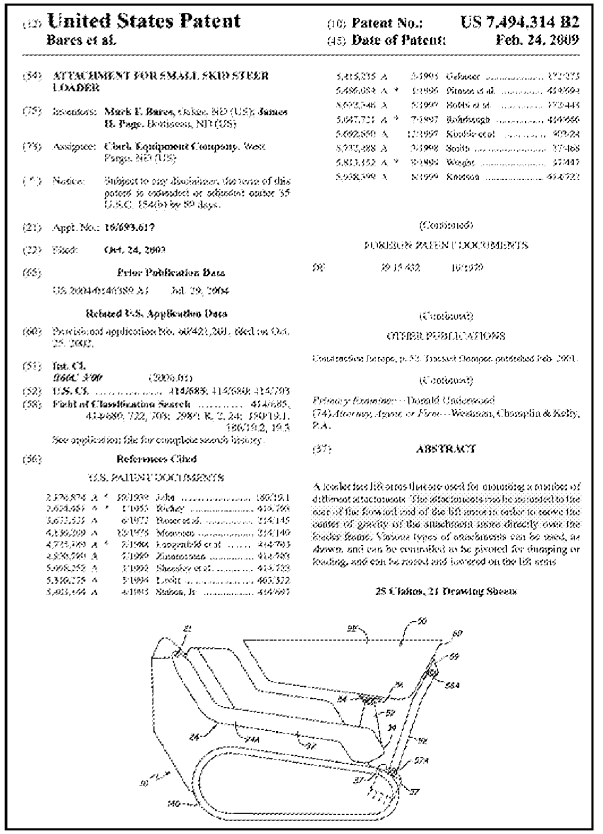
10 Claims, 5 Drawing Sheets

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Kubota North America Corporation et al
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Page 327 of 549

Attempts to Solve the Problem

- Prior art taught pivotal lift arms that move weight over frame to increase lift capacity

A loader has lift arms that are used for mounting a number of different attachments. The attachments can be mounted to the rear of the forward end of the lift arms in order to move the center of gravity of the attachment more directly over the loader frame. Various types of attachments can be used, as shown, and can be controlled to be pivoted for dumping or loading, and can be raised and lowered on the lift arms.



(12) **United States Patent**
Barcs et al.

(10) **Patent No.: US 7,494,314 B2**
(45) **Date of Patent: Feb. 24, 2009**

(54) **ATTACHMENT FOR SMALL SKID STEER LOADER**

(75) Inventors: **Mark E. Barcs**, Oakes, ND (US); **James B. Page**, Bottineau, ND (US)

(73) Assignee: **Clark Equipment Company**, West Fargo, ND (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 89 days.

(21) Appl. No.: **10/693,617**

(22) Filed: **Oct. 24, 2003**

(65) **Prior Publication Data**

US 2004/0146389 A1 Jul. 29, 2004

Related U.S. Application Data

(60) Provisional application No. 60/421,260, filed on Oct. 25, 2002.

(51) **Int. Cl.**
B66C 3/00 (2006.01)

(52) **U.S. Cl.** 414/685; 414/680; 212/293

(58) **Field of Classification Search** ..... 414/685, 414/680, 722, 703; 298/1 R, 2, 24; 180/19.1, 180/19.2, 19.3
See application file for complete search history.

(56) **References Cited**

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(Continued)

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(Continued)

Primary Examiner—Donald Underwood
(74) *Attorney, Agent, or Firm*—Westman, Champlin & Kelly, P.A.

(57) **ABSTRACT**

A loader has lift arms that are used for mounting a number of different attachments. The attachments can be mounted to the rear of the forward end of the lift arms in order to move the center of gravity of the attachment more directly over the loader frame. Various types of attachments can be used, as shown, and can be controlled to be pivoted for dumping or loading, and can be raised and lowered on the lift arms.

28 Claims, 21 Drawing Sheets

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Kubota North America Corporation et al
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Attempts to Solve the Problem

- Despite the strong need for increased lift capacity, not one manufacturer thought to produce a compact tool carrier with vertical lift, <u>until Vermeer's CTX50</u>
- Vermeer's CTX50 **increased lift capacity by 32%**



Vermeer

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Unexpected Results

- Vermeer's development team encountered significant difficulties in developing a vertical lift CUL
- At one point, they doubted that they would be successful and *considered abandoning the project*

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Industry Praise

- "Vertical lift" was an immediate success in the compact utility loader market
- Vermeer's CTX50 has been called a "game changer" in the market due to its increased lift capacity from vertical lift

"Innovative Iron Awards" – CompactEquip.com

(http://compactequip.com/features/innovative-iron-awards-toro-vermeer-compact-tool-carriers/attachment/vermeer-compact-tool-carrier/)The Vermeer (http://vermeer.com) CTX50 boasts a 600-lb ISO-rated operating capacity and a tipping capacity of 1,715 lbs due to its vertical-lifting path. The vertical-lift path is designed to keep the load closer to the machine, allowing it to lift more than a similar-sized compact tool carrier with a radial-lift path. A vertical-lift path also provides a higher lift height. These enhancements along with the Vermeer exclusive single pilot-operated joystick and stand-on platform make the CTX50 a game-changer in the rental and landscape market.

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Industry Praise



"vertical loader arms which are really unique. . . "

https://www.youtube.com/watch?v=ckMKUklzcF8

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Page 332 of 549

Industry Praise

INNOVATIVE IRON AWARDS: TORO AND VERMEER COMPACT TOOL CARRIERS

INNOVATIVE IRON AWARDS 2015 | NOVEMBER 2015 PRINT ISSUE | TORO | VERMEER by CB | on December 22, 2015 | 1 comment | in Compact Tool Carriers | Like it

Exploration is the engine that drives innovation, so let's go exploring. Let's search through a year's worth of creative ideas in the off-highway equipment industry and see if we can benchmark the innovative exploration of the American machine market. Over the last 12 months, global manufacturers from Caterpillar to Kubota have released compact machines that have set new standards for power, versatility, efficiency and design. Our editors have traveled across the globe to meet these manufacturers, operate their new products and give detailed reports and opinions both in print and on our website (compactequip.com). We sifted through the hundreds of models and brands released in 2015 and picked 19 units that set the bar for innovation. With this article, we salute those companies (from Komatsu to Case) that have changed the commercial equipment market over the last year with their unique, interesting and innovative machines, engines and technologies.

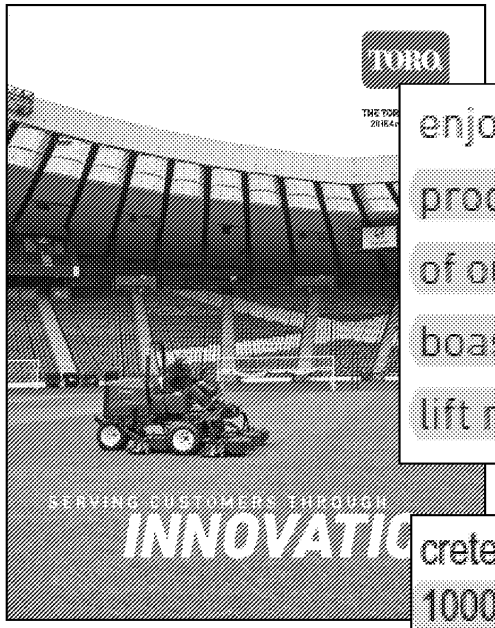


TORO AND VERMEER BRING A NEW LIFTING PATTERN TO CTCS

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Kubota North America Corporation et al
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Page 333 of 549

Commercial Success

Toro's 2015 Annual Statement



enjoy a good year. Sales in our compact utility loader product line grew nicely fueled in part by the introduction of our all-new, award-winning Dingo® TX 1000 that boasts an operating capacity exceeding 1,000 pounds to lift more than any compact utility loader on the market.

crete power tools. In fiscal 2015, we introduced the Dingo® TX 1000, which features a higher operating capacity and greater reach height that allows attachments to clear the side of dumpsters or trucks. We also expanded our masonry lineup with the launch of

"We've doubled the capacity of our current loaders." **– Toro**

Vermeer

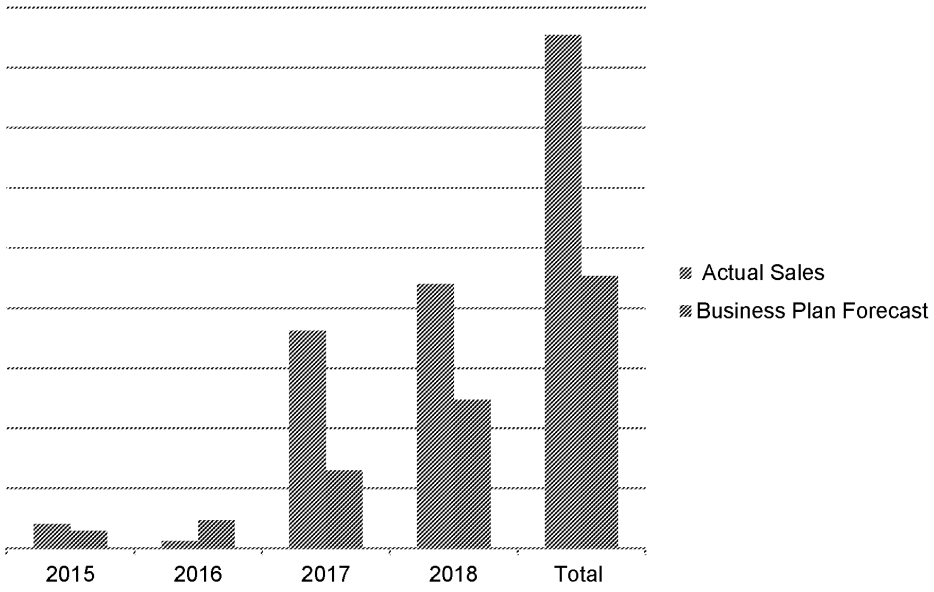
64

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Page 334 of 549

Commercial Success

Sales of Vermeer's CTX50 and CTX100 Exceed Expectations

CTX50 and CTX100 Actual Sales v. Forecast



Actual sales exceeded the forecast by almost 90%

** 2018 data is extrapolated through end of year based on data through August.*

Vermeer

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Page 335 of 549

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CERTIFICATE OF SERVICE

I certify that on December 06, 2018 the foregoing:

AMENDMENT AND RESPONSE TO OFFICE ACTION

INTERVIEW SUMMARY

DECLARATION OF LOUIS HARTKE UNDER 37 C.F.R. 1.132

DECLARATION OF MATTHEW HUTCHINSON UNDER 37 C.F.R. 1.132

DECLARATION OF SCOTT PROST-DOMASKY UNDER 37 C.F.R. 1.132;

and

INFORMATION DISCLOSURE STATEMENT

were served on the third party requester's counsel via first class mail at:

James W. Miller
Registration No. 27,661
Suite 1960 Rand Tower
527 Marquette Avenue
Minneapolis, MN 55402

Respectfully submitted,

/Michael J. Vander Molen/

Michael J. Vander Molen
Reg. No. 57,274
ARMSTRONG TEASDALE LLP
7700 Forsyth Blvd.
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St. Louis, Missouri 63105
(314) 621-5070

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,109 & 90/014,124	03/12/2018	9321386	Vermeer-386Reex-2	8108

76656 7590 10/29/2018

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105
UNITED STATES OF AMERICA

EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
10/29/2018	PAPER

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

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

Copied from 90014109 on 10/29/2018

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,124 & 90/014,109	04/13/2018	9321386	Vermeer-386Reex-3	8217

76656 7590 10/29/2018

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105
UNITED STATES OF AMERICA

EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
10/29/2018	PAPER

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Commissioner for Patents
United States Patents and Trademark Office
P.O.Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

JAMES W. MILLER, ATTORNEY
527 MARQUETTE AVENUE
SUITE 1960, RAND TOWER
MINNEAPOLIS, MN 55402

Date: 10/29/2018

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90014109 & 90014124
PATENT NO. : 9321386
ART UNIT : 3993

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Copied from 90014109 on 10/29/2018

Decision on Petition for Extension of Time in Reexamination	**Application No.**	**Applicant(s)**	
	90/014,109 & 90/014,124	9,321,386	
	Examiner	**Art Unit**	
	Russel D. Stormer	3993	

1. THIS IS A DECISION ON THE PETITION FILED October 26 2018.

2. THIS DECISION IS ISSUED PURSUANT TO:
   - A. ☒ 37 CFR 1.550(c) – The time for taking any action by a patent owner in a third party requested *ex parte* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.
   - B. ☐ 37 CFR 1.550(c) – The time for taking action by a patent owner in a patent owner requested *ex parte* reexamination proceeding will only be extended for more than two months for sufficient cause and for a reasonable time specified.
   - C. ☐ 37 CFR 1.956 – The time for taking any action by a patent owner in an *inter partes* reexamination proceeding will be extended only for sufficient cause and for a reasonable time specified.

   The petition is before the Central Reexamination Unit for consideration.

3. FORMAL MATTERS

Patent owner requests that the period for responding to the Office action mailed on September 6, 2018*** which set a two (2) month period for filing a response thereto, be extended by an additional one (1) month.

   - A. Petition fee per 37 CFR §1.17(g)):
     - i. ☒ Petition includes authorization to debit a deposit account.
     - ii. ☐ Petition includes authorization to charge a credit card account.
     - iii. ☐ Other _____.
   - B. ☒ Proper certificate of service was provided. (Not required in reexamination where patent owner is requester.)
   - C. ☒ Petition was timely filed.
   - D. ☒ Petition properly signed.

4. DECISION (See MPEP 2265 and 2665)
   - A. ☒ Granted or ☐ Granted-in-part for **one (1) month** because petitioner provided a factual accounting that established sufficient cause. (See 37 CFR 1.550(c) and 37 CFR 1.956).
     - i. ☒ Other/comment: ***__**Although Patent Owner indicates in their petition that the Office action was mailed on August 8, 2018, it was actually mailed on September 6, 2018.**__
   - B. ☐ Dismissed because:
     - i. ☐ Formal matters (See unchecked box(es) (A, B, C and/or D) in section 4 above).
     - ii. ☐ Petitioner failed to provide a factual accounting of reasonably diligent behavior by all those responsible for preparing a response to the outstanding Office action within the statutory time period.
     - iii. ☐ Petitioner failed to explain why, in spite of the action taken thus far, the requested additional time is needed.
     - iv. ☐ The statements provided fail to establish sufficient cause to warrant extension of the time for taking action (See attached).
     - v. ☐ The petition is moot

5. CONCLUSION: **__The response to the Office action mailed September 6, 2018 is due now December 6, 2018.__**

6. Telephone inquiries with regard to this decision should be directed to Stephen Stein at 571-272-1544 in the CRU.

/Stephen Stein/
Supervisory Patent Reexamination Specialist
Central Reexamination Unit

Copied from 90014109 on 10/29/2018

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Kubota North America Corporation et al

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Page 341 of 549

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control Nos.: 90/014,109 and 90/014,124
Filed: March 12, 2018 and April 13, 2018
Confirmation No.: 8108 and 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer
Conferees: Eileen Lillis and Sara Clarke

OCTOBER 26, 2018

TO THE COMMISSIONER FOR PATENTS,
SIR:

PETITION FOR EXTENSION OF TIME PURSUANT TO 37 C.F.R. §1.550(c)

Patent Owner requests the Director to extend the period of time for responding to the August 8, 2018 Office action for one month pursuant to 37 C.F.R. §1.550(c). Patent Owner's response is currently due November 6, 2018. With the one month extension, Patent Owner's response would be due December 6, 2018.

During the Examiner interview of October 24, 2018, the Examiner and conferees stated that certain declarations and other evidence may be relevant to the obviousness analysis. Because there are less than two weeks between the date of the interview and the due date for Patent Owner's response, Patent Owner requests an extension of one month to prepare declarations and gather other evidence.

Because there is sufficient cause to grant the extension and because the requested period of time for extension is reasonable, Patent Owner requests the extension be granted under 37 C.F.R. §1.550(c). The Patent Owner authorizes the Commissioner to charge any fees which may be due in connection with this Petition,

including the fee set forth in 37 C.F.R. §1.17(g), to Deposit Account No. 012384 in the name of Armstrong Teasdale LLP.

Respectfully submitted,

/Michael J. Vander Molen/

Michael J. Vander Molen
Reg. No. 57,274
ARMSTRONG TEASDALE LLP
7700 Forsyth Blvd., Suite 1800
St. Louis, Missouri 63105
(314) 621-5070

CERTIFICATE OF SERVICE

I certify that on October 26, 2018 the foregoing PETITION FOR EXTENSION OF TIME PURSUANT TO 37 C.F.R. §1.550(c) was served on the third party requester's counsel via first class mail at:

James W. Miller
Registration No. 27,661
Suite 1960 Rand Tower
527 Marquette Avenue
Minneapolis, MN 55402

Respectfully submitted,

/Michael J. Vander Molen/

Michael J. Vander Molen
Reg. No. 57,274
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7700 Forsyth Blvd.
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St. Louis, Missouri 63105
(314) 621-5070

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United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

90/014109

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,124	04/13/2018	9321386	Vermeer-386Reex-3	8217

76656 7590 10/31/2018

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105
UNITED STATES OF AMERICA

EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
10/31/2018	PAPER

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

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

PTOL-90A (Rev. 04/07)

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OCT 31 2018

(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

JAMES W. MILLER, ATTORNEY
527 MARQUETTE AVENUE
SUITE I960, RAND TOWER
MINNEAPOLIS, MN 55402

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/014,109*. 90014124

PATENT UNDER REEXAMINATION *9321386*.

ART UNIT *3993*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Ex Parte Reexamination Interview Summary	Control No.	Patent Under Reexamination	
	90/014,109 ⅞90014124	9321386	
	Examiner	Art Unit	AIA Status
	RUSSELL D STORMER	3993	Yes

All participants (USPTO personnel, patent owner, patent owner's representative):

(1) Russell Stormer	(3) Mike Vander Molen; Mike Munsell
(2) Eileen Lillis; Sara Clarke	(4) Louis Hartke

Date of Interview: 24 October 2018

Type: a) ☐ Telephonic b) ☐ Video Conference
c) ☑ Personal (copy given to: 1) ☐ patent owner 2) ☐ patent owners representative)

Exhibit shown or demonstration conducted: d) ☑ Yes e) ☐ No.
If Yes, brief description: Models of the instant machine and of a larger skid steer loader were compared and contrasted.

Agreement with respect to the claims f) ☐ was reached. g) ☑ was not reached. h) ☐ N/A.
Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."

Claim(s) discussed: 1 .

Identification of prior art discussed: Komatsu, Dingo 322 .

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
See attachment sheet .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN **ONE MONTH** FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW (37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNERS STATEMENT CAN NOT BE WAIVED. **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

/RUSSELL D STORMER/ Primary Examiner, Art Unit 3993	Conferees: /SC/	/E.D.L/ SPRS, Art Unit 3993

cc: Requester (if third party requester)

Interview Summary – Attachment Sheet

Patent Owner (through representatives Mike Vander Molen and Mike Munsell) discussed portions of a prepared presentation (see the IFW file of 90/014,109 and 90/014,124 for the entire presentation).

The prosecution history of the subject 9,321,386 patent, including continuations and pending litigation, was reviewed.

Patent Owner and Inventor Hartke emphasized the differences between compact utility loaders (CULs) and skid steers, and noted that the small size of CULs creates a desire for lift/load capacity and a higher vertical reach.

Mr. Hartke further noted that the small area at the sides of the Dingo 322 CUL would no accommodate the linkages required for a vertical lift arm arrangement.

The pivot points of the arms and linkages of the subject CUL were discussed, and compared to the arms and linkages of Komatsu. Mr. Hartke discussed the development of the CUL, and the stresses on the loader arms and the linkages, noting that the arrangement of the pivot points resulted in a 32% increase in lift capacity as compared to a similar sized machine with a radial lift. When asked how the 32% increase compared to what would normally be for a vertical lift versus a radial lift (such as in comparable skid steer machines), Mr. Hartke did not have any data available.

The Examiners noted several times that any declarations filed with the next response must be connected to structural limitations in the claims, and should include test data and other evidence. (See MPEP 716 as to declarations and the nexus requirement)

While the claims were not discussed in detail, claim 1 was discussed to the extent that Patent Owner asserted that the limitation of "an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm" was not taught by Komatsu.

Examiner Stormer pointed to page 17 of the English translation of Komatsu, where lines 8-10 describe the front portion of the vehicle body and the arm 13 being coupled to one another by a lifting cylinder 15, and asserted that each of the arms 13 would be coupled to a cylinder 15, and each cylinder would be coupled to a side of the mainframe.

Finally, the Examiners noted that arrangements of the pivot points and the distances therebetween appeared to be a structural feature Patent Owner should focus on to distinguish over Komatsu and Dingo 322.

Patent Owner was reminded of the requirement to file a separate, detailed summary of the interview with the next response as a paper separate from the arguments, or within one month of the interview. See MPEP 2281.

CERTIFICATE OF SERVICE

I certify that on October 3, 2018 the foregoing INFORMATION DISCLOSURE STATEMENT was served on the third party requester's counsel via first class mail at:

James W. Miller
Registration No. 27,661
Suite 1960 Rand Tower
527 Marquette Avenue
Minneapolis, MN 55402

Respectfully submitted,

/Michael J. Vander Molen/

Michael J. Vander Molen
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ARMSTRONG TEASDALE LLP
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⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　昭63－265022

⑤Int.Cl.⁴	識別記号	庁内整理番号	㊸公開　昭和63年(1988)11月1日
E 02 F 3/34		6828－2D	
E 01 H 5/06		7012－2D	

審査請求　未請求　発明の数 1　（全5頁）

㊹発明の名称　土砂、雪等の処理車

㉑特　願　昭62－100914

㉒出　願　昭62(1987)4月23日

㉒発明者　宮地　文矢　静岡県沼津市松長178番地　株式会社昌和製作所内

㉒発明者　畑山　辰彦　静岡県沼津市松長178番地　株式会社昌和製作所内

㉑出願人　ヤマハ発動機株式会社　静岡県磐田市新貝2500番地

㉔代理人　弁理士　鶴若　俊雄

明　細　書

1．発明の名称

土砂、雪等の処理車

2．特許請求の範囲

車体フレームに、リンク機構を介してバケットを昇降可能に取付けた土砂、雪等の処理車において、前記リンク機構は複数のアームが各々ピボット軸で回動可能に連設してなり、前記バケットの水平位置に最も近い前記ピボット軸のアームを順次回動させて、前記バケットを昇降させるように構成される土砂、雪等の処理車。

3．発明の詳細な説明

（産業上の利用分野）

この発明は、人が乗車しないで、土砂、雪等をすくい取って他の場所に移動させたり、トラック等に積込む土砂、雪等の処理車に関する。

（従来の技術）

例えば、路地裏、屋根下等に積った雪を除去するには、除雪車が通行できないため、人がスコップ等で雪をすくい取っている。

このような除雪作業を人力により行なうことは重労働であり、特に女性や老人によっては、スコップ等で雪をすくい取り、さらにこの雪を他の場所に移動するに体力と時間を要する。

（発明が解決しようとする問題点）

このため、人が乗車しないで自走する小型で簡単に操作できる車にリンク機構を介してバケットを取付け、このリンク機構の操作でバケットを昇降させ、このバケットの操作で雪をすくい取り、他の場所へ移動したり、トラック等に積込むことができれば、積雪を除去する作業が容易になる。

ところで、このような車に、リンク機構を介してバケットを取付ける場合には、車に人が乗車しないで操作するような小型なものであるため、例えば実開昭57－124119号公報や、特開昭56－22823号公報に開示されているようにバケットが前後に大きく移動するものは、車の重心移動が大きくなるため適用することができない。

この発明はこのような実状に鑑みてなされたも

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ので、バケットの昇降による重心移動を最小限に抑え、安定性の向上を図る土砂、雪等の処理車を提供することを目的としてる。

（問題点を解決するための手段）

この発明は前記問題点を解決するために、車体フレームに、リンク機構を介してバケットを昇降可能に取付けた土砂、雪等の処理車において、前記リンク機構は複数のアームが各々ピボット軸で回動可能に連設してなり、前記バケットの水平位置に最も近い前記ピボット軸のアームを順次回動させて、前記バケットを昇降させるように構成されることを特徴としている。

（作用）

この発明では、リンク機構を介して取付けられたバケットが、その昇降作動をバケットとの水平位置が最も近いピボット軸のアームから順次回動させて行なうので、昇降によるバケットの上下の移動量に対して前後の移動量を少なくできる。

このため、処理車の重心移動量を最小限に抑えることができ、特に小型の車の重心バランスが向上する。

（実施例）

次に、添付図面と共にこの発明の実施例を詳細に説明する。

図中符号１は土砂、雪等の処理車として小型のエンジンスノーダンプで、その車体フレーム２の前側にはクローラ装置３が設けられており、このクローラ装置３は前後に配置される従動スプロケット４ａと駆動スプロケット４ｂ及びトラック５で構成されている。この駆動スプロケット４ｂの上方位置の車体フレーム２にはエンジン６が搭載され、車体フレーム２の後端にはハンドル７が斜め後方に取付られ、その先端には操作レバー８が設けられている。

車体フレーム２にはリンク機構９を介してバケット１０が支持され、このリンク機構９はピラー部１１、アーム部１２、リフト機構１３及びダンプ機構１４とから構成される。

ピラー部１１の左右のアーム１５はエンジン７の側方位置で車体フレーム２に設けられたブラケット１６に、その基端部がピボット軸１７を介して回動可能に支持されている。ブラケット１６の前側にはアーム１５の回転を規制するストッパー１８が設けられている。

アーム１５の先端部に設けられたブラケット１９にはピボット軸２０が軸支されており、アーム部１２の左右のアーム２１はピボット軸２０に回動可能に支持され、アーム２１の先端は連結軸２２，２３により一体に連結されている。さらに、この連結軸２２，２３には左右のアーム２４の基部が接続され、このアーム２４の中央部は連結軸２５で連結され、アーム２４の先端にはピボット軸２６を介してバケット１０のブラケット２７が回動可能に支持されている。

前記リフト機構１３の油圧シリンダ２８は車体フレーム２のブラケット２９にピン３０を介して支持され、そのロッド３１はアーム部１２のアーム２１の基端部にピン３２を介して支持されている。

前記ダンプ機構１４の油圧シリンダ３３はピボット軸３４を介してピボット軸２０のブラケット３５に支持され、そのロッド３６は操作レバー３７の一端部にピン３８を介して連結されている。この操作レバー３７の中央部は連結軸２３のブラケット３９にピボット軸４０を介して回動可能に支持され、この操作レバー３７の他端にはロッド４１がピン４２を介して接続されている。このロッド４１の他端はピボット軸４２を介して操作レバー４３に接続され、この操作レバー４３は連結軸２５のブラケット４４にピン４５を介して回動可能に支持されている。操作レバー４３の先端部はロッド４６がピン４７を介して接続され、この他端はバケット１５のブラケット４８にピン４９で接続されている。

従って、第４図に示すように、エンジンスノーダンプ１は作業者５０が後からハンドル８の先端に手を添えて操作レバー９を操作し、まず第３図（イ）に示すようにバケット１０の底面を水平にしてバケット１０を地表面５１まで下げた状態から、クローラ装置３を作動させて前進させて地表

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面５１の雪をすくい取る。

次に、リフト機構１３の油圧シリンダ２８を作動してロッド３１を伸張させると、ピラー部１１のアーム１５がピボット軸１７を中心に後方に回動して（ロ）に示す位置まで移動する。そして、アーム１５の基部がストッパー１８に当接し、これによりアーム１５の回動が規制され、この後、更にロッド３１を伸張させると、アーム部１２のアーム２１がピボット軸２０を中心に上方に回動して（ハ）に示す位置に移動する。

次に、クローラ装置３でバケット１０をトラック５２の荷台５３の上方に移動するか、または荷台５３をバケット１０の下方に移動し、ダンプ機構１４の油圧シリンダ３３を作動して、ロッド３６を短縮すると（ニ）に示すようにバケット１０がピボット軸４９を中心に下方に回動して雪が荷台５３の上に落下する。

すなわち、リンク機構９はバケット１０の水平位置が最も近いピボット軸１７を中心にアーム１５が回動を始め、バケット１０がピボット軸１７から離れてピボット軸２０に接近したら、今度はピボット軸１７を中心とする回動を中止して、ピボット軸１８を中心としてアーム２１が回動を開始する。

このようにバケット１０との水平距離が最も近いピボット軸点のアームから順次回動させるので、昇降によるバケット１０の上下の移動量に対して前後の移動量を少なくすることができる。

また、バケット１０は車体フレーム２の前側で略垂直方向に昇降可能とし、これに対してエンジン７は車体フレーム２の後側に搭載されており、車体を大きくすることなく車体重心のバランスを向上させることができる。

また、リンク機構９は車体フレーム２の後部のエンジン７と同じ位置に支持されているので、リンク機構９を支持する新たな支持部材が不要で強度、バランスの点で優れている。さらに、リンク機構９のアーム１５，２１の作動は一個のリフト機構１３で作動することができるため、リンク機構１３の構成が簡単になる。

なお、この発明は雪を処理する処理車について説明したが、土砂等を処理する車にも同様に適用できる。

（発明の効果）

この発明は前記のように、リンク機構を複数のアームが各々ピボット軸で回動可能に連設してなり、バケットの水平位置に最も近いピボット軸のアームを順次回動させて、バケットを昇降させるように構成したから、昇降によるバケットの上下の移動量に対して前後の移動量が少なくなり、処理車の重心移動量を最小限に抑えることができるため、車が人が乗車しないで操作するような小型車において、安定性が向上する。

４．図面の簡単な説明

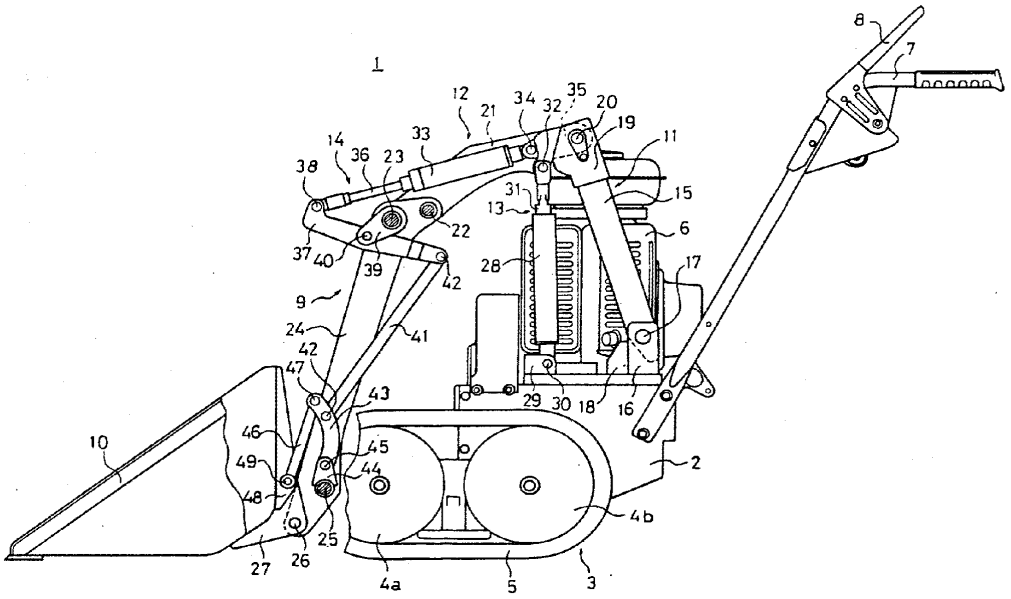
第１図はエンジンスノーダンプの一部破断側面図、第２図はリンク機構の平面図、第３図はリンク機構の作動を示す一部破断側面図、第４図はエンジンスノーダンプの使用状態を示す側面図である。

図中符号１はエンジンスノーダンプ、２は車体フレーム、３はクローラ装置、９はリンク機構、１０はバケット、１２はアーム部、１３はリフト機構、１４はダンプ機構である。

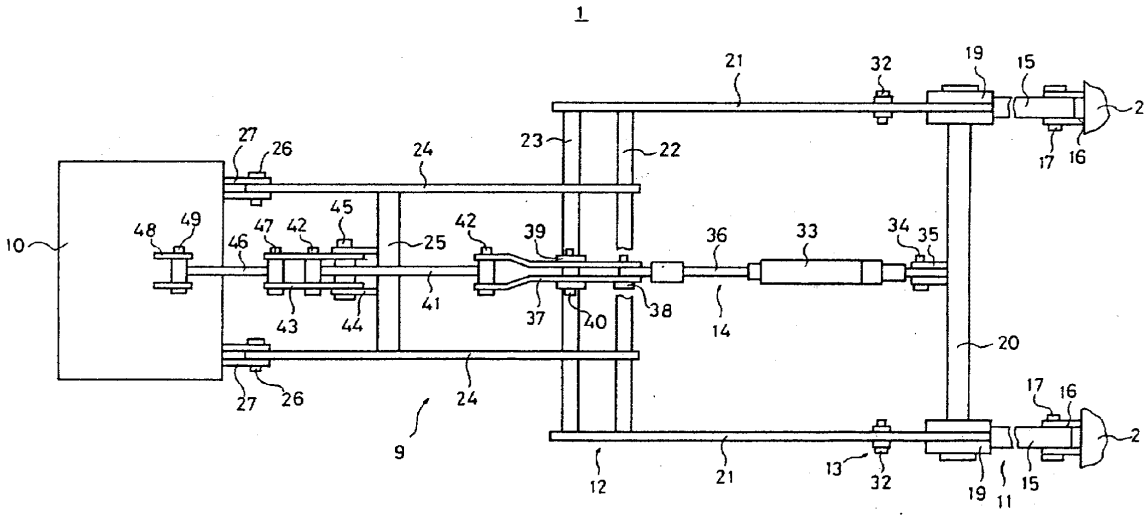
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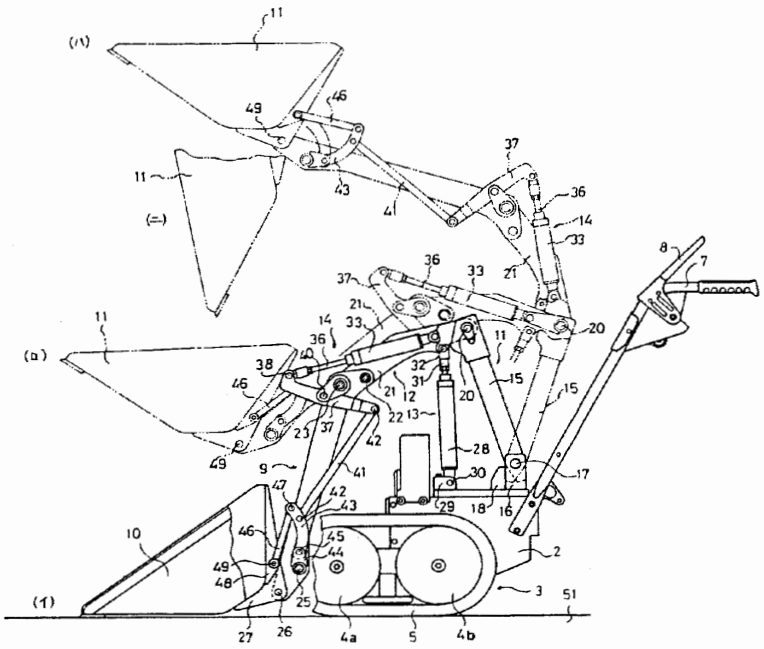
第 1 図



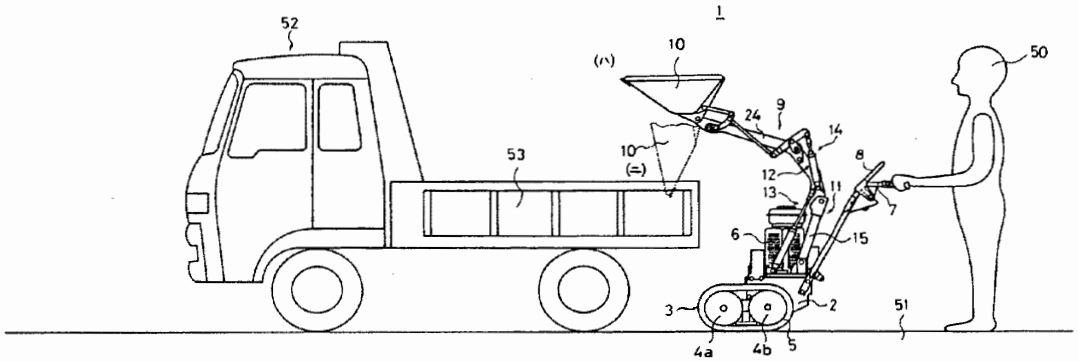
第 2 図

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第 3 図



第 4 図

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(54) Title of the Invention: Vehicle for handling earth and snow, etc.

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(22) Filing Date: April 23, 1987

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SPECIFICATION

1. Title of the Invention

Vehicle for handling earth and snow, etc.

2. Patent Claims

A vehicle for handling earth and snow, etc. in which a bucket is attached to a vehicle body frame via a linking mechanism in such a way that said bucket can be raised/lowered, wherein the linking mechanism is constructed in such a way that a plurality of arms are pivotably connected by way of respective pivot shafts, and the arms on the pivot shafts horizontally closest to the position of the bucket are pivoted in succession, whereby the bucket is raised and lowered.

3. Detailed Description of the Invention

(Field of Industrial Application)

The present invention relates to a vehicle for handling earth and snow, etc. on which a person does not ride, where earth and snow, etc. are scooped up and moved to a different location, or loaded on a truck or the like.

(Prior Art)

A snow plough cannot normally be taken to remove snow which has gathered off the street or under rooves etc., so this snow is scooped up by a person using a scoop or the like.

This kind of operation to remove snow is very labor-intensive when carried out by human power and it requires

physical strength and time to scoop up snow using a scoop or the like and also to move this snow to another location, especially for females and the elderly.

(Problem to be Solved by the Invention)

Operations to remove fallen snow are therefore simplified if it is possible to attach a bucket, via a linking mechanism, to a small and easily-operable vehicle which is self-propelled without a person riding thereon, and to raise/lower the bucket by operating the linking mechanism in order to scoop up snow by operation of the bucket, then to move the snow to another location for loading on a truck or the like.

When a bucket is attached via a linking mechanism to this kind of vehicle, the vehicle is of a small size such that it is operated by a person who does not ride thereon, and therefore it is not possible to move the bucket backward and forward by a large amount because there is a large amount of movement of the center of gravity of the vehicle, as described in JP 57-12419 U and JP 56-22823 A, for example.

The present invention has been devised in light of the situation outlined above, and the aim thereof lies in providing a vehicle for handling earth and snow, etc. in which movement of the center of gravity caused by raising/lowering of a bucket is minimized so as to improve stability.

(Means for Solving the Problem)

In order to solve the abovementioned problem, the present invention provides a vehicle for handling earth and snow, etc. in which a bucket is attached to a vehicle body frame via a linking mechanism in such a way that said bucket can be raised/lowered, wherein the linking mechanism is constructed in such a way that a plurality of arms are pivotably connected by way of respective pivot shafts, and the arms on the pivot shafts horizontally closest to the position of the bucket are pivoted in succession, whereby the bucket is raised and lowered.

(Action)

According to the present invention, the bucket attached via the linking mechanism is raised and lowered by pivoting in succession from the arm on the pivot shaft horizontally closest to the position of the bucket, and therefore it is possible to reduce the amount of backward and forward movement with respect to the amount of vertical movement of the bucket caused by raising/lowering.

It is therefore possible to minimize the amount of movement of the center of gravity of the handling vehicle, and it is possible to improve the center of gravity balance of a small vehicle in particular.

(Exemplary Embodiment)

An exemplary embodiment of the present invention will be described in detail next with reference to the appended drawings.

In the drawings, the reference symbol 1 denotes a small engine-driven snow shovel, in which a crawler device 3 is provided on a front side of a vehicle body frame 2, the crawler device 3 comprising a driven sprocket 4a and a drive sprocket 4b arranged at the front and rear, and a track 5. An engine 6 is mounted on the vehicle body frame 2 at a position above the drive sprocket 4b, a handle 7 is attached diagonally rearward at a rear end of the vehicle body frame 2, and an operating lever 8 is provided at a tip end thereof.

A bucket 10 is supported via a linking mechanism 9 on the vehicle body frame 2, said linking mechanism 9 comprising a pillar portion 11, an arm portion 12, a lifting mechanism 13, and a shovel mechanism 14.

Left/right arms 15 of the pillar portion 11 are supported by brackets 16 provided on the vehicle body frame 2 at positions to the side of the engine 7, in such a way that base end portions of said arms 15 are pivotable by way of a pivot shaft 17. A stopper 18 for restricting rotation of the arms 15 is provided in front of the brackets 16.

A pivot shaft 20 is pivotably supported on a bracket 19 provided at a tip end portion of the arms 15, and left/right arms 21 of the arm portion 12 are pivotably supported by the pivot shaft 20, tip ends of the arms 21 being linked as a single piece by means of linking shafts 22, 23. In addition, base portions of left/right arms 24 are connected to the linking shafts 22, 23, central portions of the arms 24 are

linked by a linking shaft 25, and a bracket 27 of the bucket 10 is pivotably supported at the tip ends of the arms 24 via a pivot shaft 26.

A hydraulic cylinder 28 of the lifting mechanism 13 is supported via a pin 30 on a bracket 29 of the vehicle body frame 2, and a rod 31 thereof is supported via a pin 32 at a base end portion of the arms 21 of the arm portion 12.

A hydraulic cylinder 33 of the shovel mechanism 14 is supported by a bracket 35 on the pivot shaft 20, via a pivot shaft 34, and a rod 36 thereof is linked via a pin 38 to one end portion of an operating lever 37. A central portion of the operating lever 37 is pivotably supported via a pivot shaft 40 on a bracket 39 on the linking shaft 23, and a rod 41 is connected via a pin 42 to the other end of the operating lever 37. The other end of the rod 41 is connected to an operating lever 43 via a pivot shaft 42, and the operating lever 43 is pivotably supported via a pin 45 on a bracket 44 on the linking shaft 25. A tip end portion of the operating lever 43 has a rod 46 connected thereto via a pin 47, and the other end of said rod 46 is connected by a pin 49 to a bracket 48 of the bucket 15.

Accordingly, as illustrated in fig. 4, the engine-driven snow shovel 1 is operated in the following manner, which is to say that an operator 50 operates the operating lever 9 from the rear by applying his or her hand to the tip end of the handle 8, and first of all, from a state as shown in fig.

3(a) in which a bottom surface of the bucket 10 is horizontal and the bucket 10 is lowered as far as a ground surface 51, the crawler device 3 is actuated so as to advance and scoop the snow on the ground surface 51.

Next, when the hydraulic cylinder 28 of the lifting mechanism 13 is operated to extend the rod 31, the arms 15 of the pillar portion 11 pivot to the rear about the pivot shaft 17 and move as far as the position shown in (b). The base portion of the arms 15 then abuts the stopper 18 which restricts pivoting of the arms 15, after which, when the rod 31 is further extended, the arms 21 of the arm portion 12 pivot upward about the pivot shaft 20 and move to the position shown in (c).

Next, when the bucket 10 is moved by the crawler device 3 above a loading bed 53 of a truck 52, or when the loading bed 53 is moved below the bucket 10, and the hydraulic cylinder 33 of the shovel mechanism 14 is operated to shorten the rod 36, the bucket 10 pivots downward about the pivot shaft 49, as shown in (d), and the snow is dropped onto the loading bed 53.

That is to say, the linking mechanism 9 operates in such a way that the arms 15 start to pivot about the pivot shaft 17 horizontally closest to the position of the bucket 10, and once the bucket 10 has moved away from the pivot shaft 17 and approaches the pivot shaft 20, pivoting about the current

pivot shaft 17 is stopped, and the arms 21 start to pivot about the pivot shaft 18.

Pivoting is thus produced from the arm at the pivot shaft point which is closest to the bucket 10 in terms of horizontal distance, and therefore it is possible to reduce the amount of backward and forward movement with respect to the amount of vertical movement of the bucket 10 caused by raising/lowering.

Furthermore, the bucket 10 can be raised and lowered in a substantially vertical direction in front of the vehicle body frame 2 while at the same time the engine 7 is mounted on the rear side of the vehicle body frame 2, so it is possible to improve the center of gravity balance without increasing the size of the vehicle body.

Furthermore, the linking mechanism 9 is supported at the same position as the engine 7 at the rear portion of the vehicle body frame 2, so there is no need for a new support member for supporting the linking mechanism 9, which provides better strength and balance. In addition, operation of the arms 15, 21 of the linking mechanism 9 can be produced by a single lifting mechanism 13, so the configuration of the linking mechanism 13 is simplified.

It should be noted that a handling vehicle for handling snow has been described in the present invention, but the present invention may likewise also be applied to a vehicle for handling earth, etc.

(Advantage of the Invention)

As described above, according to the present invention, a linking mechanism is constructed in such a way that a plurality of arms are pivotably connected by way of respective pivot shafts, and the arms on the pivot shafts horizontally closest to the position of a bucket are pivoted in succession, whereby the bucket is raised and lowered, so it is possible to reduce the amount of backward and forward movement with respect to the amount of vertical movement of the bucket caused by raising/lowering, and it is possible to minimize the amount of movement of the center of gravity of the handling vehicle, and therefore it is possible to improve stability in a small vehicle such as a vehicle which is operated without a person riding thereon.

4. Brief Description of the Drawings

Fig. 1 is a partial cutaway side view of an engine-driven snow shovel; fig. 2 is a plan view of the linking mechanism; fig. 3 is a partial cutaway side view illustrating operation of the linking mechanism; and fig. 4 is a side view showing the state of use of the engine-driven snow shovel.

In the drawings, 1 is an engine-driven snow shovel, 2 is a vehicle body frame, 3 is a crawler device, 9 is a linking mechanism, 10 is a bucket, 12 is an arm portion, 13 is a lifting mechanism, and 14 is a shovel mechanism.

Patent Applicant: Yamaha Motor Co., Ltd.

Representative: Toshio TSURUWAKA, Patent Attorney

[SEAL]

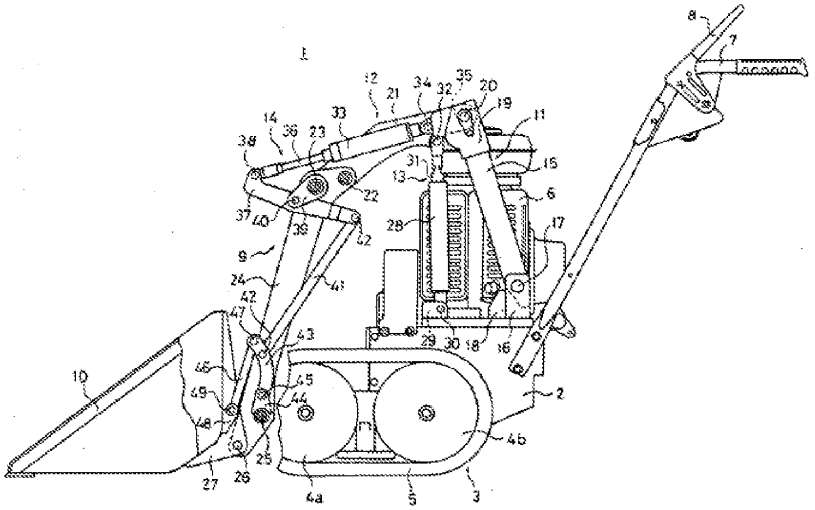


Fig. 1

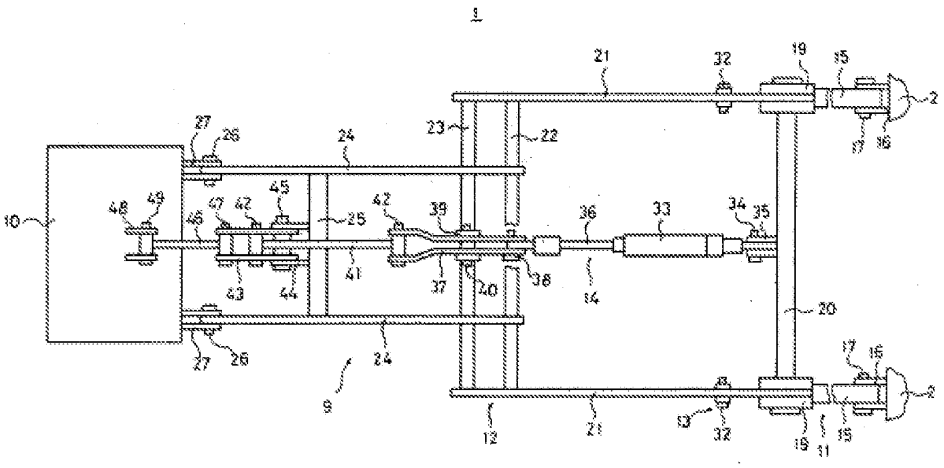


Fig. 2

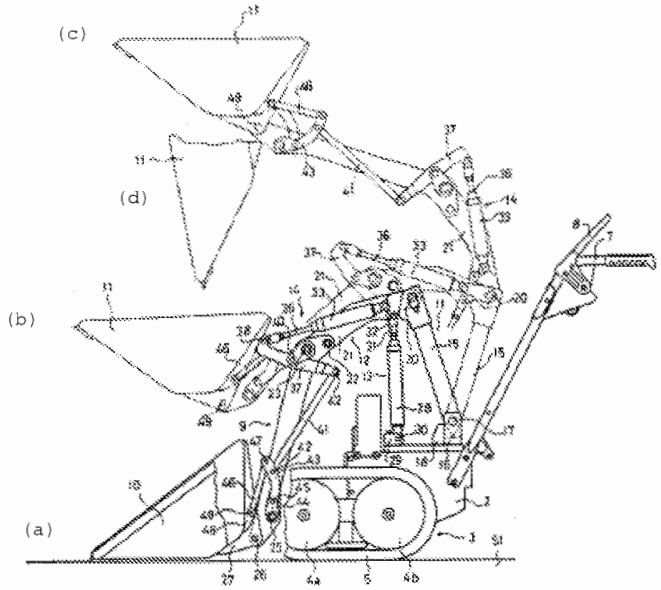


Fig. 3

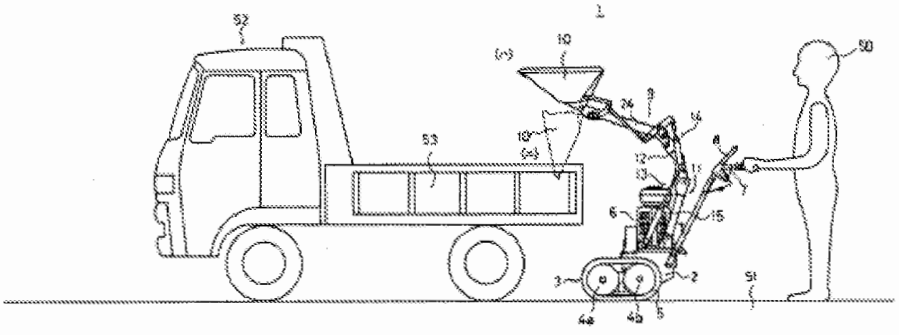


Fig. 4

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90/014,109	03/12/2018	9321386	Vermeer-386Reex-2	8108

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UNITED STATES OF AMERICA

EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

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

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

PTOL-90A (Rev. 04/07)

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/014,109 and 90/014,124 merged*.

PATENT NO. 9,321,386.

ART UNIT *3993*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Russell D. Stormer

Primary Examiner

Art Unit: 3993

PTOL-465 (Rev.07-04)

Office Action in Ex Parte Reexamination	Control No. 90/014,109 and 90/014,124, merged	Patent Under Reexamination 9321386	
	Examiner Russell D. Stormer	Art Unit 3993	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a. ☐ Responsive to the communication(s) filed on _____ .
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

b. ☐ This action is made FINAL.

c. ☐ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☐ Notice of References Cited by Examiner, PTO-892.
2. ☒ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *1-13, 15, 17, 20-63* are subject to reexamination.

1b. ☒ Claims *14 and 19* are not subject to reexamination.

2. ☐ Claims _____ have been canceled in the present reexamination proceeding.

3. ☐ Claims _____ are patentable and/or confirmed.

4. ☒ Claims *1-13, 15, 17, 20-63* are rejected.

5. ☐ Claims _____ are objected to.

6. ☐ The drawings, filed on _____ are acceptable.

7. ☐ The proposed drawing correction, filed on _____ has been (7a) ☐ approved (7b) ☐ disapproved.

8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have

1 ☐ been received.

2 ☐ not been received.

3 ☐ been filed in Application No. _____ .

4 ☐ been filed in reexamination Control No. _____.

5 ☐ been received by the International Bureau in PCT application No. _____.

* See the attached detailed Office action for a list of the certified copies not received.

9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.

10. ☐ Other: _____

cc: Requester (if third party requester)

U.S. Patent and Trademark Office

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

Reexamination – Proceedings Merged

As set forth in the Decision mailed July 30, 2018, the proceedings of Reexaminations 90/014,109 and 90/014,124 are merged in accordance with 37 CFR 1.565(c).

Brief Summary of the Prosecution History

On March 12, 2018, a second reexamination was requested by a third party requester for claims 1-13, 15-18, and 20 of United States Patent Number 9,321,386 to Thomas et al. ("the '386 patent") and assigned Control Number 90/014,109 ("the '109 proceeding").

On April 13, 2018, a third reexamination was requested by a third party requester for claims 1, 15, 17, and 20-63 of the same '386 patent and assigned Control Number 90/014,124 ("the '124 proceeding").

On May 18, 2018 an Order was mailed in the '109 proceeding, granting reexamination of claims 1-13, 15, 17, and 20 (claims 16 and 18 were cancelled in the first (now concluded) reexamination proceeding 90/013,915 after the '109 Request was filed).

On May 30, 2018 an Order was mailed in the '124 proceeding, granting reexamination of claims 1, 15, 17, and 20-63.

On July 30, 2018, a Decision to Merge the proceedings of the '109 and '124 reexaminations was mailed in each of the proceedings.

Scope of Reexamination

Between the '109 and '124 proceedings, reexamination of claims 1-13, 15, 17, and 20-63 has been requested and ordered. Reexamination has not been requested for claims 14 and 19.

Therefore, claims 1-13, 15, 17, and 20-63 are within the scope of this merged proceeding.

This Office action addresses the claims 1-13 as they appear in the subject '386 patent, and claims 15, 17, and 20-63 as they appear on the Reexamination Certificate (11288th) which issued April 12, 2018 at the conclusion of the prior '915 proceeding.

Prior Art Documents Relied Upon in this Action

Dingo® 322 Operator's Manual ("Dingo")

Dingo® 322 Parts Catalog ("Dingo Parts Catalog")

Japanese Patent Application JP 11-140900 to Komatsu Ltd. ("Komatsu")

Vermeer Manufacturing Company, "Vermeer Mini Skid Steers S600/S600TX" brochure ("Vermeer Brochure")

Grounds of Rejection

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:[1]

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

Ground 1

Claims 1, 2-13, 15, 17, 20-36, and 45-60, 62, and 63 are rejected under 35 U.S.C. 103 as being unpatentable over Dingo and Dingo Parts Catalog in view of Komatsu.

Inasmuch as Dingo and Dingo Parts Catalog refer to the same Dingo 322 Utility Loader, these two references may be referred to individually or together throughout the rejections.

With respect to claim 1, Dingo discloses a compact tool carrier (loader) configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader having an arm 3 (Dingo, Fig. 9), the loader being adapted to carry a tool;

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

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1; and Dingo, figure 9), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo, Fig. 9 and/or Dingo Parts Catalog, p. 4, the engine bracket ahead of the rear end of the operator platform and/or of the rear ends of the triangular gussets);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4);

and a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader (Dingo, Fig. 9, control panel 10), the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

The loader arms 3 are pivotally attached to the mainframe at lift points 11 (Dingo, figure 9) and therefore the loader uses a radial lift arrangement. As such, Dingo/Dingo Parts Catalog do not appear to show the loader arm *not* being directly attached to the mainframe, and do not appear to teach a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm.

Komatsu teaches a skid-steer loader comprising a mainframe 1, an engine, a control station having operator controls, and an actuator 15 pivotally attached to the mainframe and pivotally attached to a loader arm 13. Rather than being directly attached to the mainframe, the arm is indirectly connected through a four-joint link

mechanism comprising a linkage 11, 12 pivotally attached between the first side of the mainframe and the loader arm as shown in figure 1, for example.

Komatsu further teaches this indirect attachment provides some advantages over a direct attachment: The use of the linkage raises the arm in a vertical lift, an example of which is shown in figure 7. A vertical lift is more compact and more stable than a radial lift (prior art figure 13), as described in paragraph 0007 and shown in prior art figures 11 and 12.

From the teachings of Komatsu, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the tool carrier of Dingo/Dingo Parts Catalog such that the loader arm was not directly attached to the mainframe and instead included a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm in order to change the trajectory of the tool or bucket from a radial lift to a vertical lift. This would yield the predictable result of increasing the stability of the loader by reducing the front-to-back travel of the center of gravity of the tool or load.

Claim 2. The mainframe of Dingo/Dingo Parts Catalog incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

Claim 3. In the loader/tool carrier of Dingo/Dingo Parts Catalog as modified by Komatsu, the loader arm is a first loader arm and the linkage is a first linkage. The loader further comprises a second loader arm and the compact tool carrier comprises a second linkage pivotally attached to the second side of the mainframe and pivotally

attached to the second loader arm. See the loader arms 3 of Dingo and the arms 13 and front linkages 11 of Komatsu.

Claim 4. Dingo provides first and second actuators 4. See figure 9.

Claim 5. The drive mechanisms of both Dingo and Komatsu comprise wheels.

Claim 6. The engine 8 of Dingo is attached to the engine bracket as shown in figure 9.

Claim 7. The actuator 4 of Dingo is a hydraulic cylinder. (Dingo, pp. 25-26)

Claim 8. Each loader arm 3 of Dingo incorporates a single weldment (Dingo Parts Catalog, p. 1, Loader & Decal Assembly 13 comprises a single part No. 99-1354).

Claims 9 and 10. The control station of Dingo is mounted toward the rear of the compact tool carrier (Dingo, Fig. 9, control panel 10), the compact tool carrier comprises an operator platform (Dingo, Fig. 9, operator platform 7) for standing operation of the compact tool carrier. While the difference between the height of the control station and the height of the platform is not expressly described as being at least 90 cm, such a height would have been obvious in order to accommodate most operators of average height, and also to comply with ISO 6682 and 3411.

Claims 11 and 12. The method of operating the compact tool carrier of Dingo/Dingo Parts Catalog as modified by Komatsu with respect to claim 1, comprising standing behind the compact tool carrier and operating the control station to propel the compact tool carrier forward and/or raise or lower the loader, and operating the control station while standing on the operator platform would have been obvious to those of

ordinary skill in the art given the positioning of the control station relative to the operator platform.

Claims 13 and 20. A bucket may be attached to the loader as noted on page 10 of Dingo.

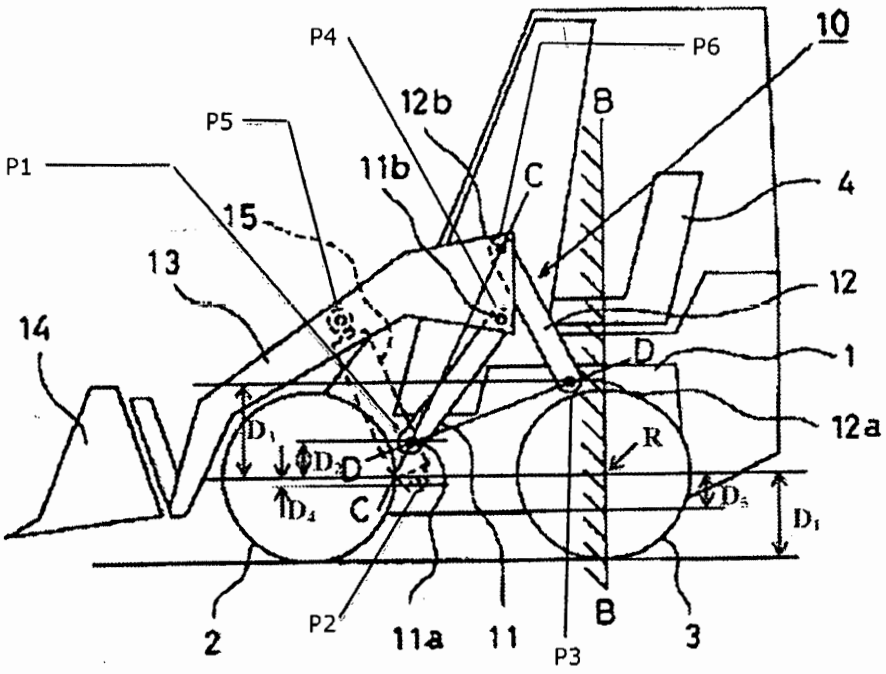
Claim 15. Dingo, Dingo Parts Catalog, and Komatsu are applied as set forth above for claim 1, and further in that each side of the mainframe of Dingo/Dingo Parts Catalog has a top and a bottom, and the tool carrier has a drive mechanism and a bottom at which the wheels contact the ground, the rotational axis of the wheel and the bottom of the tool carrier are separated by a vertical distance D1, the rotational axis being separated from the pivot point of the actuator by a distance D4, and the rotational axis and the bottom of the side of the mainframe are separated by a vertical distance D5.

The first side of Dingo's mainframe has pivot points for the arm and the lifting cylinder 4, but lacks a linkage and a pivot point for a linkage, and further lack a vertical distance corresponding to D2.

The loader of Komatsu includes a rotational axis of a drive wheel, a linkage 11 pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, and the actuator 15 is attached at a pivot point to a side of the mainframe. The loader has a bottom, the rotational axis and bottom of the loader being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage 11 is attached to the mainframe being separated by

a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4.

A marked-up figure 1 of Komatsu is provided on page 27 of the '124 Request, and is reproduced below with additional markings by the Examiner to identify the pivot points (P1-P6).



As can be seen from this figure, D4 is negligible compared to D1 and D5, and D2 is clearly less than half of D1 and approximately equal to D5. As such, D2 and D4 would each be less than 1.5 limes D1, and are each less than twice D5, as shown in figure 1 of Komatsu.

However, it is well-settled that the drawings cannot be considered as being to scale unless the reference specifically describes them as much, and Komatsu appears to be silent as to the scale of the drawings, and thus may not teach the specific dimension relationships.

Therefore, Komatsu is applied as follows.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the tool carrier of Dingo/Dingo Parts Catalog in light of the teachings of Komatsu such that the loader arm was not directly attached to the mainframe and instead included a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm in order to change the trajectory of the tool or bucket from a radial lift to a vertical lift. This would yield the predictable result of increasing the stability of the loader by reducing the front-to-back travel of the center of gravity of the tool or load.

Since stability is an important characteristic in a compact utility loader/compact tool carrier such as disclosed by Dingo and Komatsu, it would have been desirable to keep the center of gravity of the machine low. Moreover, the compact size of such machines presents limited space for attaching the arms, actuators, and linkages. Finally, Komatsu teaches lowering the attachment points of the linkages and the arm of the actuator to increase visibility and stability as shown in inventive figures 1 and 7 as compared to prior art figures 11 and 12. See paragraphs 0003-0004 and 0006-0009.

If the drawings of Komatsu are not considered to teach the claimed relationships of the distances, then in order to reduce or keep the center of gravity low, it would have

been obvious to one of ordinary skill in the art to arrange the pivots points of the linkage and the actuator such that D2 and D4 are each less than 1.5 limes D1, and further are each less than twice D5, in order to lower the center of gravity and improve visibility as opposed to arranging the pivot points such that D2 and D4 were *greater* than 1.5 limes D1, and *greater* than twice D5.

Finally, it is noted that the subject '386 patent affords no criticality to the claimed measurements. D2 and D4 can range from less than .75 to 1.5 times D1, and from less than 1.5 to 2.0 times D5. See column 5, lines 16-31, for instance.

Claim 17. It would have been obvious for the measurements to be duplicated on the second side so that the compact loader was symmetrically constructed.

Claim 21. The third party Requester asserts the '386 patent lacks support for the limitations of claim 21, specifically, that the recitation of the first through sixth pivot points being disposed forward of the control station lacks support in the disclosure of the '386 patent, and further, that figure 2 shows five of the six pivot points to ***not*** be disposed forward of the control station. See pages 44-46 of the '124 Request.

Looking at figure 2, the operator control 35 appears to be the forward-most control, and only P1 and P4 are clearly disposed forward of the control 35. The same is true in Figure 3. In each of figures 2 and 3, the control station 36 is not clearly shown, but in figure 1 it appears to be a control panel. The '386 patent appears to be silent as to the boundaries of the operator control and the control station.

Dingo/Dingo Parts Catalog and Komatsu are further applied such that the linkage is a first linkage, the first linkage is pivotally attached to the first side of the mainframe at a first pivot point and pivotally attached to the loader arm at a second pivot point, the actuator is attached to the mainframe at a third pivot point and pivotally attached to the loader arm at a fourth pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a fifth pivot point and pivotally attached to the loader arm at a sixth pivot point.

The equivalent of points P2 and P5 in Dingo are shown in figure 9 to be forward of the operator control station, and/or between the operator controls and a bottom of the mainframe. In the marked-up figure 1 of Komatsu depicted on page 9 above, a second linkage 12 is provided, all of the pivot points are shown to be disposed between the operator controls and a bottom of the mainframe and/or (2) disposed forward of the control station, at least to the same extent that the six pivot points are shown and described as such in the '386 patent.

Therefore, it would have been obvious, in the compact tool carrier of Dingo/Dingo Parts Catalog as modified in light of Komatsu, that as the loader travels from a down position to a vertically raised position, the first, second, third, fourth, fifth, and sixth pivot points would be (1) disposed between the operator controls and a bottom of the mainframe and/or (2) disposed forward of the control station to keep the center of gravity low on the machine as taught by Komatsu, and/or to keep the pivot arms low on the machine so that they would not obstruct the view of the operator as taught by Komatsu.

Claim 22. The operator platform shown in Dingo, Figure 9 is located toward a rear of the compact tool carrier such that the fifth pivot point are disposed forward of the operator platform. When modified by Komatsu, it would have been obvious for the first and third pivots to also be disposed forward of the operator platform at least because there is no place to attach the links next to or behind the platform.

With respect to claims 23-26, it would have been obvious to one of ordinary skill in the art to arrange the pivots points of the linkage and the actuator such that D2: and D4 are each less than 1.75 D5; D2 and D4 are each less than 1.5 D5; D2 and D4 are each less than D1; and D2 and D4 are each less than 0.75 D1 in order to lower the center of gravity and/or improve visibility and generally keep the machine as compact as possible as opposed to arranging the pivot points such that D2 and D4 were *greater* than 1.5 limes D1, and *greater* than twice D5. Note that the disclosure of the '386 patent does not attribute any criticality to the claimed dimensions.

27. The machine of Komatsu includes a second linkage 12 pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader as shown in figure 1 at least. It would have been obvious to provide a second linkage in the assembly of Dingo, and further obvious for the rotational axis and the pivot point at which the second linkage is attached to the mainframe to be separated by a vertical distance D3 (see the marked-up figure on page 9 above) being less than 1.5 limes D1 to keep the center of gravity low as taught by Komatsu.

Claims 28-30. The linkage of Dingo/Dingo Parts Catalog in view of Komatsu is a first linkage, and further comprises a second linkage (Komatsu. Fig. 1. rear linkage 12)

pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader. The mainframe of Komatsu comprises a forward-most pivot either where the actuator 15 is attached to the mainframe, or where the first linkage 11 is attached to the mainframe (at 11a). It would further have been obvious to attach the first linkage in this manner in the modification of Dingo/Dingo Parts Catalog, and as such, the forward-most pivot point would be (1) the pivot point at which the first linkage is attached to the mainframe, or (2) the pivot point at which the actuator is attached to the mainframe.

For the vertical distance between the rotational axis and the forward-most pivot point to be less than 0.75 D1 (and thus less than D1) and/or less than 1.5 D5, would have been obvious in order to keep the center of gravity of the machine as low as possible and improve its stability as taught by Komatsu.

Claim 31. The compact tool carrier of Dingo is configured for standing or walk-behind operator control, has a longitudinal axis, and a mass of less than about 1500 kg., the compact tool carrier comprising:

a loader (Dingo, Fig. 9, arms 3) adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket"), the loader being moveable between a down position and a vertically raised position, the loader comprising:

a first loader arm (Dingo, Fig. 9, left arm 3);

a second loader arm (Dingo, Fig. 9, right arm 3); and

at least one cross-member (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached) that extends from the first loader arm to the second loader arm;

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4);

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader (Dingo, Fig. 9, control panel 10), the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing operation, each cross-member being disposed forward of the control station in the vertically raised position of the loader (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached inherently remains forward of control panel 10 due to the length of loader arms 3, 3 and the 66 inch maximum hinge pin height in relation to the 60 inch length of the loader as set forth in the specifications on pg. 10 of Dingo and this will be even truer when Komatsu's vertical lift linkage is adapted to Dingo with the loader arms 3, 3 moving forwardly in the upper half of the lift pattern to provide a vertical lift path for the tool); and

an operator platform for standing operation of the operator controls of the control station (Dingo, Fig. 9, operator platform 7).

The loader arm of Dingo is directly attached to the mainframe, and the machine does not include a linkage.

Komatsu teaches a skid-steer loader comprising a mainframe 1, an engine, a control station having operator controls, and an actuator 15 pivotally attached to the mainframe and pivotally attached to a loader arm 13, which is indirectly attached to the mainframe using a four-joint link mechanism comprising a linkage 11, 12 pivotally attached between the first side of the mainframe and the loader arm as shown in figure 1, for example.

From the teachings of Komatsu, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the tool carrier of Dingo/Dingo Parts Catalog such that the loader arm was not directly attached to the mainframe and instead included a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm in order to change the trajectory of the tool or bucket from a radial lift to a vertical lift. This would yield the predictable result of increasing the stability of the loader by reducing the front-to-back travel of the center of gravity of the tool or load, as taught by Komatsu.

As to claim 32, Komatsu further teaches the use of a second linkage (Komatsu, rear linkage 12) pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm.

Claim 33. See claim 2 above.

Claim 34. Dingo/Dingo Parts Catalog further teaches each cross-member being disposed forward of the operator platform and forward of the control station in the down position of the loader (Dingo, Fig. 9, shown in front perspective view).

Claim 35. Dingo/Dingo Parts Catalog further teaches an attachment plate (Dingo, Fig. 9, mounting plate 1) for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

As to claim 36, Dingo/Dingo Parts Catalog further teaches an actuator (Dingo, Fig. 9, tilt cylinder 2) for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

Claim 45. Dingo/Dingo Parts Catalog discloses a compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader (Dingo, Fig. 9, arms 3) adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket");

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform);

the loader being free of cross-members between the first linkage pivot point and the second linkage pivot point (Dingo, Fig. 9);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm at an actuator pivot point (Dingo, Fig. 9, cylinder 4);

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation (Dingo, Fig. 9, control panel 10); and

an operator platform (Dingo, Fig. 9, operator platform 7) for standing operation of the operator controls of the control station.

The loader arms of Dingo are pivotally attached to the mainframe at lift points 11 (Dingo, figure 9) and therefore the loader uses a radial lift arrangement. As such, Dingo/Dingo Parts Catalog do not appear to show the loader arm *not* being directly attached to the mainframe, and do not appear to teach first and second linkages pivotally attached to the first and second sides of the mainframe and pivotally attached to the loader arm.

Komatsu teaches a skid-steer loader comprising a mainframe 1, an engine, a control station having operator controls, and an actuator 15 pivotally attached to the mainframe and pivotally attached to a loader arm 13. Rather than being directly attached to the mainframe, the arm is indirectly connected through a four-joint link mechanism comprising first and second linkages 11, 12 pivotally attached between the first side of the mainframe and the loader arm as shown in figure 1, for example. As

can be seen in figures 1 and 2 at least, the front and rear linkage pivot points are attached to the rear of Komatsu's loader arm 13 behind the cross member (unlabelled).

Komatsu further teaches this indirect attachment provides some advantages over a direct attachment: The use of the linkage raises the arm in a vertical lift, an example of which is shown in figure 7. A vertical lift is more compact and more stable than a radial lift, as described in paragraph 0007 and shown in figures 11-13.

From the teachings of Komatsu, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the tool carrier of Dingo/Dingo Parts Catalog such that the loader arm was not directly attached to the mainframe and instead included a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm in order to change the trajectory of the tool or bucket from a radial lift to a vertical lift. Further, it would have been obvious that the front and rear linkage pivot points would be attached to the rear of Dingo's loader arm behind the cross member as taught by Komatsu in order to get the maximum range of motion from the loader arm. This would yield the predictable result of increasing the stability of the loader by reducing the front-to-back travel of the center of gravity of the tool or load.

Claim 46. Dingo has two arms and a cross-member that extends between them and is disposed forward of the first and second linkage pivot point. For the cross-member to be disposed forward of the actuator pivot point (at the mainframe) would have been obvious as taught by Komatsu to better effect the vertical lift.

Claim 47. See claim 43 above.

Claim 48. See claim 36 above.

Claim 49. See claim 2 above.

With respect to claim 50, Dingo/Dingo Parts Catalog and Komatsu are applied as set forth above with respect to claim 31, and further in that Komatsu teaches a second linkage as discussed above with respect to claim 45.

With respect to claims 51-54, see claims 46, 2, 35, and 36, respectively, above.

Claim 55. Dingo, Dingo Parts Catalog, and Komatsu are applied as set forth above with respect to claim 15, and Komatsu is further applied as teaching the use of tracks as shown in figure 9. From this teaching it would have been obvious to provide the drive mechanism of Dingo to comprise tracks in order to provide greater traction in mud or uneven terrain as is well-known in the art.

With respect to claim 56, see claim 23 above.

With respect to claims 57-60, see claims 27-30, respectively, above

As to claim 62, see claim 31 above.

As to claim 63, see claim 2 above.

Ground 2

Claim 37 is rejected under 35 U.S.C. 103 as being unpatentable over Dingo and Dingo Parts Catalog in view of Komatsu, as applied to claim 31 above, and further in view of Vermeer Brochure.

Neither the Dingo references nor Komatsu appears to teach the use of a drive sprocket.

Vermeer Brochure teaches a pair of mini skid steer loaders, one of which rides on four tires, the other rides on a pair of endless tracks. As shown in several of the figures, the drive mechanism of the endless track version (the S600TX) comprises a drive sprocket for engaging and driving the track. There appears to be little or no difference in the body or mainframes of the wheeled and tracked versions, and according to the specifications of both versions, the two versions use the same or similar engines, have the same hydraulic capacity, and their transmissions use tandem hydrostatic pumps. As such, Vermeer Brochure teaches that it is a simple substitution for the drive mechanism to comprise wheels and tires, or sprockets and endless tracks.

From this teaching, it would have been obvious to modify the tool carrier of Dingo/Dingo Parts Catalog as modified by Komatsu such that the drive mechanism comprises a drive sprocket to allow the vehicle to be used with an endless track and yield the predictable result of better traction in soft ground (as opposed to tires). Vermeer Brochure has shown that the use of wheels and tires, or sprockets and endless tracks, is a simple substitution and those of ordinary skill in the art could readily choose one or the other based at least in-part on the type of terrain over which the vehicle might be used.

Ground 3

Claims 38-44 and 55-63 are rejected under 35 U.S.C. 103 as being unpatentable over Dingo and Dingo Parts Catalog in view of Komatsu and Vermeer Brochure.

Inasmuch as Dingo and Dingo Parts Catalog refer to the same Dingo 322 Utility Loader, these two references may be referred to individually or together throughout the rejections.

With respect to claim 38, Dingo/Dingo Parts Catalog discloses a compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader (Dingo, Fig. 9, arms 3) adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket"), the loader comprising:

a first loader arm (Dingo, Fig. 9, left arm 3); a second loader arm (Dingo, Fig. 9, right arm 3); and

a cross-member (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached) that extends from the first loader arm to the second loader arm;

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4);

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing operation (Dingo, Fig. 9, control panel 10); and

an operator platform (Dingo, Fig. 9, operator platform 7) for standing operation of the operator controls of the control station.

The first loader arm of Dingo is pivotally attached to the mainframe at lift points 11 (Dingo, figure 9) and therefore the loader uses a radial lift arrangement. As such, Dingo/Dingo Parts Catalog do not appear to show the loader arm *not* being directly attached to the mainframe, and do not appear to teach a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm.

Further, Dingo (such as at figure 9) appears to show a pair of cross members and therefore does not meet the limitation of a "single cross-member" that extends from the first loader arm to the second loader arm.

Komatsu teaches a skid-steer loader comprising a mainframe 1, an engine, a control station having operator controls, and an actuator 15 pivotally attached to the mainframe and pivotally attached to a loader arm 13. Rather than being directly attached to the mainframe, the arm is indirectly connected through a four-joint link mechanism comprising first and second linkages 11, 12 pivotally attached between the first side of the mainframe and the loader arm as shown in figure 1, for example. As can be seen in figures 1 and 2 at least, the front and rear linkage pivot points are attached to the rear of Komatsu's loader arm 13 behind the cross member (unlabelled).

Komatsu teaches a skid-steer loader comprising a mainframe 1, an engine, a control station having operator controls, and an actuator 15 pivotally attached to the mainframe and pivotally attached to a loader arm 13. Rather than being directly attached to the mainframe, the arm is indirectly connected through a four-joint link mechanism comprising first and second linkages 11, 12 pivotally attached between the first side of the mainframe and the loader arm as shown in figure 1, for example. As can be seen in figures 1 and 2 at least, the front and rear linkage pivot points are attached to the rear of Komatsu's loader arm 13 behind the cross member (unlabelled).

Komatsu further teaches this indirect attachment provides some advantages over a direct attachment: The use of the linkage raises the arm in a vertical lift, an example of which is shown in figure 7. A vertical lift is more compact and more stable than a radial lift, as described in paragraph 0007 and shown in figures 11-13.

Komatsu further teaches this indirect attachment provides some advantages over a direct attachment: The use of the linkage raises the arm in a vertical lift, an example of which is shown in figure 7. A vertical lift is more compact and more stable than a radial lift, as described in paragraph 0007 and shown in figures 11-13.

From the teachings of Komatsu, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the tool carrier of Dingo/Dingo Parts Catalog such that the loader arm was not directly attached to the mainframe and instead included a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm in order to change the trajectory of the tool or bucket from a radial lift to a vertical lift. Further, it would have been obvious that the

front and rear linkage pivot points would be attached to the rear of Dingo's loader arm behind the cross member as taught by Komatsu in order to get the maximum range of motion from the loader arm. This would yield the predictable result of increasing the stability of the loader by reducing the front-to-back travel of the center of gravity of the tool or loader.

Vermeer Brochure, cover page, teaches a single cross member at the same location as Toro's upper cross member Ct, namely where the loader arms change orientation between their front and rear portions. Vermeer Brochure teaches that a single cross member can be large and strong enough when placed at this location, namely at the location where Dingo's top cross member Ct already is, such that a second cross member is not required at the bottom of the loader arms. Consequently, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide only a single cross member between the arms of Dingo, having sufficient size and strength to permit this single cross member to be the only cross member between Dingo's loader arms as taught by Vermeer Brochure. This would yield the predictable result of simplifying the construction of the loader, and possibly reducing its weight as well.

Claim 39. The loader is moveable between a down position and a vertically raised position, the cross-member being disposed forward of the operator platform in the down position and the vertically raised position of the loader (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached would remain forward of operator platform 7 due to the length of loader arms 3, 3 and the 66 inch

maximum hinge pin height in relation to the 60 inch length of the loader as set forth in the specifications on pg. 10 of Dingo.

Claim 40. Dingo/Dingo Parts Catalog does not appear to teach the use of a drive sprocket.

Vermeer Brochure teaches a pair of mini skid steer loaders, one of which rides on four tires, the other rides on a pair of endless tracks. As shown in several of the figures, the drive mechanism of the endless track version (the S600TX) comprises a drive sprocket for engaging and driving the track. There appears to be little or no difference in the body or mainframes of the wheeled and tracked versions, and according to the specifications page, the two versions use the same or similar engines, have the same hydraulic capacity, and their transmissions use tandem hydrostatic pumps. As such, Vermeer Brochure teaches that it is a simple substitution for the drive mechanism to comprise wheels and tires, or sprockets and endless tracks.

From this teaching, it would have been obvious to modify the tool carrier of Dingo/Dingo Parts Catalog as modified by Komatsu such that the drive mechanism comprises a drive sprocket to allow the vehicle to be used with an endless track and yield the predictable result of better traction in soft ground (as opposed to tires). Vermeer Brochure has shown that the use of wheels and tires, or sprockets and endless tracks, is a simple substitution and those of ordinary skill in the art could readily choose one or the other based at least in-part on the type of terrain over which the vehicle might be used.

Claim 41. It would have been obvious to provide a second linkage as taught by Komatsu (rear linkage 12) pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm in order to effect the movement of the arm.

Claim 42. The mainframe of the compact tool carrier of Dingo/Dingo Parts Catalog incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

Claim 43. Dingo teaches the use of an attachment plate (Dingo, Fig. 9, mounting plate 1) for removably attaching a tool to the compact tool carrier, and the cross-member is spaced from the attachment plate.

Claim 44. The compact tool carrier of Dingo comprises an actuator 2 connected to the cross-member and the attachment plate.

Claim 55. Dingo/Dingo Parts Catalog discloses a compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader having an arm (Dingo, Fig. 9, arm 3), the loader being adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket");

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe

(Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform), each side having a top and a bottom;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4);

the drive mechanism having a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader (Dingo, Fig. 9, control panel 10), the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

Each side of the mainframe of Dingo/Dingo Parts Catalog has a top and a bottom, and the tool carrier has a drive mechanism and a bottom at which the wheels contact the ground, the rotational axis of the wheel and the bottom of the tool carrier are separated by a vertical distance D1, the rotational axis being separated from the pivot point of the actuator by a distance D4, and the rotational axis and the bottom of the side of the mainframe are separated by a vertical distance D5.

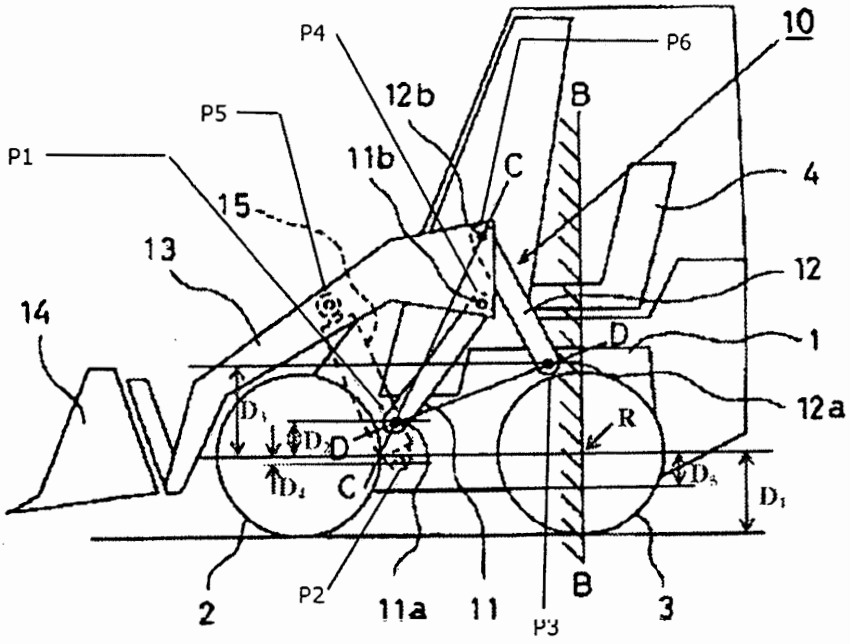
Dingo/Dingo Parts Catalog appears to lack a vertical distance corresponding to D2.

The sides of Dingo's mainframe have pivot points for the arm and the lifting cylinder 4, but lack a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm, the loader not being directly attached to the

mainframe; and a drive mechanism comprising tracks for propelling the compact tool carrier over a supporting surface.

The loader of Komatsu includes a rotational axis of a drive wheel, a linkage 11 pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, and the actuator 15 is attached at a pivot point to a side of the mainframe. The loader has a bottom, the rotational axis and bottom of the loader being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and the pivot point at which the linkage 11 is attached to the mainframe being separated by a vertical distance D2, the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4.

A marked-up figure 1 of Komatsu is provided on page 27 of the '124 Request, and is reproduced below with additional markings by the Examiner to identify the pivot points (P1-P6).



As can be seen from this figure, D4 is negligible compared to D1 and D5, and D2 is clearly less than half of D1 and approximately equal to D5. As such, D2 and D4 would each be less than 1.5 limes D1, and are each less than twice D5, as shown in figure 1 of Komatsu.

However, it is well-settled that the drawings cannot be considered as being to scale unless the reference specifically describes them as much, and Komatsu appears to be silent as to the scale of the drawings and thus may not teach the specific dimensional relationships.

Therefore, Komatsu is applied as follows.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the tool carrier of Dingo/Dingo Parts Catalog in light of the teachings

of Komatsu such that the loader arm was not directly attached to the mainframe and instead included a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm in order to change the trajectory of the tool or bucket from a radial lift to a vertical lift. This would yield the predictable result of increasing the stability of the loader by reducing the front-to-back travel of the center of gravity of the tool or load.

Since stability is an important characteristic in a compact utility loader/compact tool carrier such as disclosed by Dingo and Komatsu, it would have been desirable to keep the center of gravity of the machine low. Moreover, the compact size of such machines presents limited space for attaching the arms, actuators, and linkages. Finally, Komatsu teaches lowering the attachment points of the linkages and the arm of the actuator to increase visibility and stability as shown in inventive figures 1 and 7 as compared to prior art figures 11 and 12. See paragraphs 0003-0004 and 0006-0009.

If the drawings of Komatsu are not considered to teach the claimed relationships of the distances, then in order to reduce or keep the center of gravity low, it would have been obvious to one of ordinary skill in the art to arrange the pivots points of the linkage and the actuator such that D2 and D4 are each less than 1.5 limes D1, and further are each less than twice D5, in order to lower the center of gravity and improve visibility as opposed to arranging the pivot points such that D2 and D4 were *greater* than 1.5 limes D1, and *greater* than twice D5.

Finally, it is noted that the subject '386 patent affords no criticality to the claimed measurements. D2 and D4 can range from less than .75 to 1.5 times D1, and from less than 1.5 to 2.0 times D5. See column 5, lines 16-31, for instance.

Vermeer Brochure teaches a pair of mini skid steer loaders, one of which rides on four tires, the other rides on a pair of endless tracks. As shown in several of the figures, the drive mechanism of the endless track version (the S600TX) comprises a drive sprocket for engaging and driving the track. There appears to be little or no difference in the body or mainframes of the wheeled and tracked versions, and according to the specifications page, the two versions use the same or similar engines, have the same hydraulic capacity, and their transmissions use tandem hydrostatic pumps. As such, Vermeer Brochure teaches that it is a simple substitution for the drive mechanism to comprise wheels and tires, or sprockets and endless tracks.

From this teaching, it would have been obvious to substitute tracks for the wheels/tires on the tool carrier of Dingo/Dingo Parts Catalog such that the drive mechanism comprises tracks for propelling the carrier over a supporting surface as a simple substitution of one well-known type of drive assembly for another, and would yield the predictable result of providing better traction in soft ground or rough terrain. Vermeer Brochure has shown that the use of wheels and tires, or sprockets and endless tracks, is a simple substitution and those of ordinary skill in the art could readily choose one or the other based at least in-part on the type of terrain over which the vehicle might be used.

With respect to claim 56, it would have been obvious to one of ordinary skill in the art to arrange the pivots points of the linkage and the actuator such that D2 and D4 are each less than 0.75 D1 in order to lower the center of gravity and/or improve visibility and generally keep the machine as compact as possible. Note that the disclosure of the '386 patent does not attribute any criticality to the claimed dimensions.

Claim 57. Komatsu teaches a second linkage 12 pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader as shown in figure 1 at least. It would have been obvious to provide a second linkage in the assembly of Dingo to control the loader arm, and further obvious for the rotational axis and the pivot point at which the second linkage is attached to the mainframe to be separated by a vertical distance D3 (see the marked-up figure on page 31 above), D3 being less than 1.5 limes D1 to keep the center of gravity low as taught by Komatsu.

Claims 58-60. The linkage of Dingo/Dingo Parts Catalog in view of Komatsu is a first linkage, and further comprises a second linkage (Komatsu. Fig. 1. rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader. The mainframe of Komatsu comprises a forward-most pivot either where the actuator 15 is attached to the mainframe, or where the first linkage 11 is attached to the mainframe (at 11a). It would further have been obvious to attach the first linkage in this manner in the modification of Dingo/Dingo Parts Catalog, and as such, the forward-most pivot point would be (1) the pivot point at which the first linkage is attached to the mainframe, or (2) the pivot point at which the actuator is attached to the mainframe.

For the vertical distance between the rotational axis and the forward-most pivot point to be less than D1 or less than 0.75 D1, would have been obvious in order to keep the center of gravity of the machine as low as possible and improve its stability as taught by Komatsu.

Claim 61. It would have been obvious to provide the compact tool carrier with a drive sprocket in order to drive the endless track as taught by Vermeer Brochure.

Claim 62. Dingo discloses an operator platform for standing operation of the operator controls of the control station.

Claim 63. The mainframe of Dingo incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

Extensions of Time

Extensions of time under 37 CFR 1.136(a) **will not be permitted** in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that ex parte reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

Submissions

Patent Owner is reminded that 37 CFR 1.550(f) requires that "After filing of a request for *ex parte* reexamination by a third party requester, any document filed by

either the patent owner or the third party requester **must** be served on the other party in the reexamination proceeding in the manner provided by § 1.248."

In order to ensure full consideration of any affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to this first Office action on the merits (which does not result in a close of prosecution). Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37C.F.R. 1.116, after final rejection and by 37 C.F.R. 41.33 after appeal, which will be strictly enforced.

Notice of Concurrent Proceedings or Litigation

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 9,321,386 throughout the course of this reexamination proceeding. The third party requestors are also reminded of the ability to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the subject patent. See MPEP §§ 2207, 2282 and 2286.

Correspondence

All correspondence relating to this *ex parte* reexamination proceeding should be directed:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents

United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication or earlier communications from the Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

/Russell D. Stormer/

Russell D. Stormer
Primary Examiner
Central Reexamination Unit
Art Unit 3993
(571) 272-6687

Conferee: /SC/

Conferee: /EDL/ SPRS 3993

Reexamination	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/014,109 and 90/014,124, merged	9321386
	Certificate Date	**Certificate Number**

Requester Correspondence Address: ☐ **Patent Owner** ☒ **Third Party**

JAMES W. MILLER, ATTORNEY
527 MARQUETTE AVENUE
SUITE 1960, RAND TOWER
MINNEAPOLIS, MN 55402

LITIGATION REVIEW ☒	/rds/ (examiner initials)	05/09/2018 (date)
Case Name		Director Initials

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	**NUMBER**
1. Reexamination	90/013,915 (concluded)
2. Reexamination	90/014,124

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/014,124	04/13/2018	9321386	Vermeer-386Reex-3	8217

76656 7590 07/30/2018

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
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St. Louis, MO 63105
UNITED STATES OF AMERICA

EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
07/30/2018	PAPER

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

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

PTOL-90A (Rev. 04/07)

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THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

JAMES W. MILLER, ATTORNEY
527 MARQUETTE AVENUE
SUITE 1960, RAND TOWER
MINNEAPOLIS, MN 55402

Date: July 30, 2018

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90014109 & 90014124
PATENT NO. : 9321386
ART UNIT : 3993

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

UNITED STATES PATENT AND TRADEMARK OFFICE

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P.O. Box 1450
Alexandria, VA 22313-1450

Patent Docket Department Armstrong Teasdale LLP 7700 Forsyth Boulevard Suite 1800 St. Louis MO MISSOURI 63105	(for Patent Owner)	:	
JAMES W. MILLER, ATTORNEY 527 Marquette Avenue Suite 1960, Rand Tower Minneapolis, MN 55402	(for Third Party Requester)	:	
In re Thomas et al. Reexamination Proceeding Control No.: 90/014,109 Filed: March 12, 2018 For: U.S. Patent 9,321,386 B1		:	
In re Thomas et al. Reexamination Proceeding Control No.: 90/014,124 Filed: April 13, 2018 For: U.S. Patent 9,321,386 B1		:	**DECISION MERGING REEXAMINATION PROCEEDINGS**

The above noted reexamination files are before the Director of the Central Reexamination Unit for consideration of the proceedings under 37 C.F.R. 1.565(c).

BACKGROUND

1. United States Patent 9,321,386 issued April 26, 2016, is the subject of Reexamination Control Nos. 90/014,109 and 90/014,124.

2. A first request for reexamination, assigned Reexamination Control No. 90/013,915 ('915 proceeding), was filed February 28, 2017 by a Third Party Requester. The request urged that a substantial new question of patentability of claims 1, 3-13, 15-18 and 20 was raised by the newly cited references that either disclose the claimed composition or are so close as to establish a case of obviousness.

3. Reexamination was ordered for claims 1, 3-13, 15-18 and 20 for the '109 proceeding on April 7, 2017.

4. A first reexamination certificate amending the figures, confirming claims 1 and 3-13, canceling claims 16 and 18, amending claims 15, 17 and 19, determining claim 20, which depended on an amended claims, patentable and adding new claims 21-63 was published on April 12, 2018.

5. A second request for reexamination, assigned Reexamination Control No 90/014,109 ('109 proceeding), was filed March 12, 2018. The request urged that a substantial new question of patentability of claims 1-13, 15-18 and 20 was raised by the newly cited references that either disclose the claimed composition or are so close as to establish a case of obviousness.

6. Reexamination was ordered for claims 1-13, 15, 17 and 20 for the '109 proceeding on May 18, 2018. Reexamination was not ordered for claims 16 and 18 because those claims had been canceled in the certificate that published on April 12, 2018.

7. Patent Owner did not file a Patent Owner's statement in the '109 proceeding.

8. No Office action has been issued in the '109 proceeding.

9. A third request for reexamination, assigned Reexamination Control No. 90/014,124 ('124 proceeding), was filed April 13, 2018 by Third Party Requester. The request urged that a substantial new question of patentability of claims 1, 15, 17 and 20-63 was raised by the newly cited references that either disclose the claimed composition or are so close as to establish a case of obviousness.

10. Reexamination was ordered for claims 21-63 for the '124 proceeding on May 30, 2018.

11. Patent Owner did not file a Patent Owner's statement in the '124 proceeding.

12. No Office action has been issued in the '124 proceeding.

DISCUSSION

Under 37 C.F.R. 1.565(c):

> If *ex parte* reexamination is ordered while a prior *ex parte* reexamination proceeding is pending and prosecution in the prior *ex parte* proceeding has not been terminated, the *ex parte* reexamination proceedings will be consolidated and result in the issuance of a single certificate under paragraph 1.570.

As noted in the above REVIEW OF SALIENT FACTS, reexamination has been ordered in each of the above reexamination proceedings. Accordingly, merger of the proceedings under 37 C.F.R. 1.565(c) is appropriate. MPEP 2283 further sets forth:

> If the second request is based upon essentially the same patents or publications as in the first request or on patents or printed publications which raise essentially the same issues as raised in the first request, and if reexamination is ordered, the examination of the merged proceeding will continue at the point reached in the first reexamination proceeding. If, however, *new* patents or printed publications are presented in the second

request which raise different questions than those raised in the first request, then prosecution in the merged reexamination proceeding will be reopened, if applicable, to the extent necessary to fully treat the question raised.

DECISION

I. MERGER OF PROCEEDINGS

In accordance with 37 C.F.R. 1.565(c), the 90/014,109 and 90/014,124 proceedings are merged. The merged proceeding will be conducted in accordance with the following guidelines and requirements.

II. THE SAME CLAIMS MUST BE MAINTAINED IN BOTH PROCEEDINGS

Patent owner is required to maintain the same claims (and specification) in both files throughout the merged proceeding. Since the claims in both files are the same, the Patent Owner is not required to file a ''Housekeeping'' Amendment. See MPEP §2283, "Merger of Reexaminations.''

III. CONDUCT OF MERGED PROCEEDING

All papers mailed by the Office throughout the merged proceeding will take the form of a single action which applies to all proceedings. All papers issued by the Office or filed by the Patent Owner will contain the identifying data for all files and will be physically entered in each reexamination file. All papers filed by the Patent Owner must consist of a single response, **filed in duplicate**, each bearing a signature and identifying data for **all** files, for entry into each file.

All correspondence from the USPTO will be addressed to the Patent Owner's representative address listed in Reexamination Control Nos. 90/014,109 and 90/014,124 as:

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis MO MISSOURI 63105

A copy of all correspondence from the USPTO will be served on the Third Party Requesters at the addresses listed in Reexamination Control Nos. 90/014,109 and 90/014,124 as:

JAMES W. MILLER, ATTORNEY (Third Party Requester)
527 Marquette Avenue
Suite 1960, Rand Tower
Minneapolis, MN 55402

CONCLUSION

Reexamination Control Nos. 90/014,109 and 90/014,124 are merged. The merged proceeding is being forwarded to the assigned Examiner for the next appropriate action.

Any inquiry concerning this decision should be directed to Eileen Lillis, Supervisory Patent Reexamination Specialist, at telephone No. (571) 272-6928.

/Eileen Lillis/
Eileen Lillis
SPE, Art Unit 3993
Central Reexamination Unit

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90/014,124	04/13/2018	9321386	Vermeer-386Reex-3	8217

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Patent Docket Department
Armstrong Teasdale LLP
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St. Louis, MO 63105

EXAMINER	
STORMER, RUSSELL D	

ART UNIT	PAPER NUMBER
3993	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

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

PTOL-90A (Rev. 04/07)

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/014,124*.

PATENT NO. *9,321,386* .

ART UNIT *3993*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Russell D. Stormer

Primary Examiner

Art Unit: 3993

PTOL-465 (Rev.07-04)

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

Decision Granting Ex Parte Reexamination

A Substantial New Question of patentability ("SNQ") affecting claims 1, 15, 17, and 20-63 of United States Patent Number 9,321,386 to Thomas et al (hereafter "the '386 patent") is asserted in the Request for *ex parte* reexamination filed by a third party Requester on April 13, 2018.

Preliminary Matters

The instant reexamination proceeding, 90/014,124 (the "instant" or "the '124" reexamination), is the third to be requested and granted for claims of the '386 patent. The first proceeding, 90/013,915 (the "first" or "the '915" reexamination), is concluded and the Reexamination Certificate issued April 12, 2018.

The second proceeding, 90/014,109 (the "second" or "the '109" reexamination) was requested March 12, 2018 and Granted in the Order mailed May 18, 2018.

As set forth in MPEP 2240:

> The second or subsequent request for reexamination under 35 U.S.C. 302 may provide information raising a substantial new question of patentability with respect to any new or amended claim which has been proposed under 37 CFR 1.530(d) in the first (or prior) pending reexamination proceeding. However, in order for the second or subsequent request for reexamination to be granted, the second or subsequent requester must independently provide a substantial new question of patentability which is different from that raised in the pending reexamination for the claims in effect at the time of the determination.

Accordingly, this Decision based on the asserted SNQs which are different from those raised in the '915 and the '109 reexaminations.

Prior Art Documents Relied Upon in the Request

Dingo® 322 Operator's Manual ("Dingo")

Dingo® 322 Parts Catalog ("Dingo Parts Catalog")

Japanese Patent Application JP 11-140900 to Komatsu Ltd. ("Komatsu")

Vermeer Manufacturing Company, "Vermeer Mini Skid Steers S600/S600TX" brochure ("Vermeer Brochure")

Summary of the Prosecution History of the '386 Patent

Original Examination[1]

The '386 patent issued with 20 claims on April 26, 2016. The patent application (14/691,649) was filed with 20 claims on April 21, 2015. The application claimed priority from provisional application 62/118,860 filed February 20, 2015.

The first Office Action rejected claims 14-19 as anticipated by Yasuda et al. (US 8,821,104), claims 14-16 and 18-20 as anticipated by Green (US 7,695,236) and claims 1-13 and 17 as obvious over Green in view of Valere (US 2009/0116943- with Valere showing a standing platform and a two-armed loader).

An October 12, 2015 response amended independent claim 1 by adding "the loader being adapted to carry a tool," "a mainframe for supporting the loader, the

[1] The summary of the original examination of the '386 patent is taken directly from pages 4-6 of the Order in the prior '915 reexamination, which was mailed April 7, 2017.

mainframe having a first side and a second side, the loader arm not being directly attached to the mainframe" and specifying that the linkage and actuator were both "pivotally attached to the first side of the mainframe" (adding cancelled claim 2 into claim 1). Similar changes were made to independent claim 14 as well as "a control station having operator controls for propelling the compact tool carrier forward and for raising and/or lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation." Claims 15 and 20 were cancelled and claims 21 and 22 were added, claiming a tool attached to the loader.

An October 23, 2015 final rejection rejected claims 1, 3-9, 11, 12, 14, 16-19, 21, and 22 as obvious over Yasuda in view of Bares et al. (US 6,695,568) and claims 10 and 13 were found obvious over Yasuda in view of Bares et al. and further in view of Valere.

A December 3, 2015 amendment added claim 23 without cancelling a claim, so an advisory action of December 14, 2015 stated that the amendment was not entered.

During a January 15, 2016 interview, the applicant, "described the industry standard difference between a 'compact tool carrier' and a small or compact 'skid steer.'" The interview summary continues, "The Yasuda et al. patent (8,821,104) that was used as base reference in the 35 U.S.C. 103 final rejection is directed to a skid steer containing an enclosed cabin (4) that is shielded from the heat produced by the rear mounted engine (101)(see column 27, lines 38-49). In contrast, the tool carrier of the instant invention has a walk-behind operator control disposed at the rear of the

carrier. An amendment to claim 1 further defining an engine bracket that is spaced from the rear end of the mainframe (see bracket 60 in Figure 6 of the drawings) would define over the Yasuda et al. patent which requires its engine to be located at the rear of the mainframe away from the cabin (4)."

An RCE was filed on January 21, 2016 which amended claim 1 by adding the carrier has a longitudinal axis and adding that the mainframe "having a front end and a rear end relative to the longitudinal axis, the mainframe comprising *an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe*," with similar changes made to claim 14.

This amendment led to the February 17, 2016 Notice of Allowability. No reasons for allowance were stated.

From the prosecution history, it appears that claims 1 and 15 of the '386 patent were found allowable because the "engine bracket limitation" was missing from the prior art of record.

The '915 Reexamination[2]

The Third Party Requester requested reexamination of claims 1, 3-13, 15-18, and 20 of U.S. Patent No. 9,321,386 (hereinafter "the '386 patent) based upon rejections over "S450TX Mini Skid Steer," published by Vermeer (hereinafter "**Vermeer**") in view of "Skid Steer Loaders, Radial & Vertical Lift" published by Mustang

[2] The summary of the '915 reexamination is taken directly from pages 5-8 of the Order in the '109 reexamination, which was mailed May 18, 2018.

(hereinafter "**Mustang**"), and further in view of "S450TX Mini Skid Steer Parts Manual" published by Vermeer, (hereinafter "**Vermeer Parts Manual**"). Reexamination of claims 2 and 14 was not requested.

Reexamination was granted in the Order mailed April 7, 2017.

In the Office action mailed August 25, 2017, claims 1, 3-13, 15-18, and 20 were rejected as obvious over Vermeer in view of Mustang and the Vermeer Parts Manual.

As recorded in the Examiner's Summary of the Interview of October 16, 2017:

> Patent Owner presented the models and used them to demonstrate the location of the operator and the cross member of the Mustang that is in the rear portion of the arms to reduce torsion and how a similar placement in a rear operator tool carrier will not work as it impedes the operator (both physically and visually). It was agreed that this feature makes the vertical lift of Mustang unsuitable for a compact tool carrier with a rear operator, but it is not clear that this feature has been claimed. PO discussed other differences between vertical and radial lift systems such as weight distribution, engine placement and overall weight. These differences were stated to teach away from adding the vertical lift system of Mustang (which has a central seated operator). PO pointed out that TPR's patent states, "the use of such high lift loader arms on a compact utility loader has been considered difficult if not impossible due to size and durability constraints."

In the Response filed October 25, 2017, PO argued, *inter alia*, that the proposed modification of the S450TX (the commercial embodiment disclosed in Vermeer) would render it unsatisfactory for its intended purpose (pp. 30-34); and that there was no expectation of success and "incorporation of a vertical lift loader arm such as that of Mustang 2700V onto a compact tool carrier such as the S450TX would have been "difficult if not impossible" (pp. 34-39). PO reiterated these arguments on page 45, and further argued that the linkage pivot points of the secondary reference Mustang 2700V

are located at the rear of the machine near the operator, and that it would not have been obvious to move these pivot points forward (pp. 45-47).

With respect to claim 15, PO argued the recited compact tool carrier having a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader [arm] and that the loader [arm] is not directly attached to the mainframe, independent claim 15 is patentable over the S450TX Brochure in view of the Mustang Brochure and the S450TX Parts Manual for the reasons set forth above relating to independent claim 1 (p. 49). PO further argued that because the Mustang 2700V does not include a linkage with the distance between its pivot point and the rotational axis being less than twice D5, as well other “distance” limitations incorporated into claim 15 from claims 16 and 18 (pp. 49-51).

The reasons for patentability in the Final action mailed January 12, 2018 are essentially the same as those set forth in the NIRC mailed February 23, 2018:

> Applicant’s arguments are persuasive that there would be no expectation of success from adding the lift mechanism of Mustang to the S450TX skid steer. The rear cross member of the Mustang lift system could not be present on a smaller rear controlled skid steer, as it would inhibit access to the controls and be positioned where either the operator or the engine are located. It is further noted that the increase of lift capacity from using the claimed vertical lift (32% increase over the radial lift) was unexpected. It is further no longer considered obvious for an ordinary practitioner at the time of invention to combine the known compact S450TX with the much larger known vertical lift system of the Mustang reference as it was stated by the requester in US PG Pub 2016/0244937, “While high lift loader arms are known on full size skid steer loaders as disclosed in U.S. Pat. No. 5,542,814, the use of such high lift loader arms on a compact utility loader has been considered difficult if not impossible due to size and durability constraints.” The "less than about” language was taken from the

patented claims, so the rejection regarding this language has been withdrawn.

Therefore, it appears that the patentability of claim 1 (and 3-13) was confirmed because the proposed modification of Vermeer would render it unsatisfactory for its intended purpose; that there was no expectation of the success of such a modification; the linkage pivot points of the secondary reference Mustang are located at the rear of the machine near the operator, and that it would not have been obvious to move these pivot points forward; and the rear cross member of the Mustang lift system, if added to Vermeer, would inhibit access to the controls and be positioned where either the operator or the engine are located.

Claim 15 (and 17 and 20) was found to be patentable for the same reasons, and further due to the addition of the 'distance' limitations from claims 16 and 18.

Finally, the limitations in claims 1 and 15 of a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader arm, and that the loader arm is not directly attached to the mainframe were argued and found to be missing from the prior art considered in the '915 reexamination.

The '109 Reexamination

The Third Party Requester requested reexamination of claims 1-13, 15-18, and 20 of U.S. Patent No. 9,321,386 based upon Dingo, Dingo Parts Catalog, and Komatsu.

Reexamination was granted in the Order mailed May 18, 2018, which found Komatsu raised an SNQ as to claims 1-13, 15, 17, and 20. Dingo and Dingo Parts Catalog were not found to raise an SNQ. See the Order for a detailed explanation.

Analysis of the Substantial New Questions of Patentability Raised by the Request

The Statement on page 6 of the Request does not point out an SNQ with respect to specific limitations in patent claims 1, 15, 17, and 20-63 that were found to be missing from the prior art during the original examination and/or the prior '915 reexamination, in the manner set forth in MPEP §§ 2214 and 2216.

However, the discussion on pages 7-11 sets forth teachings argued and found to be missing from the prior art considered during original examination and/or the prior '915 reexamination. Moreover, the proposed rejections by the Request set forth the manner in which the prior art is applied to the claims, and the salient limitations of claims 1, 15, 17, and 20-63 are addressed.

The rejections proposed in the Request address the claims as they appear in the Reexamination Certificate, and the requirements of 37 CFR 1.510(b)(2) have been met.

Substantial New Questions Raised

Komatsu

The instant Request asserts Komatsu raises an SNQ as to claims 1, 15, 17, and 20-63.

Komatsu was not cited, considered, or discussed on the record during the original examination of the subject '386 patent, or during the prior '915 reexamination.

Komatsu was found to raise an SNQ as to claims 1, 3-13, 15, 17, and 20 in the '109 reexamination, and absent any new teachings identified therein, cannot be used to raise the same SNQ on the same claims, as set forth in MPEP 2242:

> The second or subsequent request for reexamination under 35 U.S.C. 302 may provide information raising a substantial new question of patentability with respect to any new or amended claim which has been proposed under 37 CFR 1.530(d) in the first (or prior) pending reexamination proceeding. However, in order for the second or subsequent request for reexamination to be granted, the second or subsequent requester must independently provide a substantial new question of patentability which is different from that raised in the pending reexamination for the claims in effect at the time of the determination. The decision on the second or subsequent request is based on the claims in effect at the time of the determination (37 CFR 1.515(a)). Thus, the second or subsequent request must be directed to the claims of the patent, as modified by any disclaimer, or by any reexamination certificate that has issued as of the time of the determination. If a "different" substantial new question of patentability is not provided by the second or subsequent request for the claims in effect at the time of the determination, the second or subsequent request for reexamination must be denied since the Office is only authorized by statute to grant a reexamination proceeding based on a substantial new question of patentability "affecting any claim of the patent." See 35 U.S.C. 303. Accordingly, there must be at least one substantial new question of patentability established for the existing claims in the patent in order to grant reexamination.

Inasmuch as the Request in the '109 Reexamination did not assert or raise an SNQ for claims 21-63, Komatsu is available to raise an SNQ as to these claims.

Claims 21 and 22 depend from claim 1, and claims 23-30 depend from claim 15, claims 21-30 having been added during the '915 reexamination. Komatsu raises an SNQ as to claims 21-30 by virtue of their dependency from claims 1 and 15.

With respect to independent claims 31, 38, 45, 50, and 55, the Request asserts Komatsu teaches a loader arm which is not directly attached to the mainframe of the machine, and a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (or first and second linkages pivotally attached in the same manner), (Request, pp. 50, 52, 53-54, 60, and 63-64). Figures 1 and 5-8, at least, show a linkage (11 or 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to loader arm 13, and the loader arm is not directly attached to the mainframe.

Komatsu further teaches that is was known that the arms of a work machine or vehicle could be arranged for vertical or radial lifting (compare figures 11-12 with figure 13; and see pages 16-18 of the Request), and that a radial lifting arrangement provides better visibility but less stability than vertical lifting system, as noted on pages 17-18, for example, of the Request. Further, Komatsu teaches that the arms and linkages of a vertical lifting arrangement can be modified and/or re-positioned farther forward on the work machine to provide better visibility and improve stability as shown by the inventive figures 1-10 when compared to figures 11-12. See also pages 19-23 (at least) of the Request.

With respect to the “distance” limitations of claim 55, Komatsu further teaches the rotational axis and bottom of the machine being separated by a vertical distance D1, the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5, the rotational axis and [each] the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2, the rotational axis

and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4, D2 and D4 each being less than 1.5 times D1 and each being less than twice D5. See Request, pages 27-29 and 64.

Therefore, Komatsu teaches the limitations of a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader arm, a loader arm not directly attached to the mainframe, and the "distance" limitations, all of which were argued and found to be missing from the prior art during the prior '915 reexamination.

Komatsu further teaches that it is known to move the linkage pivot points from the rear of the machine to locations farther forward on the machine to improve visibility and/or stability, and provides a teaching argued and/or found to be missing from the prior art during said '915 reexamination.

These teachings of Komatsu raise new SNQs as compared to those raised in the '109 reexamination at least because claims 31, 38, 45, 50, and 55 are different from claims 1 and 15.

Therefore, Komatsu has been shown to have new, non-cumulative technical teachings relevant to the limitations argued or found to be missing from the prior art used during the prior '915 reexamination, and a reasonable Examiner would consider this reference to be important in determining the patentability of claims 31, 38, 45, 50, and 55 of the '386 patent.

Accordingly, it is **agreed** that Komatsu raises an SNQ as to claims 31, 38, 45, 50, and 55 of the '386 patent.

Dingo and Dingo Parts Catalog

The Request asserts Dingo and Dingo Parts Catalog raise an SNQ as to claims 1, 15, 31, 38, 45, 50, and 55.

Dingo is an operator's manual for the Dingo 322 Compact Utility Loader. Several views of the loader are provided, and some of the parts are labelled. Dingo Parts Catalog includes multiple exploded views of the Dingo 322 Compact Utility Loader, with the views labelled to identify the parts shown therein. Despite being published separately, Dingo and Dingo Parts Catalog are drawn to the same compact utility loader, and therefore will be analyzed together for determination of an SNQ.

Neither Dingo nor Dingo Parts Catalog were considered or discussed on the record during the original examination of the subject '386 patent, or during the prior '915 reexamination.

The Request asserts that the engine bracket limitation is found in figure 9 of Dingo, and on page 4 of Dingo Parts Catalog (Request, p. 30, 32). While the rear view of figure 9 appears to show a bracket or mounting structure beneath the engine, page 4 of Dingo Parts Catalog plainly shows and labels the Engine Mount 2, which is a plate or bracket extending from the first side of the mainframe toward the second side and spaced from the rear end of the mainframe.

However, in the prior '915 reexamination, the "engine bracket limitation" of claims 1 and 15 was shown to be taught by the engine mount plate 2 depicted on page P1.04 of the Vermeer S450TX Parts Manual. See pages 31-32 of the Request filed February 28, 2017.

Moreover, the S450TX Parts Manual was used for its teaching of the bracket limitation in the rejection of claims 1 and 15 (see page 6 of the Office action mailed August 25, 2017), and claims 1 and 15 were subsequently found to be patentable over S450TX Parts Manual and the other references used in this rejection.

During the '915 reexamination proceeding, limitations drawn to an operator platform for standing operation were included in new claims 31, 38, 45, and 50, among others, and argued by PO to define over the references under consideration. See pages 47, 55, and 56, for instance.

The Request further asserts the additional teaching of an operator platform 7shown in figure 9 of Dingo (Request, pp. 51, 52, 54, and 60). The operator platform is also shown on pages 1, 4, 5, 6, 14, 16, and 17 of Dingo Parts Catalog. These features are not taught by Vermeer or the Vermeer S450TX parts Manual.

Therefore, Dingo and Dingo Parts Catalog have been shown to have new, non-cumulative technical teachings relevant to the operator platform limitations argued or found to be missing from the prior art used during the prior '915 reexamination, and a reasonable Examiner would consider this reference to be important in determining the patentability of claims 31, 38, 45, and 50 of the '386 patent.

Accordingly, it is **agreed** that Dingo and Dingo Parts Catalog, taken alone or together, raise an SNQ as to claims 31, 38, 45, and 50 of the '386 patent.

It is ***not*** agreed that Dingo and Dingo Parts Catalog, taken alone or together, raise an SNQ as to claims 1, 15, or 55 of the '386 patent.

Vermeer Brochure

The instant Request asserts Vermeer Brochure raises an SNQ as to claims 38 and 55.

Vermeer Brochure was not cited, considered, or discussed on the record during the original examination of the subject '386 patent, or during the prior '915 reexamination. Vermeer Brochure is not asserted to raise an SNQ in the '109 reexamination.

With respect to claim 38, the Request asserts Vermeer Brochure teaches a mini skid steer having a single cross member extending between the two loader arms (Request, pp. 58-59).

The limitation of a "single cross member" was argued by PO to be missing from the prior art during the '915 reexamination. See pages 55-56 of the Response filed March 3, 2017.

The pictures shown in pages 1, 3, 4, and 6 (at least) show the mini skid steer of Vermeer Brochure to have a single cross member extending between the arms.

With respect to claim 55, the Request asserts Vermeer Brochure teaches a drive mechanism comprising tracks and a drive sprocket (Request pp. 56-57, 61-64).

PO argued the limitation of a drive mechanism comprising tracks was missing from the prior art during the '915 reexamination. See page 57 of the March 3, 2017 Response.

Vermeer Brochure shows variations of the mini skid steer to employ a drive system comprising tracks driven by sprockets.

Vermeer Brochure teaches limitations which were argued and found to be missing from the prior art during the prior '915 reexamination.

Therefore, Vermeer Brochure has been shown to have new, non-cumulative technical teachings relevant to the limitations argued or found to be missing from the prior art used during the prior '915 reexamination, and a reasonable Examiner would consider this reference to be important in determining the patentability of claims 38 and 55 of the '386 patent.

Accordingly, it is **agreed** that Vermeer Brochure raises an SNQ as to claims 38 and 55 of the '386 patent.

Claims Not Requested

The Request does not request reexamination of patent claims 2-14 and 19.

While the decision to reexamine any claim for which reexamination has not been requested under 35 U.S.C. 302 lies within the sole discretion of the Office, the determination in both the order for reexamination and the examination stage will generally be limited solely to a review of the claims for which reexamination was requested. See MPEP 2240 and 2243, and *Sony Computer Entertainment America Inc. v. Dudas*, 85 USPQ2d 1594 (E.D. Va 2006).

Conclusion and Scope of Reexamination

The Requester has shown that Komatsu raises a new SNQ as to claims 31-63 of the '386 patent, as these claims appear on the reexamination certificate. In addition,

claims 21-30 depend from claims 1 or 15 for which Komatsu was shown to raise an SNQ in the '109 reexamination, and Komatsu raises an SNQ as to these claims by their dependency.

The Requestor has shown that Dingo and Dingo Parts Manual, taken alone or together, raise an SNQ as to claims 31, 38, 45, and 50.

The Requester has shown that Vermeer Brochure raises an SNQ as to claims 38 and 55.

The Requester did not provide a *new* SNQ as to claims 1 and 15.

Reexamination of claims 2-14 and 19 was not requested.

Accordingly, claims 21-63 will be reexamined.

Waiver of Right to File Patent Owner Statement

Patent Owner has **not** agreed to waive its right to file a Patent Owner Statement under 37 C.F.R. 304. PTO personnel unable to reach Patent Owner by telephone.

Extensions of Time

Extensions of time under 37 CFR 1.136(a) **will not be permitted** in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that ex parte reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in ex parte reexamination proceedings are provided for in 37 CFR 1.550(c).

Notice of Concurrent Proceedings or Litigation

The patent owner is reminded of the **continuing responsibility** under 37 CFR 1.565(a), to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 9,321,386 throughout the course of this reexamination proceeding. The third party requestor is also reminded of the ability to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving the subject patent. See MPEP §§ 2207, 2282 and 2286.

Submissions

In order to ensure full consideration of any affidavits or declarations or other documents as evidence of patentability, such documents must be submitted in response to the first Office action on the merits (which does not result in a close of prosecution). Submissions after the second Office action on the merits, which is intended to be a final action, will be governed by the requirements of 37C.F.R. 1.116, after final rejection and by 37 C.F.R. 41.33 after appeal, which will be strictly enforced.

Correspondence

All correspondence relating to this *ex parte* reexamination proceeding should be directed:

By EFS: Registered users may submit via the electronic filing system EFS-Web, at https://efs.uspto.gov/efile/myportal/efs-registered

By Mail to: Mail Stop *Ex Parte* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand: Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

For EFS-Web transmissions, 37 CFR 1.8(a)(1)(i) (C) and (ii) states that correspondence (except for a request for reexamination and a corrected or replacement request for reexamination) will be considered timely filed if (a) it is transmitted via the Office's electronic filing system in accordance with 37 CFR 1.6(a)(4), and (b) includes a certificate of transmission for each piece of correspondence stating the date of transmission, which is prior to the expiration of the set period of time in the Office action.

Any inquiry concerning this communication or earlier communications from the Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

/Russell D. Stormer/

Russell D. Stormer
Primary Examiner
Central Reexamination Unit
Art Unit 3993
(571) 272-6687

Conferee: /SC/

Conferee: /EDL/

Order Granting Request For Ex Parte Reexamination	**Control No.** 90/014,124	**Patent Under Reexamination** 9321386
	Examiner Russell D. Stormer	**Art Unit** 3993

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed *13 April 2018* has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☐ PTO-892, b)☐ PTO/SB/08, c)☐ Other: _____

1. ☒ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

cc:Requester (if third party requester)

Reexamination	Application/Control No. 90014124	Applicant(s)/Patent Under Reexamination 9321386
	Certificate Date	Certificate Number

Requester Correspondence Address: ☐ Patent Owner ☒ Third Party
JAMES W. MILLER, ATTORNEY 527 MARQUETTE AVENUE SUITE 1960, RAND TOWER MINNEAPOLIS,, MN 55402

LITIGATION REVIEW ☒	/rds/ (examiner initials)	05/22/2018 (date)
Case Name		Director Initials
Vermeer Corporation v. The Toro Company, 4:17 cv 76, US District - Iowa Southern (stay lifted 5/2/2018)		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
Reexamination	90/013,915 (concluded)
Reexamination	90/014,109 (ordered)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent No. 9,321,386
Inventors: Brad Thomas et al. Art Unit: 3993
Reexamination Control No.: 90/014,124
Filed: April 13, 2018
Confirmation No.: 8217
For: LOW PROFILE COMPACT TOOL CARRIERS
Examiner: Russell D. Stormer

May 9, 2018

NOTICE OF CONCURRENT PROCEEDINGS

Patent Owner submits this Notice of Concurrent Proceedings under 37 CFR § 1.565. See also MPEP § 2282. As set forth in 37 CFR § 1.565(a), "patent owner must inform the Office of any prior or concurrent proceedings in which the patent is or was involved such as interferences, reissues, *ex parte* reexaminations, *inter partes* reexaminations, or litigation and the results of such proceedings." Moreover, 37 CFR § 1.565(b) provides that "[i]f a patent in the process of *ex parte* reexamination is or becomes involved in litigation, the Director shall determine whether or not to suspend the reexamination." Patent Owner provides the following information in compliance with 37 CFR(a) and (b) so that the Office can properly determine if the pending *ex parte* reexamination proceedings should be suspended in the event they are even granted.

U.S. Patent No. 9,321,386 (the '386 Patent) has been, or is involved, in the following proceedings:

- *Vermeer Corporation v. The Toro Company*, Case No. 4:17-cv-00076-CRW-HCA (S.D. IA) was filed February 28, 2017. In view of an *ex parte* reexamination proceeding (Control Number 90/013,915, which is listed below) initiated by Toro, the Court granted Toro's motion to stay the litigation on April 21, 2017. Following the resolution of this *ex parte* reexamination proceeding, on May 2, 2018, the Court ordered that the stay be lifted. In regard to the present request for *ex parte* reexamination and in regard to a second *ex parte*

reexamination request listed below (Reexamination Control No. 90/014,109), the order to lift the stay indicates that the reexamination requests lack merit. The orders granting the stay and lifting the stay are attached for reference.

- A third party Request for *Ex Parte* Reexamination was filed by Toro on February 28, 2017 and assigned Control Number 90/013,915. Following conclusion of this *ex parte* reexamination, the Office mailed an *Ex Parte* Reexamination Certificate on April 12, 2018 in which the patentability of claims 1, 3-13 and 20 was confirmed, claims 15, 17 and 19 as amended were determined to be patentable, and added claims 21-63 were determined to be patentable.

- Another third party Request for *Ex Parte* Reexamination was filed by Toro on March 12, 2018 and assigned Control Number 90/014,109. This Reexamination proceeding has been assigned to an Examiner and is awaiting determination.

- A first continuation application was filed by Patent Owner on March 7, 2016 and assigned Serial No. 15/062,801. Patent Owner cited the references from the *Ex Parte* Reexamination Request of the present reexamination in an Information Disclosure Statement dated March 19, 2018. The Interview Summary that accompanied a Corrected Notice of Allowability dated April 23, 2018 states that "the pending claims define over these references whether taken individually or in combination with the teachings of the other prior art of record."

- A second continuation application was filed by Patent Owner on September 14, 2017 and assigned Serial No. 15/704,685. Patent Owner cited the references from the Ex Parte Reexamination Request of the present reexamination in an Information Disclosure Statement dated March 30, 2018. The Office mailed an Office action on April 23, 2018. The references from the

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Ex Parte Reexamination Request did not form the basis of any rejection under 35 U.S.C. §102 or 35 U.S.C. §103. Several claims were found to be allowable.

Respectfully submitted,

/Michael J. Vander Molen/

Michael J. Vander Molen
Reg. No. 57,274
ARMSTRONG TEASDALE LLP
7700 Forsyth Blvd., Suite 1800
St. Louis, Missouri 63105
(314) 621-5070

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Kubota North America Corporation et al

Ex. 2035
Page 436 of 549

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF IOWA
CENTRAL DIVISION

VERMEER CORPORATION,
Plaintiff, No. 4-17-cv-76-CRW-HCA

vs.

ORDER

THE TORO COMPANY,
Defendant.

On April 21, 2017, this Court stayed proceedings in this patent infringement case in order that "Toro could undertake reexamination proceedings before the USPTO." But on February 23, 2018, the Patent Office rejected Toro's invalidity arguments and confirmed the validity of twelve of the seventeen patent claims asserted by Vermeer Corporation (Vermeer).

Before the court for ruling is the resisted motion to lift stay (Docket #57) filed by plaintiff Vermeer Corporation. On April 17, 2018, the Court received oral arguments by telephone conference call.

In its Complaint, Vermeer alleges infringement of claims 1, 3-13, 15-18, and 20 of the '386 patent. Of those claims, the USPTO confirmed the patentability of claims 1 and 3-13, and permitted amendment of claims 15, 17, and 20. During the course of the reexamination proceedings, the USPTO also allowed an additional forty-three patent claims, many of which Vermeer intends to assert against Toro in this lawsuit

Although Toro resists the motion to lift stay, there is no merit in its protest. Vermeer properly argues that another reexamination would be useless. This Court grants Vermeer's motion to lift stay. The parties shall work toward being ready for trial here at an early date.

IT IS SO ORDERED.

Dated this 2nd day of May, 2017.

Charles R Wolle
CHARLES R. WOLLE, JUDGE
U.S. DISTRICT COURT

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF IOWA
CENTRAL DIVISION

VERMEER CORPORATION,

Plaintiff, No. 4-17-cv-76-CRW-HCA

vs.

ORDER

THE TORO COMPANY,

Defendant.

Vermeer Corporation seeks a preliminary injunction (Docket #18) to enforce its patent on a vertical lift compact tool carrier; The Toro Company seeks a stay of proceedings (Docket #6) in this court during reexamination of its '386 patent by the U.S. Patent and Trademark Office.

The court has studied the large volume of documents in the record that both parties have filed both before and after the April 7, 2017 hearing, including each party's proposed order and decision filed simultaneously on April 18.

Toro's motion for a stay complies with the sound precedents cited in its brief and proposed decision. Discovery awaits reexamination; a stay may well simplify the claims and triable issues; if Vermeer prevails, money damages secured in a trial will be a satisfactory outcome. See, e.g. Ethicon, Inc. v. Quigg, 849 F.2d 1422, 1426-27 (Fed Cir. 1988).

Vermeer's request for a preliminary injunction is denied. The court has considered the four factors applicable here in the Eighth Circuit. See Dataphase Sys. Inc. v. CL Sys, Inc., 640 F.2d 109, 114 (8th Cir. 1981). Vermeer has not yet demonstrated a likelihood that it will prevail on the merits; it has not proved irreparable harm absent injunctive relief; its potential harm is no greater than Toro's potential harm; the public interest is not clearly affected,

though preventing Toro sales activities could inhibit market forces.

On balance, the facts and authorities cited by the parties support denial of Vermeer's injunction request (Docket #18) and a grant of a limited stay (Docket #16) during reexamination proceedings. The court urges the Patent Office to expedite reexamination.

By August 21, 2017, the parties shall report to the court in writing the status of reexamination proceedings. They shall also propose one or more dates for the jury trial and outline how they plan to complete discovery.

The court now asks U.S. Magistrate Judge Helen Adams to schedule a settlement conference at an appropriate time.

IT IS SO ORDERED.

Dated this 21st day of April, 2017.

Charles R Wolle

CHARLES R. WOLLE, JUDGE
U.S. DISTRICT COURT

CERTIFICATE OF SERVICE

I certify that on May 9, 2018 the foregoing NOTICE OF CONCURRENT PROCEEDINGS, was served on the third party requester's counsel via first class mail at:

James W. Miller
Registration No. 27,661
Suite 1960 Rand Tower
527 Marquette Avenue
Minneapolis, MN 55402

Respectfully submitted,

/Michael J. Vander Molen/

Michael J. Vander Molen
Reg. No. 57,274
ARMSTRONG TEASDALE LLP
7700 Forsyth Blvd., Suite 1800
St. Louis, Missouri 63105
(314) 621-5070

UNITED STATES PATENT AND TRADEMARK OFFICE

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

REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/014,124	04/13/2018	9321386

CONFIRMATION NO. 8217

JAMES W. MILLER, ATTORNEY
527 MARQUETTE AVENUE
SUITE 1960, RAND TOWER
MINNEAPOLIS,, MN 55402

REEXAMINATION REQUEST NOTICE

OC000000098858172

Date Mailed: 04/18/2018

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

Requester is hereby notified that the filing date of the request for reexamination is 04/13/2018, the date that the filing requirements of 37 CFR § 1.510 were received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner
76656
Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

/tplovelace/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/014,124	04/13/2018	9321386

CONFIRMATION NO. 8217

REEXAM ASSIGNMENT NOTICE

76656
Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105

OC00000009885817 4

Date Mailed: 04/18/2018

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3993. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

NOTICE OF USPTO EX PARTE REEXAMINATION PATENT OWNER STATEMENT WAIVER PROGRAM

The USPTO has implemented a pilot program where, after a reexamination proceeding has been granted a filing date and before the examiner begins his or her review, the patent owner may orally waive the right to file a patent owner's statement. See *"Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings,"* 75 FR 47269 (August 5, 2010). One goal of the pilot program is to reduce the pendency of reexamination proceedings and improve the efficiency of the reexamination process.

Ordinarily when ex parte reexamination is ordered, the USPTO must wait until after the receipt of the patent owner's statement and the third party requester's reply, or after the expiration of the time period for filing the statement and reply (a period that can be as long as 5 to 6 months), before mailing a first determination of patentability. The USPTO's first determination of patentability is usually a first Office action on the merits or a Notice of Intent to Issue Reexamination Certificate (NIRC).

Under the pilot program, the patent owner's oral waiver allows the USPTO to act on the first determination of patentability immediately after determining that reexamination will be ordered, and in a suitable case issue the reexamination order and the first determination of patentability (which could be a NIRC if the claims under reexamination are confirmed) at the same time.

Benefits to the Patent Owner for participating in this pilot program include reduction in pendency.

To participate in this pilot program, Patent Owners may contact the USPTO's Central Reexamination Unit (CRU) at 571-272-7705. The USPTO will make the oral waiver of record in the reexamination file in an interview summary and a copy will be mailed to the patent owner and any third party requester.

cc: Third Party Requester(if any)
JAMES W. MILLER, ATTORNEY
527 MARQUETTE AVENUE
SUITE 1960, RAND TOWER
MINNEAPOLIS,, MN 55402

/tplovelace/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

UNITED STATES PATENT AND TRADEMARK OFFICE

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BIB DATA SHEET

CONFIRMATION NO. 8217

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
90/014,124	04/13/2018 RULE	414	3993	Vermeer-386Reex-3

APPLICANTS

INVENTORS

9321386, Residence Not Provided;
VERMEER MANUFACTURING COMPANY (ASSIGNEE), PELLA, IA;
THE TORO COMPANY (3RD PTY REQ.), BLOOMINGTON, MN;
JAMES W. MILLER, ATTORNEY, MINNEAPOLIS,, MN

**** CONTINUING DATA ***************************

This application is a REX of 14/691,649 04/21/2015 PAT 9321386
which claims benefit of 62/118,860 02/20/2015

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

Foreign Priority claimed ☐ Yes ☐ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and Acknowledged _____ Examiner's Signature	☐ Met after Allowance _____ Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
				20	3

ADDRESS

Patent Docket Department
Armstrong Teasdale LLP
7700 Forsyth Boulevard
Suite 1800
St. Louis, MO 63105
UNITED STATES

TITLE

LOW PROFILE COMPACT TOOL CARRIERS

FILING FEE RECEIVED		
12000	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

Patent Assignment Abstract of Title

Total Assignments: 1

Application #: 14691649 **Filing Dt:** 04/21/2015 **Patent #:** 9321386 **Issue Dt:** 04/26/2016
PCT #: NONE **Intl Reg #:** **Publication #:** NONE **Pub Dt:**
Inventors: Brad Thomas, Louis Hartke, Greg Langenfeld, Matt Hutchinson
Title: LOW PROFILE COMPACT TOOL CARRIERS

Assignment: 1

Reel/Frame: 035676 / 0246 **Received:** 05/20/2015 **Recorded:** 05/20/2015 **Mailed:** 05/21/2015 **Pages:** 10
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
Assignors: THOMAS, BRAD **Exec Dt:** 05/08/2015
HARTKE, LOUIS **Exec Dt:** 05/05/2015
LANGENFELD, GREG **Exec Dt:** 05/18/2015
HUTCHINSON, MATT **Exec Dt:** 05/04/2015
Assignee: VERMEER MANUFACTURING COMPANY
1210 VERMEER ROAD EAST
PELLA, IOWA 50219
Correspondent: PATENT DOCKET DEPARTMENT ARMSTRONG TEASD
7700 FORSYTH BOULEVARD
SUITE 1800
ST. LOUIS, MO 63105

Search Results as of: 04/17/2018 10:10 AM

If you have any comments or questions concerning the data displayed, contact PRD / Assignments at 571-272-3350. v.2.6
Web interface last modified: Jun 20, 2017 v.2.0

PTO/SB/57 (09-16)
Approved for use through 09/30/2018. OMB 0651-0064
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(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: Vermeer-386Reex-3

Date: 04/13/2018

1. ☑ This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 9,321,386 issued 04/26/2016. The request is made by:
   ☐ patent owner. ☑ third party requester.
2. ☑ The name and address of the person requesting reexamination is:
   The Toro Company
   8111 Lyndale Avenue South
   Bloomington, MN 55420
3. Requester asserts ☐ small entity status (37 CFR 1.27) or ☐ certifies micro entity status (37 CFR 1.29). Only a patent owner requester can certify micro entity status. Form PTO/SB/15A or B must be attached to certify micro entity status.
4. ☐ a. A check in the amount of $_____ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);
   ☐ b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. _____;
   ☐ c. Payment by credit card. Form PTO-2038 is attached; **or**
   ☑ d. Payment made via EFS-Web.
5. ☑ Any refund should be made by ☐ check or ☑ credit to Deposit Account No. 20-1315. 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.
6. ☑ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4).
7. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
   ☐ Landscape Table on CD
8. ☐ Nucleotide and/or Amino Acid Sequence Submission
   If applicable, items a. – c. are required.
   a. ☐ Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
      ii. ☐ paper
   c. ☐ Statements verifying identity of above copies
9. ☑ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.
10. ☑ Reexamination of claim(s) 1,15, 17 and 20-63 is requested.
11. ☑ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.
12. ☑ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) a request for reexamination. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop *Ex Parte* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

13. ☑ The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1).

b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2).

14. ☐ A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e).

15. ☑ It is certified that the statutory estoppel provisions of 35 U.S.C. 315(e)(1) or 35 U.S.C. 325(e)(1) do not prohibit requester from filing this *ex parte* reexamination request. 37 CFR 1.510(b)(6).

16. ☑ a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).

The name and address of the party served and the date of service are:

Armstrong Teasdale LLP

7700 Forsyth Boulevard, Suite 1800, St. Louis MO 63105

Date of Service: 04/13/2018; **or**

☐ b. A duplicate copy is enclosed since service on patent owner was not possible. An explanation of the efforts made to serve patent owner **is attached**. See MPEP 2220.

17. Correspondence Address: Direct all communication about the reexamination to:

☑ The address associated with Customer Number: 61145

OR

☐ Firm or Individual Name

Address

City	State	Zip
Country		
Telephone	Email	

18. ☑ The patent is currently the subject of the following concurrent proceeding(s):

☐ a. Copending reissue Application No.

☑ b. Copending reexamination Control No. 90/014,109

☐ c. Copending Interference No.

☐ d. Copending litigation styled:

Vermeer Corporation v. The Toro Company, Case No. 4:17-cv-00076-CRW-HCA,

United States District Court for the Southern District of Iowa

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

/James W. Miller/ — Authorized Signature

04/13/2018 — Date

James W. Miller — Typed/Printed Name

27661 — Registration No.

☐ For Patent Owner Requester

☑ For Third Party Requester

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No: Vermeer-386Reex-3

In re Patent of:	)
	)
Brad Thomas et al.	)
	)
Patent No. 9,321,386	)
	)
Issued April 26, 2016	)
	)
For LOW PROFILE COMPACT TOOL CARRIERS	)

DETAILED REQUEST FOR *EX PARTE* PATENT REEXAMINATION

Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 CFR §1.510, The Toro Company, the real party in interest and a third party requester, respectfully requests *ex parte* reexamination of claims 1, 15, 17 and 20-63 of U.S. Patent 9,321,386, referred to hereafter as "the '386 patent." A Request for *Ex Parte* Reexamination Transmittal Form (PTO/SB/57) is attached hereto. This is the third Request for *Ex Parte* Reexamination of the '386 patent filed by Toro.[1]

[1] See Sections I(C) and I(D) hereof for the related nature of the second and third reexamination requests.

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I. Notice of Prior or Concurrent Proceedings and Decisions Thereon

A. Concurrent Patent Litigation

Pursuant to MPEP §2282, the '386 patent is involved in patent litigation entitled Vermeer Corporation v. The Toro Company, Case No. 4:17-cv-00076-CRW-HCA, United States District Court for the Southern District of Iowa.

B. Concluded First Patent Reexamination

Toro filed a first Request for *Ex Parte* Reexamination of the '386 patent on February 28, 2017 which matured into a first reexamination identified as Reexam Control No. 90/013,915. A Reexamination Certificate issued on April 12, 2018 in the first reexamination confirming the patentability of claims 1 and 3-13 of the '386 patent, finding that claims 15, 17, 19 and 20 of the '386 patent were patentable as amended, and further finding that new claims 21-63 were patentable.

C. Concurrent Second *Ex Parte* Patent Reexamination

Toro filed a second Request for *Ex Parte* Reexamination of the '386 patent on March 12, 2018 directed to claims 1-13, 15-18 and 20 of the '386 patent. This Request has been assigned Reexam Control No. 90/014,109. At the time of the filing of the second Request, a NIRC dated February 23, 2018 had issued in the first reexamination closing prosecution therein but the Reexamination Certificate had not yet been printed. Accordingly, the second Request for *Ex Parte* Reexamination was directed only to the original claims of the '386 patent as these were the only claims in existence at the time the second Request for *Ex Parte* Reexamination was filed.

D. The Related Nature of the Second and Third Requests

This current third Request for *Ex Parte* Reexamination is being filed on or shortly after the issuance of the Reexamination Certificate in the first reexamination. This third Request does

not rely on different base prior art or different SNQ's than that presented in the Control No. 90/014,109.[2] This third Request is simply a follow on filing to Control No. 90/014,109 to extend the application of the prior art and the prior art combinations provided in Control No. 90/014,109 to the new claims 21-63 of the '386 patent resulting from their addition to the '386 patent through issuance of the Reexamination Certificate on April 12, 2018.

Despite being treated in Control No. 90/014,109, Claim 1 is included in this third Request because new claims 21 and 22 depend from claim 1. Similarly, despite being treated in Control No. 90/014,109[3], amended claim 15 is included in this third Request because amended claims 17 and 20 and new claims 23-30 depend from claim 15.

[2] One new additional secondary reference is being added to address a few minor and well known limitations in the new claims that were not present in the original claims of the '386 patent and that are not therefore addressed by the prior art supplied in the second Request. See Ground 2 herein which does not appear in the second Request and which relies on this additional secondary reference herein as a further teaching reference.

[3] Claim 15 as it appears in amended form in the Reexamination Certificate incorporates original dependent claims 16 and 18 of the '386 patent into the original independent claim 15 of the '386 patent. Accordingly, the application of prior art to claim 18 in Control No. 90/014,109 applies equally to amended claim 15 herein.

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Kubota North America Corporation et al

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II. Statement Pointing Out Each SNQ

The prior art patents and printed publications relied upon by Toro in this Request raise the following substantial new questions (SNQ's) of patentability and proposed grounds of rejection:

Ground 1. Claims 1, 15, 17, 20-36, and 45-54 of the '386 patent are unpatentable under 35 U.S.C. 103(a) over a printed publication entitled Dingo® 322 Operator's Manual, referred to hereafter as "Dingo," in view of a printed publication entitled Dingo® 322 Parts Catalog, referred to hereafter as "Dingo Parts Catalog," and further in view of Japanese Patent Application JPH11140900 to Komatsu, hereafter referred to as "Komatsu".

Ground 2. Claims 37-44 and 55-63 of the '386 patent are unpatentable under 35 U.S.C. 103(a) over Dingo and Dingo Parts Catalog in view of Komatsu as applied in Ground 1, further in view of printed publication entitled Vermeer Mini Skid Steers S600/S600TX Brochure, referred to hereafter as "Vermeer Brochure."

III. Why the SNQs Are New Questions

A. With Respect to the Original Prosecution

In the prosecution of the '386 patent, there were no rejections made that used a mini skid steer corresponding to that of the '386 patent as the primary reference and that modified such primary reference to use a vertical lift linkage as taught in a larger skid steer having a seated operator and a rear engine. The Final Rejection dated October 23, 2015 posited the reverse - that it would have been obvious in a larger skid steer having a seated operator and a rear engine and equipped with a vertical lift linkage to utilize a control station for a standing operator at the rear (the Yasuda in view of Bares combination). In Amendment C dated January 21, 2016, the Patent Owner argued essentially that this modification would put the operator too close to the rear mounted engine. The Examiner agreed and allowed the application in response to Amendment C.

Significantly, the Examiner made no rejection in the prosecution of the '386 patent similar to the one proposed herein, namely to use a mini skid steer as the primary reference (Dingo herein) and to modify it using a secondary reference that teaches a vertical lift loader linkage. Accordingly, this Reexam Request clearly raises a SNQ that was not considered by the PTO during the original prosecution of the '386 patent.

B. With Respect to the First Reexamination

In the first reexamination relating to the '386 patent, i.e. Control No. 90/013915, the issue of obviousness presented was based on a mini skid steer as the primary reference (the reference known as Vermeer relating to the S450TX skid steer) in view of the vertical lift linkage on a full sized ride on skid steer as the secondary reference (the reference known as Mustang). After first finding this combination obvious, the Examiner eventually withdrew his rejection and found the asserted combination to be non-obvious. The Examiner stated his reasons for confirming patentability in the NIRC issued February 23, 2018 as follows:

> "Applicant's arguments are persuasive that there would be no expectation of success from adding the lift mechanism of Mustang to the S450TX skid steer.

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> **The rear cross member of the Mustang lift system could not be present on a smaller rear controlled skid steer, as it would inhibit access to the controls and be positioned where either the operator or the engine are located.** It is further noted that the increase of lift capacity from using the claimed vertical lift (32% increase over the radial lift) was unexpected. It is further no longer considered obvious for an ordinary practitioner at the time of invention to combine the known compact S450TX with the much larger known vertical lift system of the Mustang reference as it was stated by the requester in US PG Pub 2016/0244937, "While high lift loader arms are known on full size skid steer loaders as disclosed in U.S. Pat. No. 5,542,814, the use of such high lift loader arms on a compact utility loader has been considered difficult if not impossible due to size and durability constraints."
> (Emphasis Added)

In an interview with the Examiner held on October 16, 2017 and in its subsequent Amendment and Response To Office Action dated October 25, 2017, the Patent Owner had argued that the large vertical lift linkage of Mustang was incompatible with the small size of a mini skid steer. The Patent Owner presented various photographs to the Examiner showing the Mustang linkage and pointing out the rear cross member that extended between the rear ends of the loader arms. One such photograph found on page 54 of the Patent Owner's Amendment of October 25, 2017 is reproduced below.

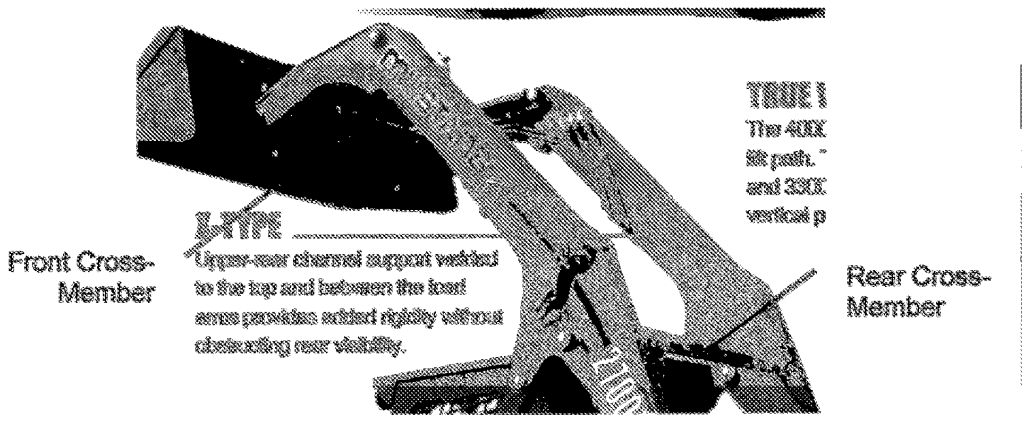
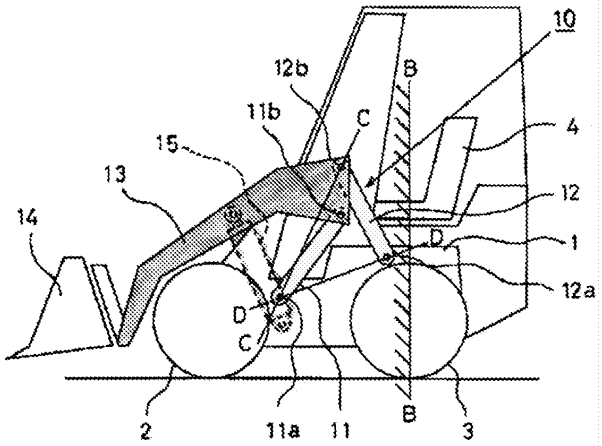


Fig. 5 of Mustang Brochure

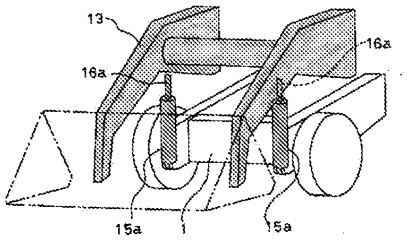
In response thereto, the Examiner found the presence of the rear cross member in Mustang to be disqualifying to using Mustang's vertical lift linkage on a mini skid steer in which

the operator is at the very rear. The photograph above shows the position of the rear cross member when the vertical lift linkage is elevated. Even in an elevated position, the rear cross member is always behind the operator's cab and the operator. To return to the highlighted portion in the Examiner's NIRC, such a rear cross member **"could not be present on a smaller rear controlled skid steer, as it would inhibit access to the controls and be positioned where either the operator or the engine are located."**

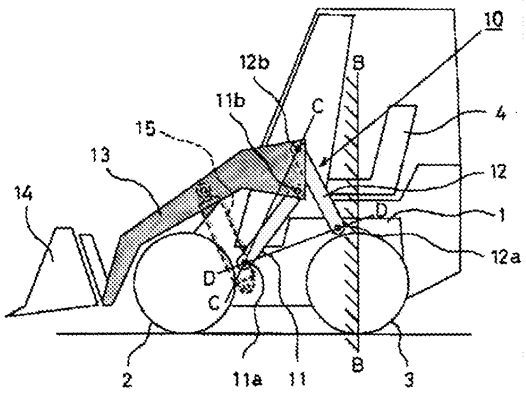
As Toro will show in much greater detail later in this Request, Komatsu (newly cited JPH11140900) was well aware of the wrap around nature of the vertical lift linkages of the type shown in Mustang in which the loader arms and the structure at the back of the loader arms, including the rear cross member, were always behind the operator. Komatsu recognized that this cut off access to the operator's seat except from the front of the loader and restricted lateral and rearward visibility. Komatsu expressly sought to avoid these disadvantages by proposing a different vertical lift linkage in a different fore-and-aft relationship to the operator. As shown in Fig. 1 of Komatsu to the left hereof, this involved moving the operator further rearwardly on the skid steer loader, even as far back as to a position behind the rear wheel, and moving the vertical lift linkage and any cross members thereon substantially forwardly of the operator. Komatsu expressly discloses and claims moving the vertical lift linkage to a position that is forward of a line B-B through the center of the rear wheel.



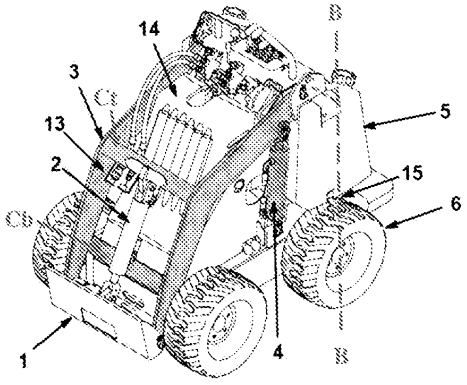
In this forward position, the spaced loader arms of Komatsu must nest around the operator's cab and seat and around the frame. There can be NO rear cross members since their presence would prevent such nesting. In fact, Komatsu diagrammatically shows the open space between the rear ends of the loader arms that must be provided in its design. See Fig. 3 of Komatsu as reproduced to the right hereof. Komatsu begs one of ordinary skill in the art to do the same in a mini skid steer. Plainly, Komatsu overcomes the difficulty the Examiner had in applying Mustang to a mini skid steer.



The other newly cited reference to Dingo discloses a skid steer loader made and sold by Toro which is ideally suited for using a downsized and forwardly located vertical lift linkage as disclosed in Komatsu. The skid steer loader of Dingo is pictured below side-by-side with Fig. 1 of Komatsu. Both are similar four wheel vehicles. Dingo discloses placing its radial lift linkage forwardly of a line B-B through the center of its rear wheel just as Komatsu teaches that such a location is where its vertical lift linkage should be placed. Thus, the issue of obviousness is now completely different and involves combining two references, namely Dingo in view of Komatsu, that are driving at the same objective without any structural impediments, such as the rear cross member in Mustang, being a bar to making the combination.



Komatsu



Dingo

The issue of obviousness based on the Dingo and Komatsu references is a far different and stronger one than the one the Examiner had before him in the first reexamination,

particularly given the Examiner's focus on the rear cross member as being the reason for withdrawing the prima facie finding of obviousness he had originally adopted. Even though the Examiner in the NIRC further mentioned two secondary considerations of non-obviousness, namely unexpected success and Toro's statement allegedly indicating skepticism, such factors must be assessed anew with respect to the different and stronger case of obviousness posed by Dingo and Komatsu. Neither Dingo nor Komatsu was of record in the original prosecution of the '386 patent or the first reexamination thereof. They clearly pose SNQ's that have never been resolved previously by the PTO. This Request for *Ex Parte* Reexamination should be granted.

Moreover, as to the secondary considerations of non-obviousness presented to the Examiner in the first reexamination, the record before the Examiner is incomplete and misleading. For example, the alleged showing of unexpected results is inconsistent with the Patent Owner's repeated published statements regarding the results actually achieved. Toro's alleged statement of skepticism was taken out of context and used inappropriately by the Patent Owner. Toro will offer the Examiner the critical counterbalance that the Examiner needs to properly assess the ex parte presentation of objective evidence of non-obviousness provided by the Patent Owner in the first reexamination.

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IV. Detailed Explanation of the Pertinency and Manner of Applying the Patents and Printed Publications to Every Claim for Which Reexamination Is Requested

A. Review of the '386 Patent at Issue Herein

The basic difference between a radial lift loader arm linkage and a vertical lift loader arm linkage is the removal of the fixed pivot connection of the loader arm to the mainframe of the skid steer. With that removal, the loader arm is no longer constrained to pivot about a circular arc. Instead, the loader arm is now free to move longitudinally back and forth in a fore-and-aft direction to lift the load in a vertical path that remains closer to the vehicle. This enhances stability of the loader and permits a vertical lift loader to lift more weight than a comparable radial lift loader. It also permits greater forward reach at full height. However, the loader arm must still be supported even as it makes such fore-and-aft movements.

The vertical lift linkage of the '386 patent comprises a loader arm 15a (colored green in Fig. 2 of the '386 patent below) that is, in the words of claims 1 and 15 of the '386 patent, "not…directly attached to the mainframe". Instead, loader arm 15a is supported on mainframe 10 by a front linkage 46a (colored yellow below) and by a rear linkage 50a (also colored yellow below). A hydraulic cylinder actuator 54 (colored blue below) is used to lift and lower the loader arm 15a through a substantially vertical lift path instead of the radial lift path provided by radial arm loaders. The vertical lift linkage is duplicated on both the left and right sides of the skid steer loader.

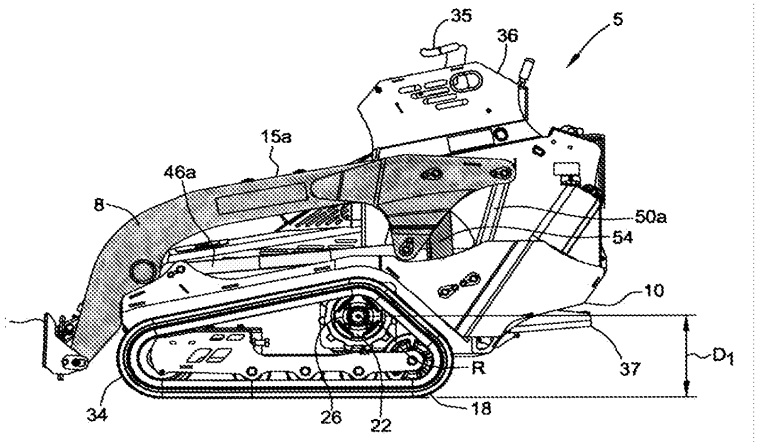


FIG. 2

Fig. 2 above from the ‘386 patent shows the vertical lift loader arm linkage in its lowermost position. Fig. 3 of the ‘386 patent, reproduced below and color coded similarly to Fig. 2, shows the vertical lift linkage in its uppermost position. Note how the rear end of loader arm 15a has swung forwardly in Fig. 3 relative to mainframe 10 from the position shown in Fig. 2 above with the tool attachment 12 in Fig. 3 having moved vertically upwardly from its lowermost position in Fig. 2. This is the vertical lift linkage in action.

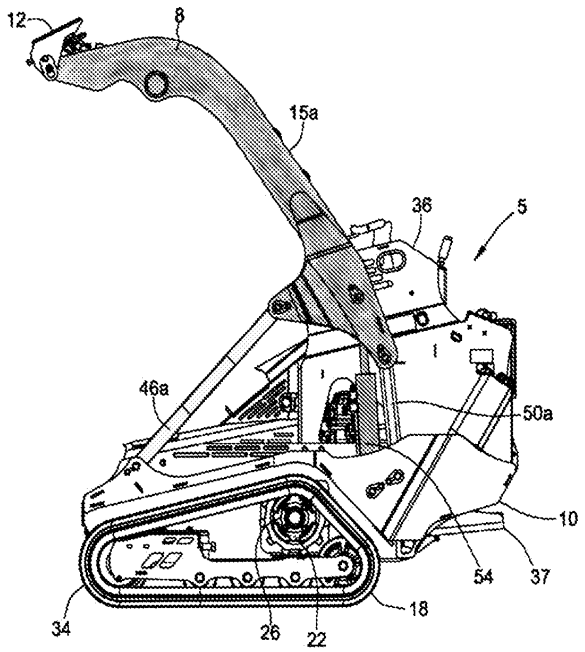


FIG. 3

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B. Review of JPH11140900 to Komatsu

A patent application published in Japan in 1999, namely JPH11140900, which is being referred to herein as Komatsu, sheds an entirely new light on what those of ordinary skill in the skid steer loader art knew some fifteen years before the purported invention of the '386 patent. That knowledge included an awareness of certain disadvantages of previously existing vertical and radial lift linkages used in sit down, ride on skid steer loaders. That awareness led to the development and disclosure in Komatsu of various improvements to vertical lift linkages. These improvements are ideal candidates for use on a mini skid steer.

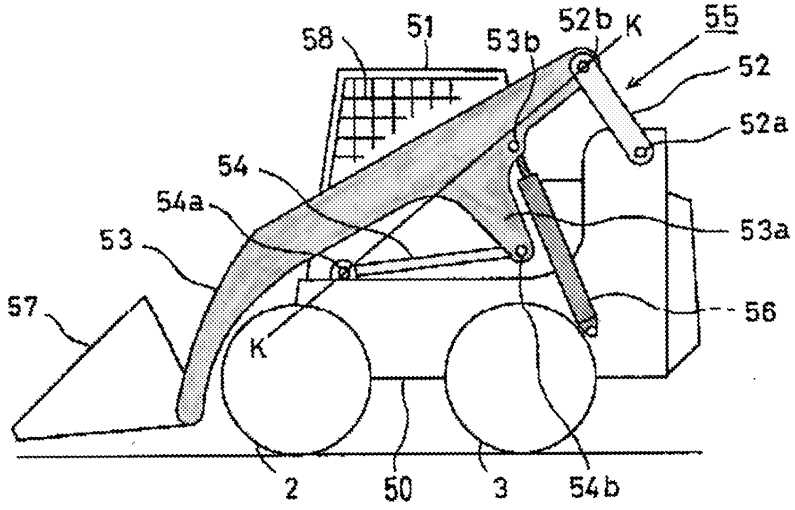
Komatsu also disproves the fundamental premise submitted by the Patent Owner in the first reexamination of the '386 patent to overcome the prima facie case of obviousness, namely that the rear cross member of Mustang disqualifies a vertical lift linkage from being used on a mini skid steer. While some vertical lift linkages such as Mustang use rear cross members as convenient ways to reinforce the loader arm structure, others like Komatsu do not. The Examiner in the first reexamination would not have accepted the unrebutted premise of the necessity of a rear cross member if he had known of Komatsu. In order to fully appreciate the significance of Komatsu's improvements, Toro will first turn to Komatsu's discussion of the disadvantages of known vertical and radial lift linkages.

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1. The Prior Art Vertical Lift Linkage Described in Komatsu

Komatsu depicts in Figs. 11 and 12 a prior art vertical lift linkage. Komatsu describes Fig. 11 as being a "side elevation of loading machine provided with a first example of a **conventional** four-joint link." (Emphasis Added). (Komatsu, p. 25, ll. 18-19; caption above Fig. 11)[4]. Fig. 11 of Komatsu is reproduced below and has been color coded similarly to that used with respect to the '386 patent, namely green for the loader arms, yellow for the front and rear linkages, and blue for the actuators. The conventional vertical lift linkage shown below comprises a green loader arm 53, a rear linkage 52 and a front linkage 54 for movably supporting loader arm 53 relative to the frame 50[5], and a cylinder 56 for lifting and lowering loader arm 54. The linkage shown below is duplicated on the other side of the skid steer vehicle.



In describing this conventional vertical lift linkage, Komatsu made the following additional observations.

> "Meanwhile, the side of the vehicle body 50 is dangerous because the arm 53 and the like move up and down, and as illustrated in Figure 11, a wire mesh 58

[4] All citations for quotations from Komatsu will be to the English translation thereof.

[5] The reference in the quote from Komatsu to a "four-joint link" should not be construed as being to a four bar linkage. Instead, Komatsu is referring to the four pivots 52a, 52b and 54a, 54b that the rear linkage 52 and front linkage 54 have with respect to the frame 50 and loader arm 53, respectively. (Komatsu, ¶ [0002] at p. 8, ll. 4-10).

for protection is attached to the side surface of the driver's cab 51, and the operator gets on an off from the front of the vehicle body 50."
(Komatsu, ¶ [0004], p. 9).

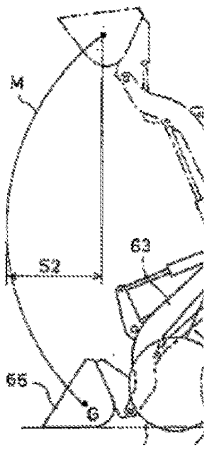
Komatsu found that these characteristics gave rise to the following disadvantages.

"[Problems to be resolved by the invention] However, the conventional configuration described hereinabove has the following problems.

(1) In the first example, since one gets on and off the vehicle body from the front of the vehicle, **it is not possible to get on or off the vehicle body when in a loaded state**. Further, the arm and the like are present in the lateral direction, and a frame and the like are present laterally at the rear, and therefore **visibility in the lateral direction and the rearward lateral direction is poor**."
(Emphasis Added) (Komatsu, ¶ [0006], bottom of p. 10).

Since access to cab 51 is blocked from the sides and the rear of frame 50, the only way for an operator to enter cab 51 is to step up onto bucket 57 and enter cab 51 through the open front side of cab 51. If bucket 57 is heavily loaded, this access is cut off. Thus, an operator who has bucket 57 loaded with dirt cannot stop and dismount without first dumping the load. Komatsu is right to highlight this disadvantage. More significantly, during operation of the skid steer loader, the operator's view directly to the left or right or rearwardly over the operator's left or right shoulders is substantially cut off by the loader arms and the vertical lift linkages therefor. As Komatsu correctly notes, "visibility in the lateral direction and the rearward lateral direction is poor".

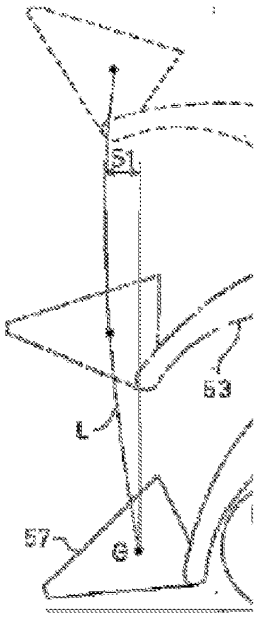
2. <u>The Prior Art Radial Lift Linkage Described in Komatsu</u>



Before turning to Komatsu's solution to overcoming the disadvantages of the known vertical lift linkage described above, Komatsu also describes a conventional prior art radial lift linkage on a skid steer loader. In the portion of Fig. 13 reproduced to the right hereof, Komatsu recognizes a fundamental characteristic of a radial lift linkage. Bucket 65 moves forwardly through a large distance S2 when loader arm 63 moves from a lowered to a substantially horizontal position.

Komatsu then notes that the forward distance S2 provided by the operation of the prior art radial lift linkage is much larger than the distance S1

provided by the operation of the prior art vertical lift linkage shown in Fig. 11 of Komatsu. In the relevant portion of Fig. 12 reproduced to the right hereof, Komatsu illustrates the smaller forward distance S1 provided by a vertical lift linkage. Komatsu describes this fundamental difference between a radial lift linkage and a vertical lift linkage as follows:



> "The movement trajectory of the center of gravity G of the bucket 65 at this time is as indicated by the curve M, and an amount of movement S2 in the front-back direction is greater than the amount of movement S1 in the first example since the position of the rear end pivot portion 63a of the arm is fixed."
> (Komatsu, ¶ [0005] at p. 10, ll. 10-15).

Komatsu then goes on to restate, as if any restatement is needed, the reason why such a large forward projection of the bucket in a radial lift linkage is disadvantageous.

> "In the second example, since the amount of movement of the position of the center of gravity of the bucket in the front-back direction during raising and lowering of the bucket is large, **there is a large variation in the position of the center of gravity, and therefore stability of the vehicle in the front-back direction when loaded is poor**."
> (Emphasis Added) (Komatsu, ¶ [0006], top of p. 11).

3. Komatsu's Design Objective

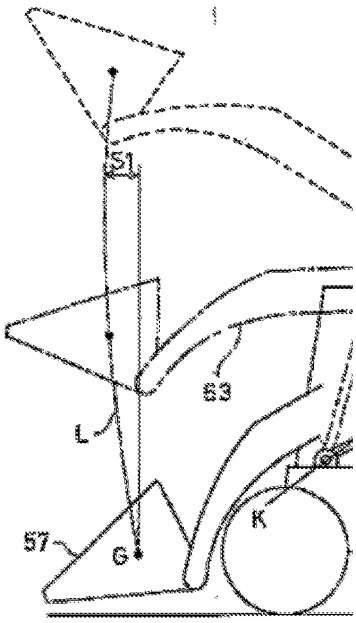
After setting forth its review of the disadvantages it perceived in prior art vertical lift and radial lift linkages in skid steer loaders, Komatsu clearly sets forth its design objectives as follows:

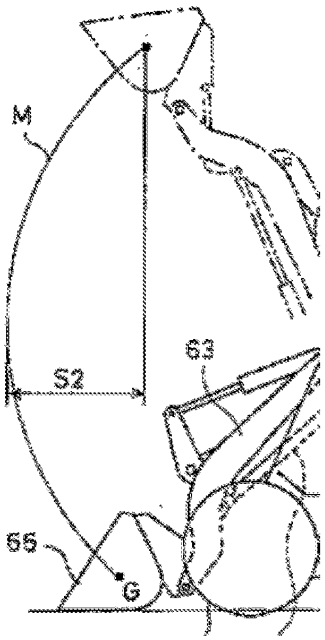
> "The present invention takes account of the abovementioned problems, and **the objective thereof is to provide a** four-joint link mechanism of **a work vehicle with which it is possible to get on and off the driver's seat even in a loaded state, which has good visibility, and which also has good stability."**
> (Emphasis Added) (Komatsu, ¶ [0007]).

Notably, Komatsu rules out using a radial lift linkage by restricting the various disclosed embodiments of the invention to skid steer loaders having only vertical lift linkages. Komatsu

thus acknowledges the first motivation, which is so well known in the loader art that the PTO may take Official Notice of it, for replacing a radial lift linkage with a vertical lift linkage. A vertical lift linkage keeps the load closer to the vehicle as it is lifted (the distance S1 versus S2) to improve fore-and-aft vehicle stability, thereby permitting an increase in lift capacity.

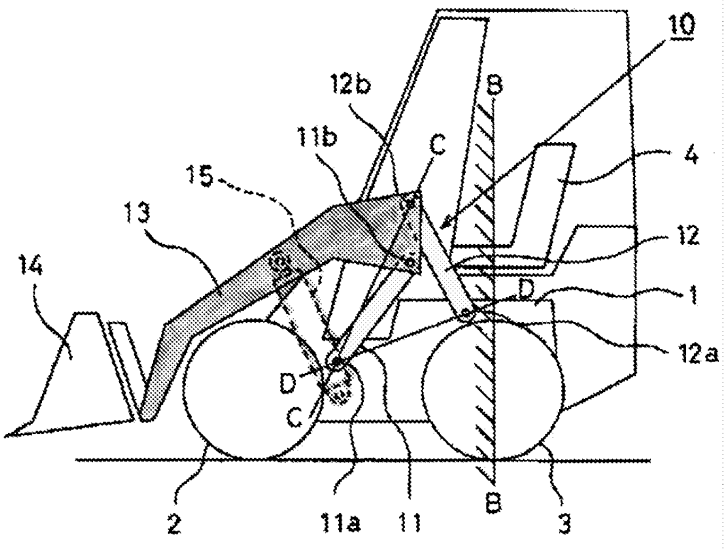
Moreover, while Komatsu does not expressly discuss the second motivation for replacing a radial lift linkage with a vertical lift linkage, Komatsu illustrates the second motivation when one compares the lift patterns illustrated in Figs. 12 and 13 of Komatsu, as reproduced below. That second motivation is the increased forward reach of the lift bucket at full height produced by a prior art vertical lift linkage (Fig. 12 of Komatsu at the left below) as compared to that produced by a prior art radial lift linkage (Fig. 13 of Komatsu at the right below). This increased forward reach makes a vertical lift linkage better able to dump loads into the boxes of dump trucks than a radial lift linkage. No wonder then that all the inventive improvements in Komatsu relate to vertical lift linkages and none relate to radial lift linkages.



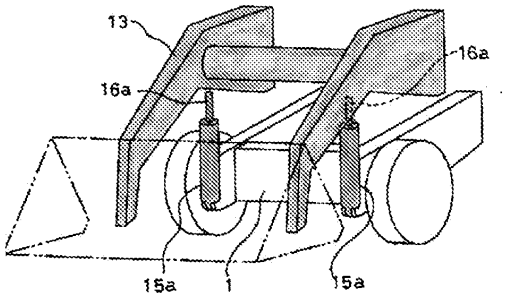


4. Komatsu's Solution

Fig. 1 of Komatsu shows a first embodiment of a vertical lift linkage which solves the problems set forth above. Fig. 1 of Komatsu is reproduced below and has been color coded similarly to that used with respect to the '386 patent, namely green for the loader arms, yellow for the front and rear linkages, and blue for the actuators. Komatsu's vertical lift linkage shown below comprises a green colored loader arm 13, a yellow colored rear linkage 12 and a yellow colored front linkage 11 for movably supporting loader arm 13 relative to the frame 1, and a blue colored cylinder 15 for lifting and lowering loader arm 13.

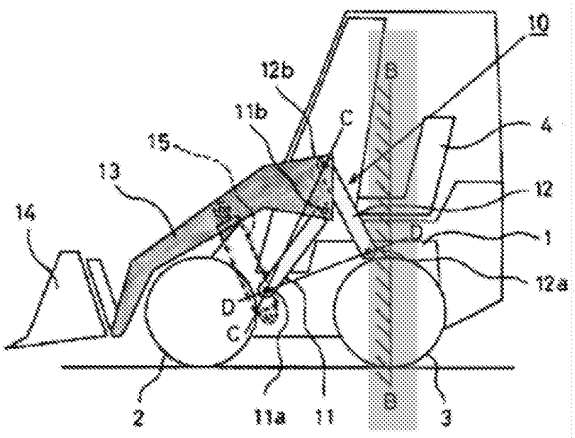


Figs. 2-4 of Komatsu are perspective views that diagrammatically illustrate various arrangements of cylinders 15 for lifting and lowering loader arms 13. In Fig. 3 of Komatsu as reproduced and color coded to the left hereof, Komatsu shows two cylinders 15 pivotally attached to the left and right sides of the vehicle frame with their piston rods extending to the laterally spaced left and right loader arms 13. Thus, it is clear from Fig. 3 of Komatsu, even though Komatsu has not shown the yellow



connecting linkages 11 and 12 in Fig. 3 for the sake of simplicity, that the vertical lift linkage as shown in Fig. 1 of Komatsu is duplicated on both sides of the skid steer vehicle.

As Fig. 3 of Komatsu further shows, loader arms 13 are connected together by a cross member placed forwardly of the rear ends of loader arms 13. In fact, Komatsu's loader arms 13, 13 could **NOT** have a **rear** cross member between them as such loader arms 13, 13 have to nest around the opposite sides of the operator's cab. Similarly, there could be **NO** cross members extending between the left and right front linkages 11, 11 and the left and right rear linkages 12, 12. Such cross members cannot be present because they would have to pass laterally through the operator's cab or through portions of frame 1. This would be a physical impossibility. Accordingly, one of ordinary skill in the art would understand that the cross member disclosed in Figs. 2-4 of Komatsu must inherently be positioned to be forward of the operator's cab and above the frame 1 so as not to interfere with the cab or the frame during motion of the vertical lift linkage through its entire range of motion.



Referring again to Fig. 1 of Komatsu as reproduced to the left hereof, the reference line B-B as highlighted in tan is an important marker in Komatsu's inventive design. Line B-B is a vertical line passing through the center of the rear wheel 3. For one thing, Line B-B passes through the middle of the operator's seat and indicates that the operator's cab and the operator's seat 4 have been moved rearwardly on the frame compared to their more centered locations in the conventional skid steer loader shown in Fig. 11 of Komatsu. Komatsu expressly describes the substantially rearward location of seat 4 as follows:

> "A vehicle body 1 is provided with a front wheel 2 and a rear wheel 3, and **a driver's seat 4 is provided substantially directly above the rear wheel 3. It should be noted that the driver's seat 4 may be provided** to the front or **to the rear of the rear wheel 3** as necessary."
> (Emphasis Added) (Komatsu, ¶ [0019] at p. 16, ll. 19-21).

If the operator's seat 4 is placed even further rearwardly than what is shown above, namely to a position "to the rear of rear wheel 3" as Komatsu expressly suggests be done, one arrives at a skid steer loader very much like the mini skid steer of the '386 patent at issue herein where the operator is at the very rear of the vehicle. Even if the operator's seat 4 remains substantially over rear wheel 3 without being moved further to the rear, the substantial shift of the operator to the rear over the operator's more centered position in a prior art skid steer loader is undeniable. Thus, Komatsu would be understood by one of ordinary skill in the art as being far more applicable to a mini skid steer given the rearward location in which Komatsu now locates the operator.

Equally significantly, Komatsu additionally teaches that the entire vertical lift linkage as depicted above, namely the loader arm 13, front and rear linkages 11 and 12, and cylinder 15 as duplicated on both sides of the vehicle, should be located forwardly of line B-B. By moving the operator rearwardly and the vertical lift linkage forwardly to be ahead of the operator, Komatsu arrives at a design in which the vertical lift linkage is ahead of the operator and no longer interferes with the operator. This gives the operator the ability to mount or dismount the skid steer loader through the side of the cab. Komatsu is clear about this placement in describing it as follows:

> "Further, **since the coupling points between the forward and rear links and the vehicle body and the arm are positioned to the front of a vertical line that passes through the center of the rear wheel, the operator can get on and off from the side surface of the vehicle body, behind the rear link**. It is therefore possible for the operator to get on and off the vehicle even in a loaded state."
> (Emphasis Added) (Komatsu, ¶ [0009] at p. 12, ll. 13-18).

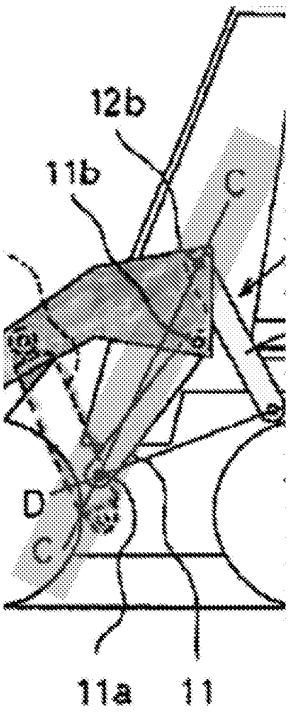
> "The lower end pivot portion 11a and the upper end pivot portion 11b of **the forward link 11, and the** lower end pivot portion 12a and the upper end pivot portion 12b of the **rear link 12 are all positioned to the front (the hatched side) of a vertical line B-B passing through the center of the rear wheel 3**."
> (Emphasis Added) (Komatsu, ¶ [0019] at p. 17, ll. 10-15).

These are not incidental disclosures to Komatsu but go to an important feature of his invention. To reiterate, this feature comprises moving the operator's seat rearwardly on the frame, including specifically as far as a position "to the rear of the rear wheel", and then locating the vertical lift linkage more forwardly on the frame to be forward of the rear wheel and the now

rearwardly located operator. In fact, this feature was so important to Komatsu that it forms the heart of independent claim 1 of Komatsu as reproduced below.

> "[Claim 1] A four-joint link mechanism of a work vehicle provided with a vehicle body (1), an arm (13) having at a distal end thereof a work member (14), a forward link (11) coupling a front portion of the vehicle body (1) and a rear portion of the arm (13), and a rear link (12) coupling a rear portion of the vehicle body (1) and a site in the vicinity of a rear portion of the arm (13), **wherein, when the four-joint link (10) is in a stowed attitude with the work member (14) held in the vicinity of the ground, a lower end pivot portion (11a) of the forward link (11) and a lower end pivot portion (12a) of the rear link (12) which are coupled to the vehicle body (1), and an upper end pivot portion (l1b) of the forward link (11) and an upper end pivot portion (12b) of the rear link (12) which are coupled to the arm (13) are positioned to the front of a vertical line which passes through the center of the rear wheel (3) and is perpendicular to the ground surface, when the vehicle body (1) is seen from the side.**"
> (Emphasis Added) (Komatsu, p. 5, ll. 2-18).

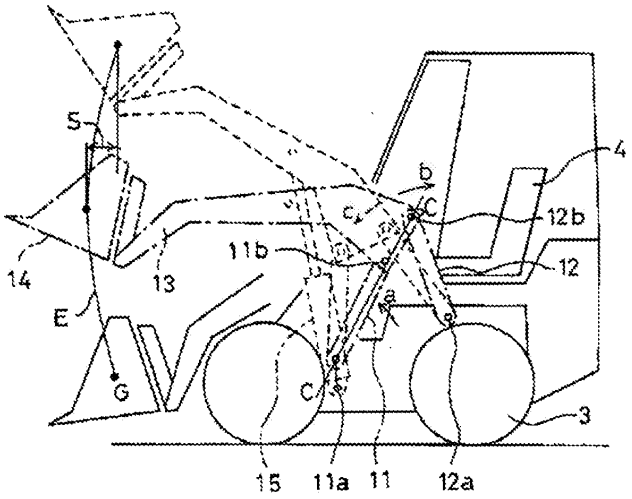
There is another marker line, namely line C-C, that Komatsu points out as part of Komatsu's express description of how the front and rear linkages 11, 12 should be arranged in order to provide a vertical lift of the bucket. Line C-C is highlighted in tan to the right hereof similarly to the highlighting used above for Line B-B.



Komatsu describes the geometry of the linkages relative to line C-C as follows:

> "Further, the upper end pivot portion 11b of the forward link 11 is positioned on the rear link 12 side of a straight line C-C joining the lower end pivot portion 11a of the forward link 11 and the upper end pivot portion 12b of the rear link 12."
> (Komatsu, ¶ [0019] at p. 17, ll. 15-19).

Put somewhat differently, it is easy to see that the front linkage 11 is cocked or tilted so that the point at which the front linkage 11 connects to the loader arm, namely at pivot 11b, is slightly behind the line C-C that joins the point at which the rear linkage 12 connects to the loader arm, namely at pivot 12b, and the frame pivot 11a of front linkage 11.



Komatsu further expressly explains that this geometry relationship is important for providing a vertical lift that enhances vehicle stability. Komatsu does so in conjunction with Fig. 5 which is labeled "Explanatory view of operation of first exemplary embodiment". Toro is reproducing Fig. 5 of Komatsu to the left hereof and has highlighted the reverse and forward arrows b and c in Fig. 5 in yellow. Arrows b and c factor significantly in Komatsu's description.

Komatsu begins its description of what happens as follows:

> "The operation will now be described. As illustrated in Figure 5, **extending the lifting cylinder 15 causes the arm 13 and the bucket 14** (illustrated with a solid line) held in the vicinity of the ground in a stowed attitude, **to rise and be elevated**, as illustrated by the alternate long and short dashed line. At this time, the forward link 11 rotates about the lower end pivot portion 11a in the direction of the arrow a, and the upper end pivot portion 11b approaches the straight line C-C joining the lower end pivot portion 11a and the upper end pivot portion 12b of the rear link 12. **The rear link 12 therefore rotates about the lower end pivot portion 12a in the direction of the arrow b, and is moved backward from the position thereof when the arm 13 and the bucket 14 are in the stowed attitude**."
> (Emphasis Added) (Komatsu, ¶ [0023] at p. 18, l. 15 - p. 19, l. 2)

In other words, as the cylinder begins the initial portion of the lift, the motion of the front linkage 12 actually rotates the rear linkage 12 rearwardly in the direction of the reverse arrow b to pull back on the loader arm 13 and the bucket 14 carried thereon. This initial retrograde motion of the loader arm 13 causes the bucket 14 to remain closer to the front of the loader, essentially to rise in a path that is closer to a vertical line, than the greater forward projection the bucket would experience from a radial lift linkage. This pull back on the bucket occurs in the first half of the lift shown above, namely from the solid line ground level position to the intermediate height position shown in the alternate long and short dashed lines. When the bucket

reaches this position, the upper pivot 11b of the front linkage 11 approaches and then crosses over the line C-C. Komatsu finishes the description of happens after that as follows:

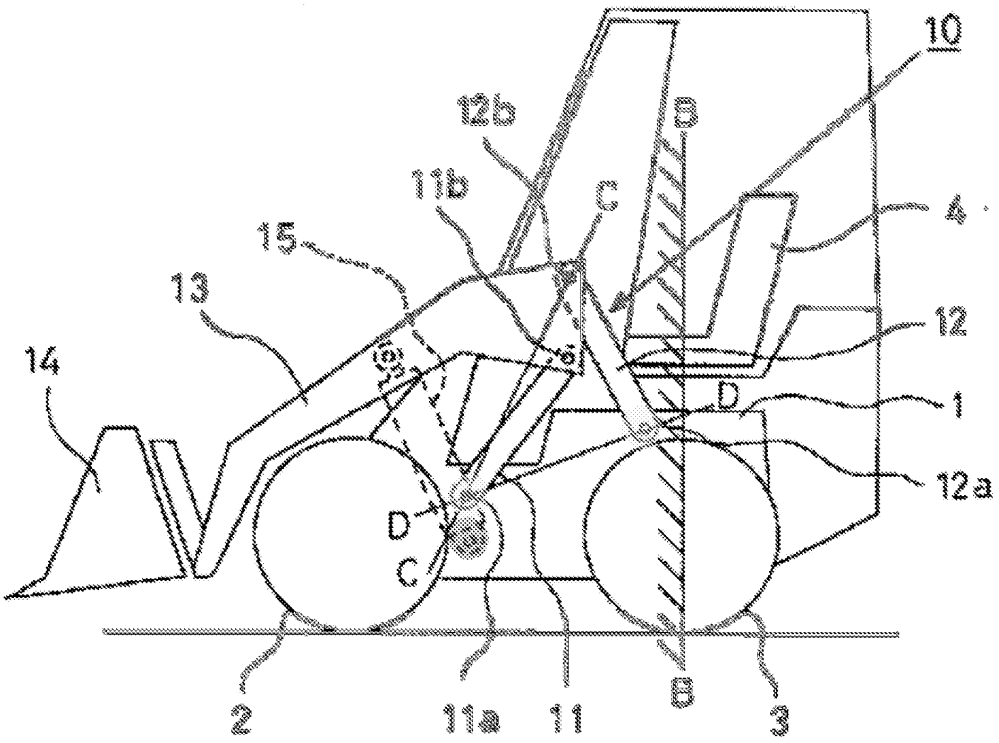
> "Next, **if the lifting cylinder 15 is extended further**, the arm 13 and the bucket 14 rise and are elevated further, as illustrated by the dashed line. At this time, **the forward link 11 rotates further in the direction of the arrow a, and the upper end pivot portion 11b crosses the straight line C-C and then moves away from the straight line C-C. At the same time, the rear link 12 rotates in the direction of the dashed line arrow c, moving the arm 13 and the bucket 14 forwards.** Thus the movement trajectory of the center of gravity G of the bucket 14 when being elevated is as indicated by the curve E, and **an amount of movement S in the front-back direction is less than the amount of movement S2 in the second example of a conventional loading machine. The stability of the vehicle in the front-back direction therefore improves**."
> (Emphasis Added) (Komatsu, ¶ [0023] at p. 19, ll. 2-16)

In other words, the motion of the front linkage 12 after its connection to the loader arm 13 passes forwardly of line C-C then rotates the rear linkage 12 forwardly in the direction of the forward arrow c to now push forwardly on the loader arm 13 and the bucket 14 carried thereon to reverse the prior rearward motion. The distance the loader arm 13 and the bucket 14 had moved rearwardly in its retrograde motion is first recovered during such forward motion and then the loader arm and bucket move even further forwardly over the top half of the lift path. This motion counteracts the rearward motion in the top half of the lift path that a radial lift linkage would provide. The result in the top half of the lift path is again to keep the bucket traveling upwardly in a path that is far more vertical than what a radial lift linkage provides. This is illustrated by Komatsu through the small amount of distance S shown in the illustration on the preceding page hereof between the intermediate height lift position and the uppermost lift position as illustrated in dashed lines.

Again, the detailed description of the geometry and operation of the front and rear linkages 11 and 12 resulting from their orientation relative to line C-C when the bucket is lowered was not unimportant to Komatsu or an incidental part of the disclosure. It was important enough for Komatsu to claim it in dependent claim 2 as follows:

> "[Claim 2] The four-joint link mechanism of a work vehicle as claimed in claim 1, wherein, when the four-joint link (10) is in a stowed attitude, the upper end pivot portion (11b) of the forward link (11) is positioned on the rear link (12) side of a straight line joining the lower end pivot portion (11a) of the forward link (11) and the upper end pivot portion (12b) of the rear link (12)."
> (Komatsu, p. 5, ll. 19-25).

After having solved the problem of providing the operator with an easy way to mount the vehicle without having to enter and exit over the front mounted bucket, part of Komatsu's solution to how to ensure adequate vehicle stability was to employ a vertical lift linkage of the type so carefully described above. However, Komatsu did not stop there. Komatsu also took care to show and describe a low placement of the vertical lift linkage on the frame of the vehicle as an additional way of increasing stability. Komatsu's disclosure on this point will be discussed in conjunction with a portion of Fig. 1 of Komatsu as again reproduced below.



The three pivots that connect the front linkage 11 (pivot 11a), the rear linkage 12 (pivot 12a), and the cylinder 15 (unnumbered pivot) to the frame 1 have been highlighted within colored yellow circles for the linkage pivots and a blue circle for the cylinder pivot. Note how low the pivots are on the frame with all the pivots being substantially below the operator's seat. Komatsu expressly discloses the locations for the yellow colored pivots 11a and 12a as follows:

> "**A lower end pivot portion 11a of a forward link 11 is** pivotally attached to a side surface of the vehicle body 1 **behind the front wheel 2**, and **a lower end pivot portion 12a of a rear link 12 is** pivotally attached to the side surface of the vehicle body 1 **above the rear wheel 3**."
>
> (Emphasis Added) (Komatsu, ¶ [0019] at p. 16, l. 23 – p. 17, l. 2).

While Komatsu does not expressly describe the pivot location for cylinder 15, it is shown in Fig. 1 above and is even lower than the linkage pivots 11a and 12a. The pivot location for cylinder 15 is disclosed as being substantially immediately beneath the pivot 11a for front linkage 11.

This very low placement of the frame pivots for the components of the vertical lift linkage allows the loader arms 13, 13 to also lie somewhat lower on frame 1. This low placement improves visibility and enables Komatsu to also increase vehicle stability. Komatsu describes this as follows:

> "**Further, the position at which the arm is attached to the vehicle body can be made lower, improving visibility** and making it possible to simplify the frame construction of the vehicle body, **and the center of gravity is lowered, yielding a work vehicle having good stability**."
>
> (Emphasis Added) (Komatsu, ¶ [0009] at p. 12, ll. 21-25)

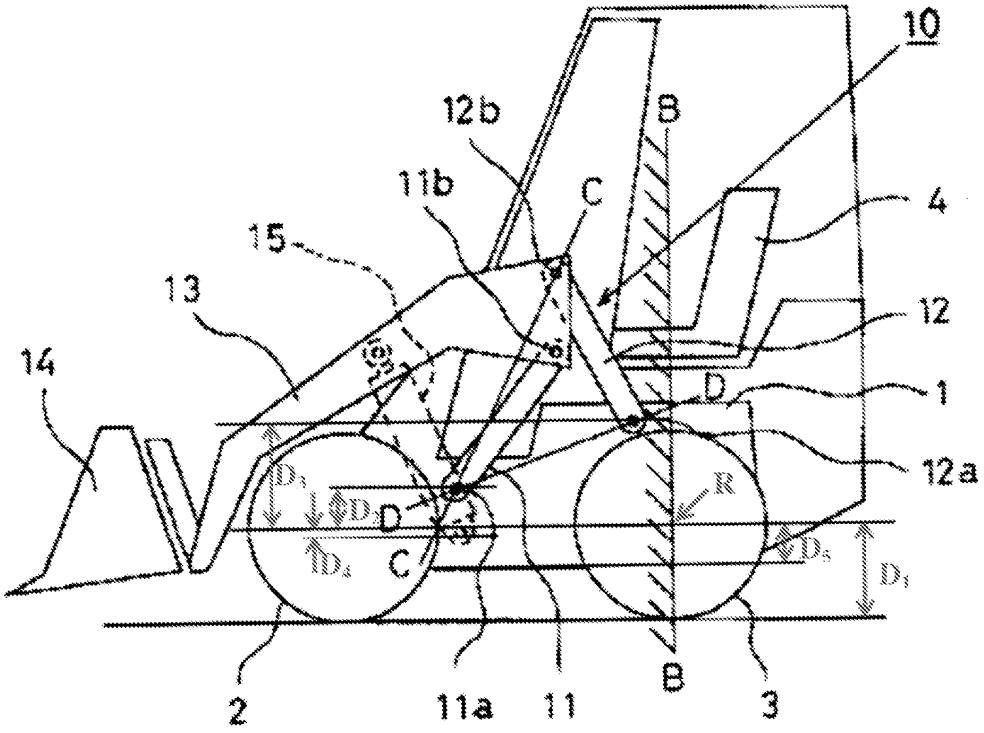
Again, as was the case earlier with the placement of the vertical lift linkage forward of the rearwardly repositioned operator and the express disclosure of the geometry and operation of the vertical lift linkage, the low placement of the pivots relative to the frame was considered by Komatsu to be important enough to recite in another claim. Claim 4 is directed to the low pivot placement as follows:

> "[Claim 4] A four-joint link mechanism of a work vehicle provided with a vehicle body (1), an arm (13) having at a distal end thereof a work member (14), a forward link (11) coupling a front portion of the vehicle body (1) and a rear portion of the arm (13), and a rear link (12) coupling a rear portion of the vehicle body (1) and a site in the vicinity of a rear portion of the arm (13), **wherein a lower end pivot portion (11a) of the forward link (11) and a lower end pivot portion (12a) of the rear link (12) are positioned lower than a driver's seat (4).**"
>
> (Emphasis Added) (Komatsu, p. 6, ll. 9-18).

5. Komatsu Teaches the Low Pivot Placements Claimed in the '386 Patent

The '386 patent at issue herein uses the rotational axis R of the traction drive mechanism as the reference point for certain distances. A first reference distance D_1 (shown in Fig. 2 of the '386 patent) and a second reference distance D_5 (shown in Fig. 5 of the '386 patent) are the distances between the axis R and the ground and the bottom of the mainframe of the skid steer loader. The three remaining distances D_2, D_3, and D_4 (shown in Fig. 5 of the '386 patent) are the distances between the axis R and the frame pivots for the front linkage, the rear linkage, and the cylinder, respectively of the vertical lift linkage of the '386 patent.

These distances have been indicated in red in Fig. 1 of Komatsu below. The rotational axis R is shown as comprising the axis at the center of rear wheels 3 as at least one pair of wheels, e.g. the rear wheels 3, must be driven by a traction drive mechanism in order for the skid steer loader to be self-propelled.



When this page of this Request containing the annotated Fig. 1 of Komatsu is printed at 100%, the various relevant dimensions can be measured and compared to one another as follows:

Dimension	**Annotated Fig. 3 Measurement**	**% of D_1**	**% of D_5**
D_1	0.625 inches		
D_5	0.250 inches		
D_2	0.250 inches	0.40**D_1**	1.00**D_5**
D_3	0.6875 inches	1.10**D_1**	2.75**D_5**
D_4	0.0625 inches	0.10**D_1**	0.25**D_5**

The specification of the '386 patent sets forth the following ranges for D_2, D_3, and D_4 relative to D_1:

> "Each of D2, D3 and D4 is less than about 1.5 times D1 (1.5xD1). In some embodiments, each of D2, D3 and D4 is less than D1 or even less than about 0.75 times D1 (0.75xD1)." ('386 patent, Col. 5, ll. 17-19)

Taking the lowest limit of $0.75D_1$, it is clear that D_2 ($0.40D_1$) and D_4 ($0.10D_1$) are both well below even the lowest end of $0.75D_1$ of the disclosed range set forth in the '386 patent.

Similarly, the specification of the '386 patent sets forth the following ranges for D_2, D_3, and D_4 relative to D_5:

> "Each of D2, D3 and D4 is less than about twice D5 (2xD5). In some embodiments, each of D2, D3 and D4 is less than about 1.75 times D5 (1.75xD5) or less than about 1.5 times D5 (1.5xD5). P2 and P3 may be relatively lower than P1 and their distances D3, D4 from the rotational axis R may be even less than about 1.25 times D5 (1.25xD5)." ('386 patent, Col. 5, ll. 17-19)

Taking the lowest limit of $1.25D_5$, it clear that D_2 ($1.00D_5$) and D_4 ($0.25D_5$) are both well below even the lowest end of $1.25D_5$ of the disclosed range set forth in the '386 patent.

The same statement is not true of D_3. While D_3 is lower than 1.5 D_1, it is not lower than last two values of D_1 in the disclosed range. Moreover, D_3 is not lower than any of the values of D_5 in the disclosed range.

Nonetheless, as Toro will show in its application of the art to the claims of the '386 patent for which reexamination is requested herein, the D_2, D_3 and D_4 dimensions as disclosed in Komatsu are sufficient to meet the dimensional limitations recited in all of these claims.

In the annotated Fig. 1 of Komatsu above that shows the distances D_1 – D_5, the frame pivot point for cylinder 15 is so close to the rotational axis R that Toro has drawn the line indicating the axis of D_4 lower than it actually is, and thus farther away from rotational axis R, simply to be able to show the distance D_4. Thus, the D_4 percentage values of D_1 and D_5 in the table above are higher than they would have been, and thus to Toro's detriment, had Toro been able to locate the D_4 reference line in a centered position on the axis of the frame pivot point for cylinder 15. In actuality, this has no effect on the application of Komatsu to the claims of the '386 patent as the D_4 percentage values of D_1 and D_5 in the table above are so low that such values easily meet all of the "less than" limitations in the '386 patent which recite the D_4 percentage values.

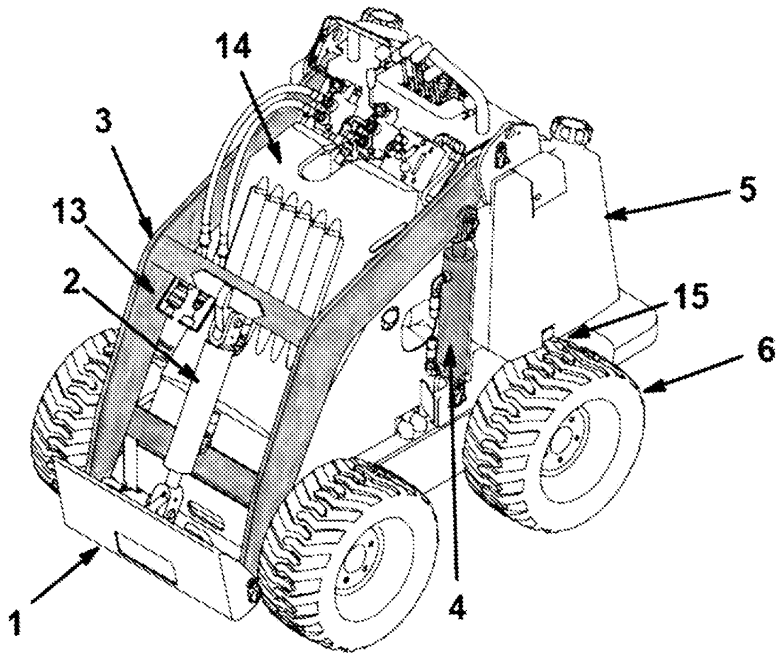
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C. **Review of the Dingo 322 Printed Publications**

Toro began selling a mini skid steer loader known as the Dingo 322 in the late 1990's. Toro continues to sell essentially the same mini skid steer loader today which is now referred to as the Dingo 323.

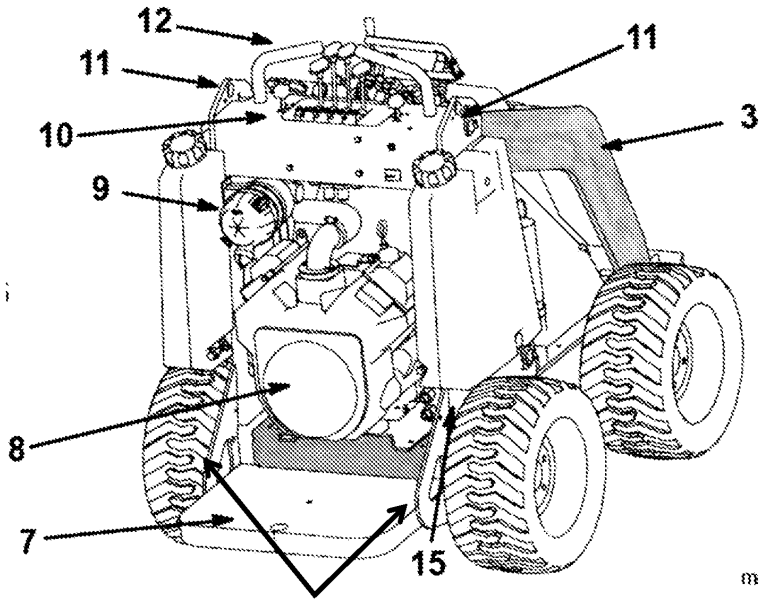
Toro is submitting herewith a Dingo® 322 Operator's Manual dated 2001, which is being referred to herein as "Dingo". The mini skid steer loader disclosed in Dingo is illustrated in a front perspective view and in a side-by-side rear perspective view on page 14 of Dingo. These two views are collectively labeled as Fig. 9 in Dingo. The front perspective view in Dingo has been separated from the rear perspective view so that they can be enlarged and viewed individually. Toro will begin with the front perspective view of Fig. 9 of Dingo as reproduced below.



The front perspective view of Dingo has been color coded similarly to that used previously herein, namely green for the loader arm 3, yellow for the loader arm linkages, and blue for the cylinder 4. However there are no yellow linkages shown since Dingo is a mini skid

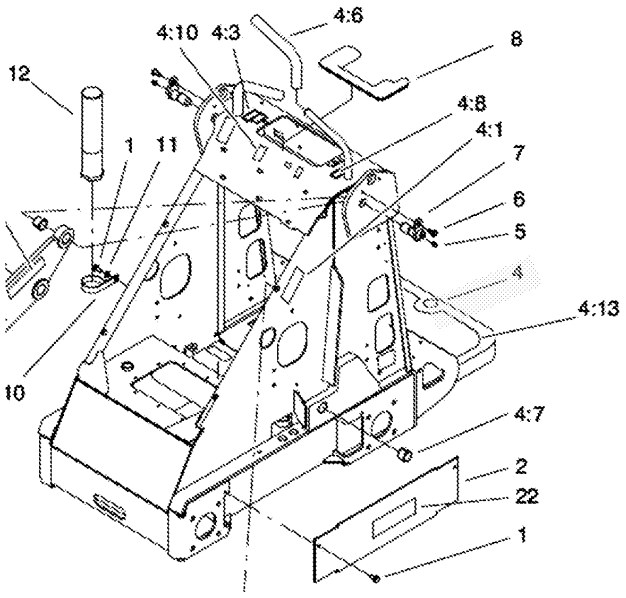
steer having a radial lift linkage. In Dingo's radial lift linkage, the loader arm 3 is pivotally attached to the frame at a fixed pivot. The use of a fixed pivot obviates the need for any movable front and rear linkages to support the loader arm 3 as would be necessary in a vertical lift linkage. As shown above, Dingo's radial lift linkage is duplicated on both sides of the mini skid steer as there clearly are both left and right loader arms 3.

The rear perspective view in Fig. 9 of Dingo, as shown below, discloses that engine 8 is mounted atop an engine bracket which has been colored orange for easy identification. The orange engine bracket is **a welded integral part of the mainframe** and extends from one side of the mainframe toward the other side of the mainframe. The operator platform 7 is also part of the mainframe as it also is **a welded integral part of the mainframe**. The rear end of the mainframe in Dingo is the rear end of operator platform 7. It should further be noted that the triangular gussets on either side of the front end of operator platform 7 as labeled below are also part of the mainframe.

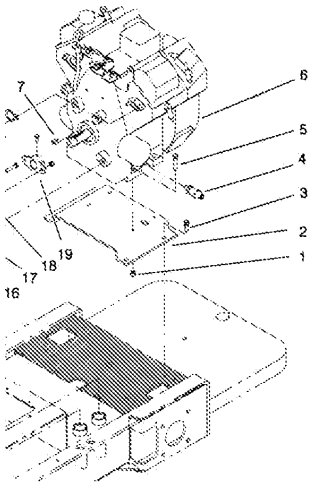


Triangular Gussets

Toro is further submitting herewith a Dingo® 322 Parts Catalog dated 1999, which is being referred to herein as "Dingo Parts Catalog". Dingo Parts Catalog confirms what Dingo shows, namely the nature of the mainframe in Dingo and the placement of the engine bracket forward of the rear end of the mainframe. A portion of an illustration on page 1 of Dingo Parts Catalog is reproduced to the right hereof. This illustration shows the mainframe of Dingo.



As can be clearly seen in the illustration above, reference numeral 4 (highlighted in yellow above) has a lead line that extends to the rear end of the operator platform. The corresponding parts list on page 1 of Dingo Parts Catalog assigns a **single** part number to item 4 (Part No. 99-3145) and further describes the entire item 4, including the operator platform at the back, as the "Frame & Decal ASY". If one were to order Part No. 99-3145, what would be shipped is the entire frame assembly shown above including the operator platform as an integral part thereof. This confirms that the operator platform is part of the mainframe and that the rear end of the operator platform, to which the reference numeral 4 is attached above, is the rear end of the mainframe.



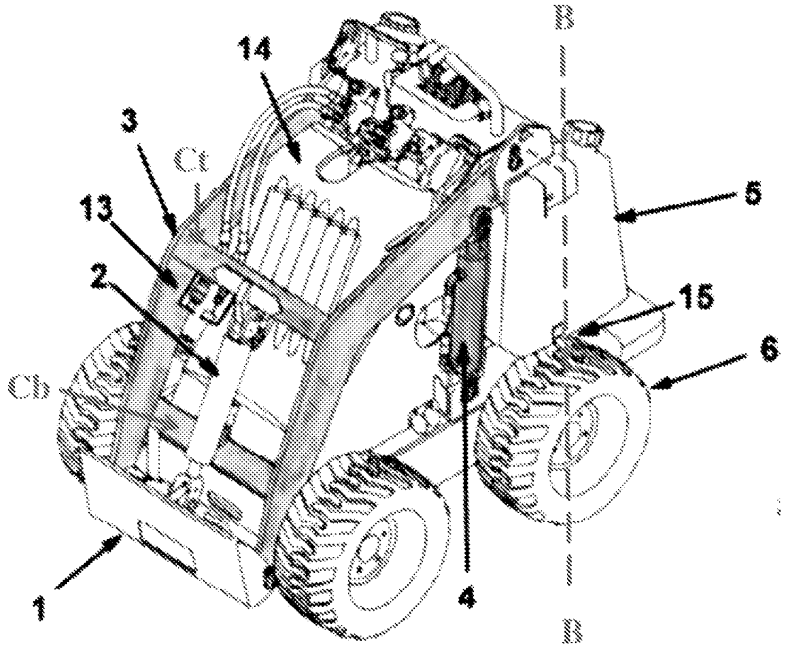
Page 4 of Dingo Parts Catalog illustrates the portion of the mainframe that mounts the engine. The relevant portion of that illustration is reproduced to the left hereof. Toro has colored the engine bracket portion of the mainframe orange to be consistent with the coloring used in Dingo on the preceding page. As can be easily seen, the engine and its mounting plate are exploded above the orange engine bracket and will clearly be lowered and bolted thereto. The orange engine bracket disclosed in Dingo Parts Catalog is the same engine bracket

shown in Dingo on the preceding page.

As one can easily see from the above, the orange engine bracket is spaced well forward of the rear end of the operator platform 7 or alternatively the rear ends of the triangular gussets. Thus, Dingo clearly discloses the following engine bracket limitation that appears in all the original claims in the '386 patent, namely:

> "…the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe."
> ('386 patent, Col. 6, ll. 42-45).

Returning to Dingo's front perspective view as used earlier, Toro has added a dashed line B-B thereto extending vertically through the center of rear wheel 6. When line B-B is projected inwardly according to the angle of the perspective, one sees that Dingo's radial lift linkage is positioned forwardly of line B-B. Thus, Dingo is structurally and conceptually a close counterpart to Komatsu and is an ideal candidate for using Komatsu's vertical lift linkage, also forward of counterpart line B-B in Komatsu, in replacement of Dingo's radial lift linkage.



Loader arms 3 have a pair of cross members extending between them, namely a top cross member labeled by Toro as Ct in the preceding illustration and a bottom cross member labeled by Toro as Cb in the preceding illustration. Neither cross member is at the rear end of the loader arms 3. The rear ends of the loader arms 3 must be open and unconnected to each other to permit the loader arms 3 to nest around the frame of the skid steer loader. This is yet another connection between Dingo and Komatsu, the lack of a rear cross member between the loader arms with only forwardly located cross members allowed. Dingo simply employs this structure in a radial lift linkage while Komatsu does the same in a vertical lift linkage.

An attachment mounting plate 1 is pivotally connected to the front ends of loader arms 3. A tilt cylinder 2 is pivotally coupled at its upper end to the top cross member Ct and the mounting plate. Tilt cylinder 2 can be actuated during operation of the loader to change the angle of the attachment carried on the mounting plate relative to the loader arms, such as when dumping a load carried in a bucket.

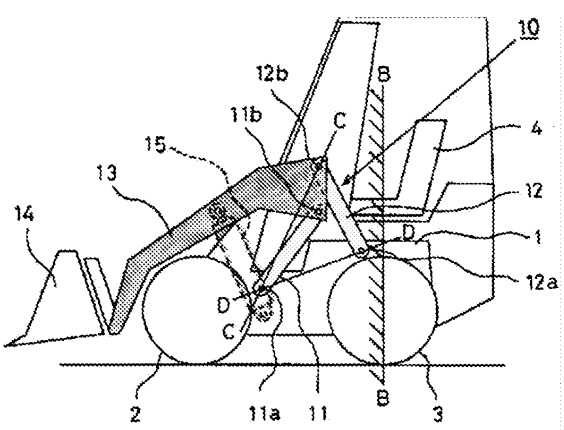
Specifications

Overall width	40.5 in. (103 cm)
Overall length	60.0 in. (152 cm)
Overall height	49.0 in. (125 cm)
Weight	1567 lb. (711 kg)
Rated operating capacity (with 200 lb. operator and std. bucket)	515 lb. (234 kg)
Tipping capacity (with 200 lb. operator and st. bucket)	1030 lb. (467 kg)
Wheelbase	28 in. (71 cm)
Dump height (with std. bucket)	47 in. (120 cm)
Reach—fully raised (with std. bucket)	26.0 in. (66 cm)
Height to hinge pin (std bucket in highest position)	66.0 in. (168 cm)

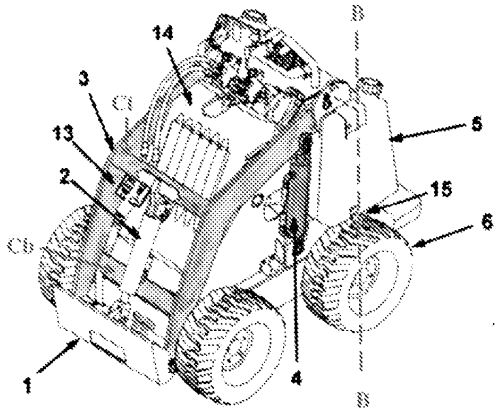
Moreover, while it should be apparent, Dingo discloses a mini skid steer loader that weighs less than 1500 kg. The specifications of the mini skid steer of Dingo found on page 10 of Dingo are reproduced to the left hereof. Note that the weight is listed as 711 kg. without the weight of the operator or the weight of any attachment carried on the loader arms. The specifications further frequently refer to a standard bucket **("std. bucket"** in the list). This confirms that a bucket is a common attachment used with the Dingo loader.

D. The Dingo and Dingo Parts Catalog in view of Komatsu Combination

There is undeniable correspondence between the skid steer loader of Komatsu and the mini skid steer loader of Dingo. This correspondence is best shown in the side by side comparison of Komatsu (on the left below) and Dingo (on the right below).



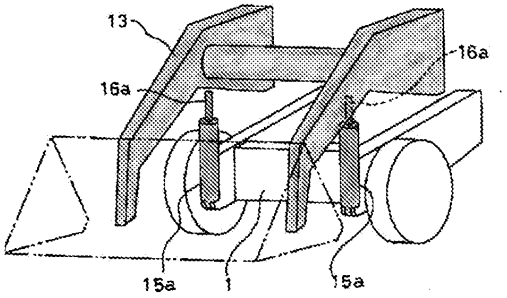
Komatsu



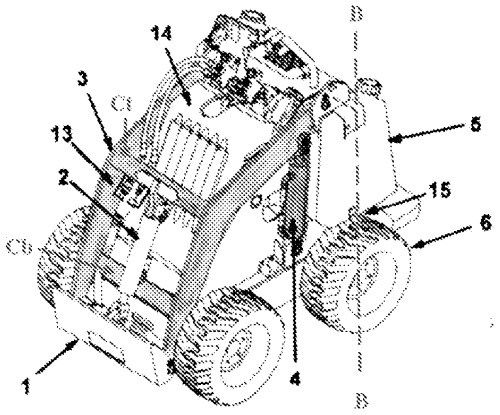
Dingo

Both Komatsu and Dingo locate their loader arm linkages, whether the vertical lift linkage in Komatsu or the radial lift linkage in Dingo, forward of a vertical line B-B extending upwardly through the center of the rear wheel. Komatsu additionally shifts the operator seat 4 further rearwardly than its usual more centered position in a skid steer loader. Note that the junction between the backrest and the seat portion of the operator's seat is located rearwardly of the line B-B. The Examiner is reminded that Komatsu expressly teaches that the seat 4 could be even further rearwardly, namely to the "rear of the rear wheel". (Komatsu, ¶ [0019] at p. 16, ll. 19-21). Thus, the seated operator in Komatsu is positioned relative to Komatsu's vertical lift linkage at substantially the **same** position as the standing operator in Dingo is positioned relative to Dingo's radial lift linkage.

The correspondence between Komatsu and Dingo does not end there. Both Komatsu and Dingo additionally disclose a laterally spaced pair of loader arms that have no rear cross member that is behind the operator as in the Mustang reference in the first reexamination. As shown below in the further comparison between Komatsu (on the left) and Dingo (on the right), the cross members that are used between the loader arms are positioned forward of the rear ends of the loader arms and are located so as not to interfere with the cab and frame in Komatsu and the frame in Dingo. This leaves the space between the rear ends of the loader arms free of any obstructions to allow the rear ends of the loader arms to nest around the cab and frame in Komatsu and the frame in Dingo.



Komatsu



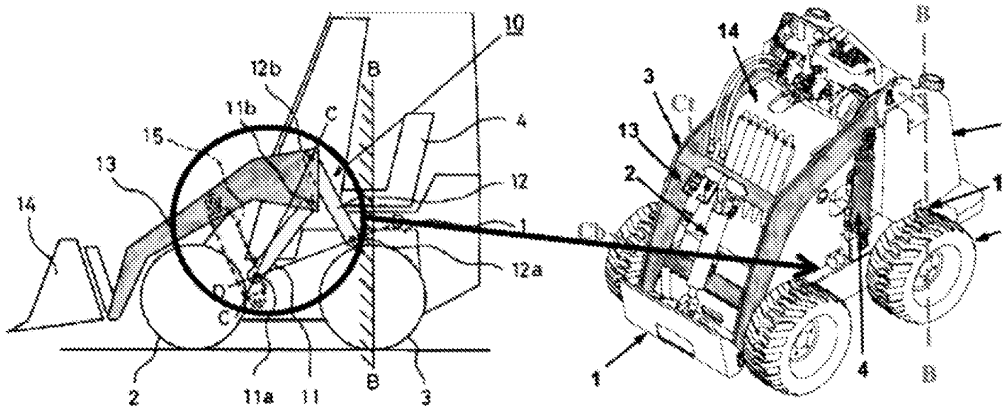
Dingo

Finally, the advantages of a vertical lift linkage over a radial lift linkage in lifting and then dumping heavy loads are so well known that the PTO would be entitled to take Official Notice thereof. To reiterate, these advantages comprise 1.) keeping the load carrying bucket closer to the frame to improve vehicle stability and thereby increase lift capacity, and 2.) providing greater forward reach at maximum lift height for improved dumping ability into truck boxes and the like.

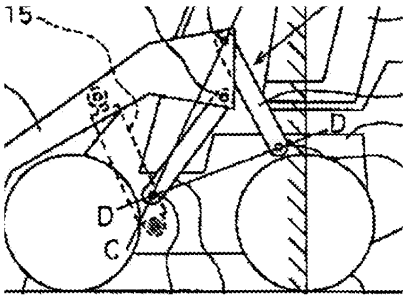
Moreover, both of these advantages are expressly disclosed in Komatsu. The Examiner is reminded of Komatsu's comparison of the large distance S2 that a bucket moves forward in a radial lift linkage to the small distance S1 that occurs in a vertical lift linkage as being the reason for an increase in vehicle stability. The Examiner is further reminded of the depiction of the

additional forward reach at maximum lift height as shown in Fig. 12 of Komatsu for a vertical lift linkage as compared to the lesser reach at maximum lift height produced by a radial lift linkage as shown in Fig. 13 of Komatsu. These advantages unquestionably establish the motivation one of ordinary skill in the art would have had at the time of the purported invention of the '386 patent for replacing Dingo's radial lift linkage with Komatsu's vertical lift linkage.

In view of this motivation and as depicted in the comparison below, it would have been obvious to one of ordinary skill in the art at the time of the invention to have freed the loader arm 3 of Dingo from its fixed pivot connection to the mainframe, to use front and rear connecting linkages 11 and 12 as taught by Komatsu to support the now freed Dingo loader arm 3 on the mainframe, and to adjust the position of Dingo's existing cylinder 4 relative to the newly added linkages 11 and 12. When Komatsu's vertical lift linkage is so adapted to Dingo, it will be located on Dingo precisely where Komatsu directs that it be located, namely forward of a vertical line B-B extending upwardly through the center of the rear wheel. This is the same placement that Dingo uses for its own radial lift linkage. The obviousness of the substitution cannot be denied.

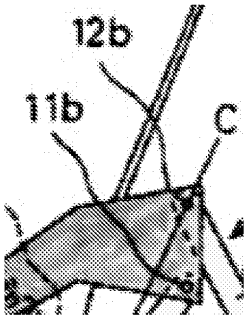


Komatsu **Dingo**



In addition, both Komatsu and Dingo are loaders having four wheels, namely a pair of front wheels and a pair of spaced rear wheels. There is space between the front and rear wheels in Dingo as shown above to accept the low mainframe pivot distances as shown in Komatsu in yellow and blue to the left hereof. Thus, Dingo is ideally suited to employing the type Komatsu's vertical lift linkage.

That is not to say that no changes whatsoever will be required in Dingo. For example, the rear end of each of Dingo's loader arm 3 will need to be reshaped to allow the upper pivot points 11a and 11b of Komatsu's front and rear linkages 11 and 12 to connect thereto in the vertically displaced manner taught by Komatsu. See Komatsu's teaching in this regard as depicted to the right hereof. Moreover, other changes in various components including the frame may need to be made to permit added components to properly fit. All changes required to adapt Komatsu's linkage to Dingo would be well within the level of skill of one of ordinary skill in the art.



The Examiner must also keep in mind when considering the obviousness of the above noted combination that physical combinability, i.e. being able to use something from the prior art in another prior art reference with no changes being required, is NOT a requirement of obviousness. The Patent Owner may attempt to argue against Dingo/Komatsu combination by reducing the analysis to just such an argument, that there is not enough space in Dingo to use the Komatsu linkage, or that the Komatsu linkage might be too heavy even though it will obviously be downsized to lift the far lighter loads which mini skid steers are intended to lift, or that the pivots might have to be heavier, or that the gas tank might have to be moved, or that the stroke of the piston in the cylinder may need to be different, etc. However, this focus on granular detail is inappropriate in an obviousness analysis. It is the concepts in the prior art which form the basis for the obviousness analysis and not the size of the parts or whether things have to be relocated to make them fit.

The PTO specifically recognizes this fact in MPEP §2145 (III) which states as follows:

> "The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). See also *In re Sneed*, 710 F.2d 1544, 1550, 218 USPQ 385, 389 (Fed. Cir. 1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); and *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973) ("Combining the teachings of references does not involve an ability to combine their specific structures.").
>
> However, the claimed combination cannot change the principle of operation of the primary reference or render the reference inoperable for its intended purpose." (Emphasis in the Original)

In addition, in the recent decision of *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373 (Fed. Cir. 2016) involving demolition equipment, the invention related to a quick change structure for mounting and dismounting tools which the PTAB had concluded could obviously be modified to additionally provide that both jaws of the tool, rather than one jaw, could be pivotal as taught in a secondary reference. The plaintiff had argued that making such a change " 'involves massive, nonobvious reconstruction of the device that not only changes its principle of operation, but renders the device inoperable as a result.' " (F.3d at 1380).

However, in affirming the PTAB's finding of obviousness, the Court reemphasized the long standing doctrine that physical combinability is simply not the standard for obviousness, writing as follows:

> "Contrary to Allied's position, "it is not necessary that [Caterpillar and Ogawa] be **physically combinable** to render **obvious** the ['489 patent]." *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983); *see also In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc) ("Etter's assertions that Azure cannot be incorporated in Ambrosio are basically irrelevant, the criterion being not whether the references could be **physically combined** but whether the claimed inventions are rendered **obvious** by the teachings of the prior art as a whole."). "The test for **obviousness** is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference," *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). *See also In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (citing *In re Keller*, 642 F.2d at 425), but rather whether "a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention," *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)." (Emphasis in the Original) (F.3d at 1381)

E. Ground 1 – Detailed Prior Art Application to Claims 1, 15, 17, 20-36, and 45-54

Claims 1, 15, 17, 20-36, and 45-54 of the '386 patent at issue herein are unpatentable under 35 U.S.C. 103(a) as such claims would have been obvious to one of ordinary skill in the art at the time of the invention over Dingo in view of Dingo Parts Catalog and further in view of Komatsu.

The analysis for why this combination of references would have been obvious to one of ordinary skill in the art has been set forth above. Accordingly, in the following application of the prior art to the claims, the references will be applied to the claim limitations assuming the combination of references set forth in the Section IV(D) hereof has been made. In other words, the application of the prior art will assume that the teachings of Komatsu have been imported into Dingo by freeing the loader arms 3, using Komatsu's front and rear linkages 113 in place of Dingo's fixed pivots to movably support loaders arms, and adjusting the position of Dingo's existing cylinders 4 as need be.

Limitations in the combination that appear in Dingo or Dingo Parts Catalog will be highlighted in yellow. Limitations in the combination that appear in Komatsu will be highlighted in tan.

1. As to Claims 1, 15, 17 and 20 [6]

The application of the prior art below to claim 1 is identical to the application to claim 1 as contained in Reexam Control No. 90/014,109. The application of the prior art below to amended claim 15[7] below is identical to the application to claim 18 as contained in Reexam

[6] In the reproduction of the amended claims 15, 17 and 20 herein for the purpose of the application of the prior art thereto, the matter enclosed in brackets in the Reexamination Certificate indicating matter being removed from an original claim is also removed below from the amended claim and the matter shown in italics in the Reexamination Certificate indicating matter being added to an original claim is added below to the amended claim but without using italics.

[7] Claim 15 as it appears in amended form in the Reexamination Certificate incorporates original dependent claims 16 and 18 of the '386 patent into the original independent claim 15 of the '386 patent. Accordingly, the application of prior art to original claim 18 in Control No. 90/014,109 applies equally to amended claim 15 herein.

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Control No. 90/014,109. The application of the prior art below to amended claims 17 and 20 below is identical to the application to claims 17 and 20 as contained in

These applications are being repeated herein simply for the sake of completeness as new claims 21 and 22 depend from claim 1 and new claims 23-30 depend from amended claim 15. Thus, the repetition of the prior art herein is intended to be a convenience for the Examiner so that the Examiner does not need to refer back to Reexam Control No. 90/014,109 in order to see the following prior art applications to the parent claim 1 to new claims 21-22 and to the amended parent claim 15 to new claims 23-30. In addition, the applications of prior art to the amended claims 17 and 20 are being repeated herein simply for the sake of completeness as amended claims 17 and 20 depend from amended claim 15 in view of the cancellation of the intervening dependent claims in the first reexamination.

1. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader having an arm (Dingo, Fig. 9, arm 3), the loader being adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket");

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo, Fig. 9 and/or Dingo Parts Catalog, p. 4, the engine bracket ahead of the rear end of the operator platform and/or of the rear ends of the triangular gussets), the loader arm not being directly attached to the mainframe (Komatsu, the teaching of a loader arm 13 having no fixed pivot);

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Komatsu, front linkage 11);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4); and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader (Dingo, Fig. 9, control panel 10), the control station being

mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

15. (Amended) A compact tool carrier comprising:

a loader (Dingo, Fig. 9, arm 3) adapted to carry a tool ('Dingo, p. 10, the referenced "std. bucket");

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo, Fig. 9 and/or Dingo Parts Catalog, p. 4, the engine bracket ahead of the rear end of the operator platform and/or of the rear ends of the triangular gussets), each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader (Komatsu, the pivot 11a of front linkage 11 and the frame pivot (unnumbered) of Dingo's cylinder 4 as positioned low on the mainframe as taught by Komatsu), the loader not being directly attached to the mainframe (Komatsu, the teaching of a loader arm 13 having no fixed pivot);

a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader (Komatsu, front linkage 11);

an actuator pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader (Dingo, Fig. 9, cylinder 4);

a drive mechanism comprising tracks or wheels for propelling the compact tool carrier over a supporting surface (Dingo, Fig. 9, wheels 6), the drive mechanism being attached to the mainframe about a rotational axis (Dingo, Fig. 9, axis of any wheel 6), the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1 (Komatsu, Fig. 1, D1=0.625 inches), the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5 (Komatsu, Fig. 1, D5=0.250 inches), the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2 (Komatsu, Fig. 1, D2=0.250 inches for the front linkage pivot point), the rotational axis and the pivot point at which the actuator is attached to the mainframe being

separated by a vertical distance D4 (Komatsu, Fig. 1, D4=0.0625 inches for the actuator pivot point), D2 and D4 each being less than 1.5 times D1 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than 1.5 x D1 of 0.625 inches which equals 0.9375 inches) and each being less than twice D5 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than 0.500 inches which is the result of twice the D5 value of 0.250 inches); and

a control station having operator controls for propelling the compact tool carrier forward and for raising and/or lowering the loader (Dingo, Fig. 9, control panel 10), the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

17. (Amended) The compact tool carrier as set forth in claim 15 wherein the second side of the mainframe comprises two pivot points, each vertical distance between the rotational axis and a pivot point being less than 1.5 times D1. (See claim 15, will be true for the duplicated vertical lift linkage on the other side of Dingo.)

20.[8] (Amended) The compact tool carrier as set forth in claim 15 further comprising a tool attached to the loader, the tool being selected from the group consisting of a bucket, auger, fork, stump grinder, tiller and roller ('Dingo, p. 10, the referenced "std. bucket").

[8] Note that claim 20 is amended only because it depends from the amended claim 15.

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2. Preliminary Comments Regarding New Claim 21

There are three components of the vertical lift linkage disclosed in the '386 patent, the two front and rear linkages colored yellow below and the hydraulic cylinder colored blue below. Each component has two pivots. The first pivot attaches the component to the loader arm colored green below. The second pivot attaches the component to the mainframe. Thus, there are six pivots in all. The three mainframe frame pivots have been enclosed in colored triangles corresponding to the color used for the component, two yellow triangles for the linkage to mainframe pivots and one blue triangle for the cylinder to mainframe pivot. The three loader arm pivots have been enclosed in similarly color coded boxes.

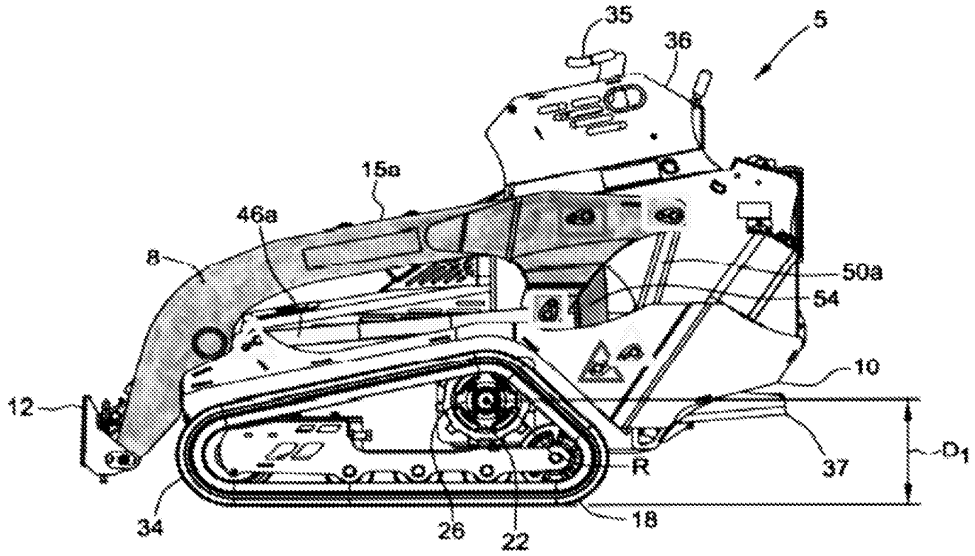


FIG. 2

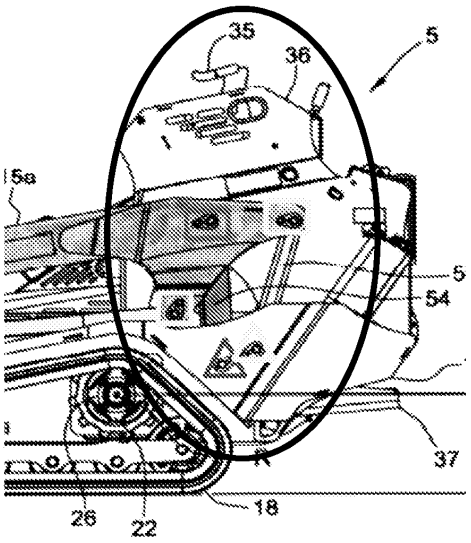
New claim 21 purports to recite the vertical and fore-and-aft locations of these six pivots relative to certain landmarks on the mainframe. New claim 21 is reproduced below.

21. The compact tool carrier as set forth in claim 1 wherein the linkage is a first linkage, the first linkage being pivotally attached to the first side of the mainframe at a first pivot point and pivotally attached to the loader arm at a second pivot point, the actuator being attached to the mainframe at a third pivot point and pivotally attached to the loader arm at a fourth pivot point,

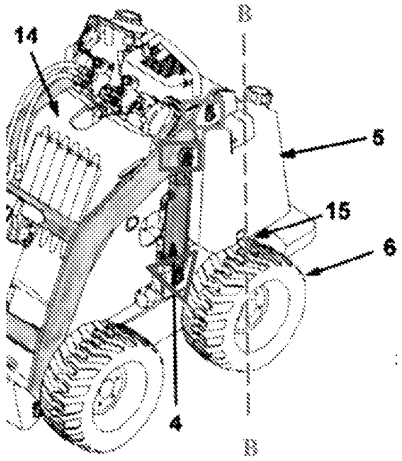
the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a fifth pivot point and pivotally attached to the loader arm at a sixth pivot point, wherein as the loader travels from a down position to a vertically raised position, **the first, second, third, fourth, fifth, and sixth pivot points are (1) disposed between the operator controls and a bottom of the mainframe and/or (2) disposed forward of the control station**. (Emphasis Added)

Claim 21 includes the use of and/or between the first and second conditions the six pivot points must meet. The PTAB recently clarified how and/or limitations are to be construed. In *Ex Parte Gross*, Appeal No. 2011-004811, 2013 WL 6907805, at *2, (Patent Tr. & App. Bd., 2013), the PTAB stated that "and/or covers embodiments having element A alone, element B alone, or elements A and B together." Applying this guidance to the and/or limitation in claim 21 above, claim 21 would be read as covering the following placement of the six pivots: disposed between the operator controls and a bottom of the mainframe, or disposed forward of the control station, or disposed between the operator controls and a bottom of the mainframe as well as being disposed forward of the control station.

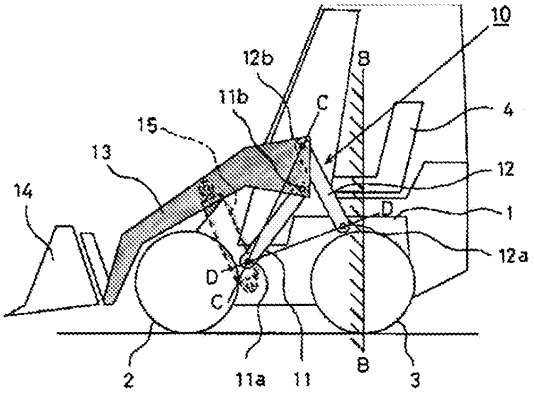
However, the '386 patent has no support for the second or third condition above, namely that the six pivots be "disposed forward of the control station". As is clear from the portion of Fig. 2 as reproduced to the right hereof, FIVE of the six pivots as enclosed in the circle are NOT forward of the control station 36 which includes the operator controls 35 that are shown within the control station 36.



If the claimed condition of the location of the pivots being "disposed forward of the control station" are deemed to be supported by the '386 patent's depiction of having five of the pivots along the side of the control station, then the Dingo in view of Komatsu combination of references will similarly meet this recitation. For example, Dingo discloses that the mainframe pivot and the loader arm pivot of its hydraulic cylinder 4, enclosed in a blue triangle and a blue box respectively in the Dingo illustration reproduced to the left hereof, are positioned forward of the control station. The fixed pivot between the loader arm and the mainframe in Dingo, enclosed in a green box to the right hereof, is positioned along the side of the control station in the same manner as the five pivots in the '386 patent depicted above.



Nothing would change when the vertical lift linkage of Komatsu is adapted to Dingo as all of Komatsu's pivots are specifically placed forwardly of the line B-B in Komatsu as shown again to the right hereof. Line B-B passes through the front of the operator's seat and Komatsu discloses that the operator's seat could be positioned even further rearwardly "to the rear of the rear wheel". Komatsu's forward shift of the vertical lift linkage relative to the rearwardly located operator would be maintained in Dingo when Komatsu's vertical lift linkage is adapted to Dingo in front of the same line B-B in Dingo passing through the center of Dingo's rear wheel. Accordingly, if having five pivots along the side of the control station as in the '386 patent is sufficient to support claim language that recites the pivots are "disposed forward of the control station", the same will be true of Dingo as modified by Komatsu.



3. As to Claims 21-36 and 45-54 [9]

In the following application of the prior art to the claims, limitations in the combination that appear in Dingo or Dingo Parts Catalog will be highlighted in yellow. Limitations in the combination that appear in Komatsu will be highlighted in tan.

21. The compact tool carrier as set forth in claim 1 wherein the linkage is a first linkage, the first linkage being pivotally attached to the first side of the mainframe at a first pivot point and pivotally attached to the loader arm at a second pivot point, the actuator being attached to the mainframe at a third pivot point and pivotally attached to the loader arm at a fourth pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a fifth pivot point and pivotally attached to the loader arm at a sixth pivot point, wherein as the loader travels from a down position to a vertically raised position, the first, second, third, fourth, fifth, and sixth pivot points are (1) disposed between the operator controls and a bottom of the mainframe and/or (2) disposed forward of the control station (Dingo, Fig. 9, front perspective view, shows Dingo's mainframe loader arm and actuator pivots to be forward of the control station if such forward positioning is found to be supported in the '386 patent and such forward positioning will be retained when Komatsu's vertical lift linkage is adapted to Dingo).

22. The compact tool carrier as set forth in claim 21 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform being located toward a rear of the compact tool carrier such that the first pivot point, third pivot point, and fifth pivot point are disposed forward of the operator platform (Dingo, Fig. 9, rear perspective view, shows Dingo's mainframe loader arm and actuator pivots to be forward of the operator platform and such forward positioning will be retained when Komatsu's vertical lift linkage is adapted to Dingo).

[9] In the reproduction of the new claims 21-36 and 45-54 herein for the purpose of the application of the prior art thereto, the italics used in the Reexamination Certificate to indicate that these are new claims being added to the '386 patent is not used herein with the text of the new claims simply being reproduced in a non-italicized font.

The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than 1.75 D5 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than 0.4375 inches which is the result of 1.75 times the D5 value of 0.250 inches).

24. The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than 1.5 D5 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than 0.375 inches which is the result of 1.5 times the D5 value of 0.250 inches).

25. The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than D1 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than the D1 value of 0.6250 inches).

26. The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than 0.75 D1 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than 0.46875 inches which is the result of 0.75 times the D1 value of 0.625 inches).

27. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, the rotational axis and the pivot point at which the second linkage is attached to the mainframe being separated by a vertical distance D3 (Komatsu, Fig. 1, D3=0.6875 inches), D3 being less than 1.5 times D1 (Komatsu, Fig. 1, D3 of 0.6875 inches is less than 0.9375 inches which is the result of 1.5 times the D1 value of 0.625 inches).

28. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, Fig. 1, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe, (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is

attached to the mainframe being the forward-most pivot point[10], a vertical distance between the rotational axis and the forward-most pivot point being less than D1 (Komatsu, Fig. 1, the D2 value of 0.250 inches of the forward-most pivot 11a is less than D1 of 0.625 inches).

29. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, Fig. 1, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe. (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point, a vertical distance between the rotational axis and the forward-most pivot point being less than 0.75 D1 (Komatsu, Fig. 1, the D2 value of 0.250 inches of the forward-most pivot 11a is less than 0.46875 inches which is the result of 0.75 times the D1 value of 0.625 inches).

30. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, Fig. 1, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe. (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point, a vertical distance between the rotational axis and the forward-most pivot point being less than 1.5 D5 (Komatsu, Fig. 1, the D2 value of 0.250 inches of the forward-most pivot 11a is less than 0.375 inches which is the result of 1.5 times the D5 value of 0.250 inches).

[10] It is very close as to whether the pivot 11a of Komatsu's front linkage 11 or the lower pivot of Komatsu's cylinder 15 is the forwardmost pivot. Since the distance D2 of Komatsu's pivot 11a relative to rotational axis R is greater than the distance D4 of the pivot of the cylinder relative to rotational axis 2, Toro will assume that pivot 11a of Komatsu's front linkage 11 is the forwardmost pivot. This is the least favorable interpretation of Komatsu for Toro and the most favorable interpretation for the Patent Owner. This assumption also applies to claims 29 and 30.

31. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader (Dingo, Fig. 9, arms 3) adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket"), the loader being moveable between a down position and a vertically raised position, the loader comprising:

a first loader arm (Dingo, Fig. 9, left arm 3);

a second loader arm (Dingo, Fig. 9, right arm 3); and

at least one cross-member (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached) that extends from the first loader arm to the second loader arm;

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform), the loader arm not being directly attached to the mainframe (Komatsu, the teaching of a loader arm 13 having no fixed pivot);

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Komatsu, front linkage 11);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4);

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader (Dingo, Fig. 9, control panel 10), the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing operation, each cross-member being disposed forward of the control station in the vertically raised position of the loader (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached inherently remains forward of control panel 10 due to the length of loader arms 3, 3 and the 66 inch maximum hinge pin height in relation to the 60 inch length of the loader as set forth in the specifications on pg. 10 of Dingo and this will be even truer when Komatsu's vertical lift

linkage is adapted to Dingo with the loader arms 3, 3 moving forwardly in the upper half of the lift pattern to provide a vertical lift path for the tool); and

an operator platform for standing operation of the operator controls of the control station (Dingo, Fig. 9, operator platform 7).

32. The compact tool carrier as set forth in claim 31 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, rear linkage 12) pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm.

33. The compact tool carrier as set forth in claim 31 wherein the mainframe incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

34. The compact tool carrier as set forth in claim 31 wherein each cross-member is disposed forward of the operator platform and forward of the control station in the down position of the loader (Dingo, Fig. 9, shown in front perspective view).

35. The compact tool carrier as set forth in claim 31 further comprising an attachment plate (Dingo, Fig. 9, mounting plate 1) for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

36. The compact tool carrier as set forth in claim 35 further comprising an actuator (Dingo, Fig. 9, tilt cylinder 2) for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

45. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader (Dingo, Fig. 9, arms 3) adapted to carry a tool (Dingo, p. 10, the referenced “std. bucket”);

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform), the loader arm not being directly attached to the mainframe (Komatsu, the teaching of a loader arm 13 having no fixed pivot);

a first linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm at a first linkage pivot point (Komatsu, front linkage 11);

a second linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm at a second linkage pivot point (Komatsu, rear linkage 12), the loader being free of cross-members between the first linkage pivot point and the second linkage pivot point (Dingo, Fig. 9, the front and rear linkage pivot points will attach to the rear of Dingo's loader arm 3 behind Dingo's cross members as taught by the positioning of pivots 11b and 12b in Komatsu);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm at an actuator pivot point (Dingo, Fig. 9, cylinder 4);

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation (Dingo, Fig. 9, control panel 10); and

an operator platform (Dingo, Fig. 9, operator platform 7) for standing operation of the operator controls of the control station.

46. The compact tool carrier as set forth in claim 45 wherein the loader comprises:

a first arm (Dingo, Fig. 9, left arm 3);

a second arm (Dingo, Fig. 9, right arm 3); and

a cross-member (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached) that extends from the first arm to the second arm, the cross-member being disposed forward of the first linkage pivot point, the second linkage pivot point, and the actuator pivot point.

47. The compact tool carrier as set forth in claim 46 further comprising an attachment plate (Dingo, Fig. 9, mounting plate 1) for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

48. The compact tool carrier as set forth in claim 47 further comprising an actuator (Dingo, Fig. 9, tilt cylinder 2) for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

49. The compact tool carrier as set forth in claim 45 wherein the mainframe incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

50. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader (Dingo, Fig. 9, arms 3) adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket"), the loader comprising;

a first loader arm (Dingo, Fig. 9, left arm 3);

a second loader arm (Dingo, Fig. 9, right arm 3); and

at least one cross-member (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached) that extends from the first loader arm to the second loader arm;

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform), the loader arm not being directly attached to the mainframe (Komatsu, the teaching of a loader arm 13 having no fixed pivot);

a first linkage pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm at a first linkage pivot point (Komatsu, front linkage 11);

a second linkage pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm at a second linkage pivot point (Komatsu, rear linkage 12), each cross-member being disposed forward of the first linkage pivot point and the second linkage pivot point (Dingo, Fig. 9, the front and rear linkage pivot points will attach to the rear of Dingo's loader arm 3 behind Dingo's cross members as taught by the positioning of pivots 11b and 12b in Komatsu);

an actuator (Dingo, Fig. 9, cylinder 4) pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm at an actuator pivot point;

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation (Dingo, Fig. 9, control panel 10); and

an operator platform (Dingo, Fig. 9, operator platform 7) for standing operation of the operator controls of the control station.

51. The compact tool carrier as set forth in claim 50 wherein each cross-member is disposed forward of the actuator pivot point (Dingo, Fig. 9, true of top cross member Ct to which the upper end of tilt cylinder 2 is attached).

52. The compact tool carrier as set forth in claim 50 wherein the mainframe incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

53. The compact tool carrier as set forth in claim 50 further comprising an attachment plate (Dingo, Fig. 9, mounting plate 1) for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

54. The compact tool carrier as set forth in claim 53 further comprising an actuator (Dingo, Fig. 9, tilt cylinder 2) for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

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F. Ground 2 – Detailed Prior Art Application to Claims 37-44 and 55-63

Claims 37-44 and 55-63 of the '386 patent at issue herein are unpatentable under 35 U.S.C. 103(a) as such claims would have been obvious to one of ordinary skill in the art at the time of the invention over Dingo in view of Dingo Parts Catalog, further in view of Komatsu, and further in view of Vermeer Brochure.

As is apparent from the statement of the proposed ground of rejection above, the additional reference to Vermeer Brochure is being relied upon in Ground 2 to teach additional features set forth in claims 37-44 and 55-63. Thus, Toro will first review below the relevant teachings of Vermeer Brochure before proceeding with the application of the prior art for Ground 2.

1. Review of Vermeer Mini Skid Steers S600/S600TX Brochure

Toro is submitting herewith a brochure published by the Patent Owner disclosing various models of a mini skid steer loader that Patent Owner previously sold and manufactured. This brochure is entitled Vermeer Mini Skid Steers S600/S600TX Brochure and is being referred to herein as Vermeer Brochure.

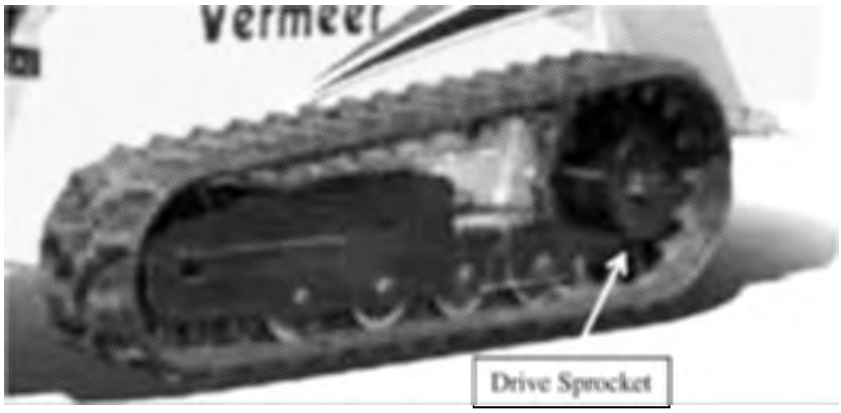


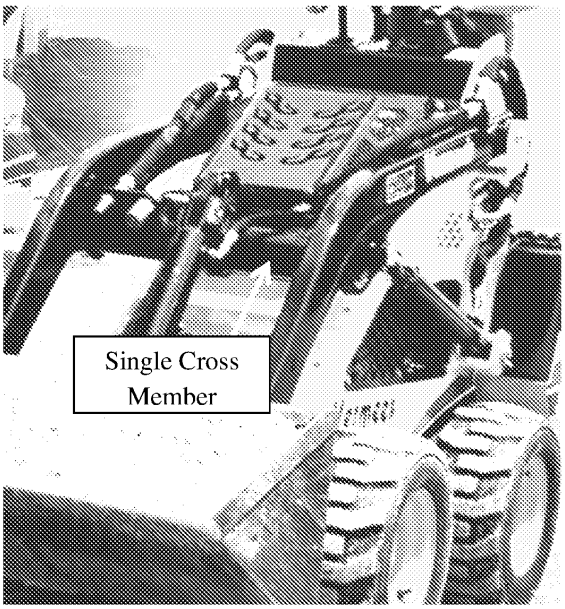
As shown in the photograph to the left hereof which was taken from the cover page of Vermeer Brochure, the Patent Owner offered the **same** mini skid steer in two different versions. The first version shown in the foreground of the photograph was a wheeled model known as the S600 supported for movement over the ground by pairs of front and rear wheels. The second version shown in the background of the photograph was a

tracked model known as the S600TX supported for movement over the ground by left and right endless ground engaging tracks.

Vermeer Brochure clearly establishes that a wheeled drive system and a tracked drive system were known to be interchangeable alternatives to one another for the purpose of propelling a mini skid steer over the ground. The Patent Owner's prior practice of offering **both** alternatives on the same mini skid steer platform, i.e. the S600 wheeled model as well as the S600TX tracked model with the TX obviously standing for "tracked', is evidence of such interchangeability. This enables a mini skid steer manufacturer to provide choice to a potential customer to enable the customer to purchase the model having the traction system best suited to his or her uses and the type of terrain over which the product will normally be used. The interchangeability of the two traction systems could hardly be clearer from the photograph on the prior page where the wheeled and tracked models are depicted together. The two mini skid steers are substantially identical to one another except that one was built with a wheeled drive system and one was built with a tracked drive system.

Referring to a detail of the tracked model, the portion of the photograph reproduced below is taken from the photograph of the S600TX shown on the third page of Vermeer Brochure with the tracked drive system having been enlarged. Each track of the S600TX is driven by a large drive sprocket which Toro has labeled below. The use of such a drive sprocket in a tracked drive system is widespread throughout the Patent Owner's mini skid steer line. As discussed above, Vermeer Brochure is being used first and foremost to establish the interchangeability of a tracked drive system having a drive sprocket, the S600TX below, with the wheeled drive system offered by the Patent Owner as an alternative on the S600.

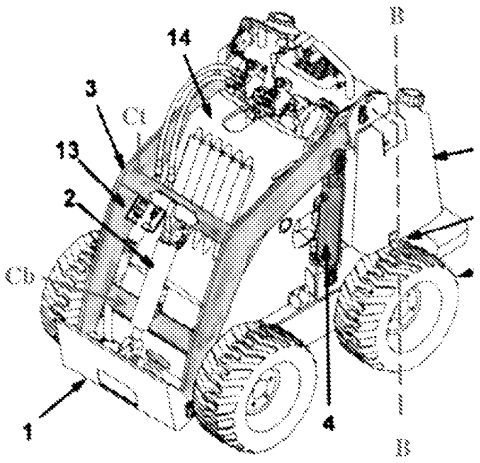




The last item of Vermeer Brochure on which Toro will rely is present in both the S600 and S600TX. As shown in the S600 depicted in the photograph on the cover page of Vermeer Brochure, which is reproduced in relevant part to the left hereof, the S600 utilized a **single** cross member extending between the loader arms. This single cross member is labeled as such by Toro to the left hereof. This cross member was utilized to mount the upper end of the tilt cylinder that controls the angular orientation of the tool, in this case a bucket, relative to the loader arms.

2. <u>As to Claims 38, 39 and 41-44</u> [11]

The basic Dingo/Dingo Parts Catalog in view of Komatsu combination that forms the basis for the rejection of the claims set forth in Ground 1 could be applied to claims 38, 39 and 41-44 except for one difference. In Dingo as shown to the right hereof, there are two cross members between the loader arms 3, a top cross member Ct located where the loader arms change orientation between their front and rear portions and a bottom cross member Cb at the bottom



[11] In the reproduction of the new claims 38, 39 and 41-44 herein for the purpose of the application of the prior art thereto, the italics used in the Reexamination Certificate to indicate that these are new claims being added to the '386 patent is not used herein with the text of the new claims simply being reproduced in a non-italicized font.

of the loader arms near the mounting plate 1. Claim 38 requires that there be only a **single** cross member.

Accordingly, as to the requirement of a single cross member, Toro will additionally rely on Vermeer Brochure and its teaching of a single cross member at the same location as Toro's top cross member Ct, namely where the loader arms change orientation between their front and rear portions. Vermeer Brochure teaches that a single cross member can be large and strong enough when placed at this location, namely at the location where Dingo's top cross member Ct already is, such that a second cross member is not required at the bottom of the loader arms. Consequently, in the combination of references that make up Ground 1, it would have been further obvious under 35 U.S.C. 103(a) to one of ordinary skill in the art at the time of the invention to provide the top cross member Ct in Dingo with sufficient size and strength to permit the top cross member Ct in Dingo to be the only cross member between Dingo's loader arms as taught by Vermeer Brochure.

When Ground 1 is so modified by the additional use of Vermeer Brochure, the prior art will read on claims 38-44 as set forth below. Limitations in the combination that appear in Dingo or Dingo Parts Catalog will be highlighted in yellow. Limitations in the combination that appear in Komatsu will be highlighted in tan. Limitations in the combination that appear in Vermeer Brochure will be highlighted in pink.

38. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.), the compact tool carrier comprising:

a loader (Dingo, Fig. 9, arms 3) adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket"), the loader comprising:

a first loader arm (Dingo, Fig. 9, left arm 3);

a second loader arm (Dingo, Fig. 9, right arm 3); and

a single (Vermeer Brochure, cover page, single cross member shown in the S600) cross-member (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached) that extends from the first loader arm to the second loader arm

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end

relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform), the loader arm not being directly attached to the mainframe (Komatsu, the teaching of a loader arm 13 having no fixed pivot);

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Komatsu, front linkage 11);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4);

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing operation (Dingo, Fig. 9, control panel 10); and

an operator platform (Dingo, Fig. 9, operator platform 7) for standing operation of the operator controls of the control station.

39. The compact tool carrier as set forth in claim 38 wherein the loader is moveable between a down position and a vertically raised position, the cross-member being disposed forward of the operator platform in the down position and the vertically raised position of the loader (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached inherently remains forward of operator platform 7 due to the length of loader arms 3, 3 and the 66 inch maximum hinge pin height in relation to the 60 inch length of the loader as set forth in the specifications on pg. 10 of Dingo and this will be even truer when Komatsu's vertical lift linkage is adapted to Dingo with the loader arms 3, 3 moving forwardly in the upper half of the lift pattern to provide a vertical lift path for the tool).

41. The compact tool carrier as set forth in claim 38 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, rear linkage 12) pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm.

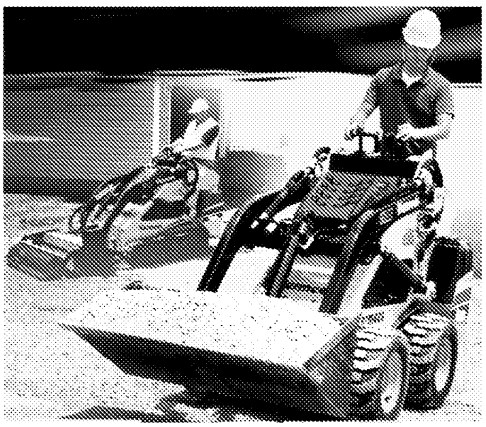
42. The compact tool carrier as set forth in claim 38 wherein the mainframe incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

43. The compact tool carrier as set forth in claim 38 further comprising an attachment plate (Dingo, Fig. 9, mounting plate 1) for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

44. The compact tool carrier as set forth in claim 43 further comprising an actuator (Dingo, Fig. 9, tilt cylinder 2) for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

3. As to Claims 37, 40 and 55-63 [12]

Finally, the remaining new claims added to the '386 patent in the first reexamination are directed to details to the tracked drive system of the '386 patent which are absent from the wheeled drive system found in Dingo. However, as shown earlier in Section IV(F)(1) hereof, Vermeer Brochure clearly establishes the interchangeability of a tracked drive system and a wheeled drive system. The **same** skid steer can be made in a wheeled drive model, as in the S600 mini skid steer of Vermeer Brochure, or in a tracked drive model, as in the S600TX mini skid steer of Vermeer Brochure. All one of ordinary skill in the art need do in order to understand this is to refer to the illustration on the cover page of Vermeer Brochure, shown again to the right hereof, showing both models of mini skid steers together as alternatives to one another.



Accordingly, it would have been further

[12] In the reproduction of the new claims 37, 40 and 55-63 herein for the purpose of the application of the prior art thereto, the italics used in the Reexamination Certificate to indicate that these are new claims being added to the '386 patent is not used herein with the text of the new claims simply being reproduced in a non-italicized font.

obvious under 35 U.S.C. 103(a) to one of ordinary skill in the art at the time of the invention to have provided Dingo in a tracked drive model in addition to a wheeled drive model as expressly taught by Vermeer Brochure. One of ordinary skill in the art would have been motivated to do so to offer a broader product line to allow a customer to pick the type of drive system best suited to the operator's needs. When so modified, claims 37, 40 and 55-63 are further met by the application of prior art as shown below.

With respect to the application of art to claim 37 which depends from independent claim 31, the application of prior art to the parent claim 31 as set forth earlier herein in Section IV(E)(3) hereof is incorporated by reference to avoid unnecessary repetition. With the application of prior art to claim 31 as stated in Section IV(E)(3) hereof, claim 37 is further met as follows.

37. The compact tool carrier as set forth in claim 31 further comprising a drive mechanism for propelling the compact tool carrier over a supporting surface, the drive mechanism having a drive sprocket (Vermeer Brochure, pg. 3, the rear drive sprocket of the tracked drive system), the cross-member being disposed forward of the drive sprocket in the vertically raised position and the down position (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached will inherently remain forward of the rear drive sprocket added to Dingo due to the length of loader arms 3, 3 and the 66 inch maximum hinge pin height in relation to the 60 inch length of the loader as set forth in the specifications on pg. 10 of Dingo and this will be even truer when Komatsu's vertical lift linkage is adapted to Dingo with the loader arms 3, 3 moving forwardly in the upper half of the lift pattern to provide a vertical lift path for the tool).

With respect to the application of art to claim 40 which depends from independent claim 38, the application of prior art to the parent claim 38 as set forth earlier herein in Section IV(F)(2) hereof is incorporated by reference to avoid unnecessary repetition. With the application of prior art to claim 38 as stated in Section IV(F)(2) hereof, claim 40 is further met as follows.

40. The compact tool carrier as set forth in claim 38 wherein the loader is moveable between a down position and a vertically raised position, the compact tool carrier further comprising a drive mechanism for propelling the compact tool carrier over a supporting surface, the drive mechanism having a drive sprocket (Vermeer Brochure, pg. 3, the rear drive sprocket of the tracked drive system), the cross-member being disposed forward of the drive sprocket in the down position and the vertically raised position of the loader (Dingo, Fig. 9, top cross member Ct to which the upper end of tilt cylinder 2 is attached will inherently remain forward of the rear drive sprocket added to Dingo due to the length of loader arms 3, 3 and the 66 inch maximum hinge pin height in relation to the 60 inch length of the loader as set forth in the specifications on pg. 10 of Dingo and this will be even truer when Komatsu's vertical lift linkage is adapted to Dingo with the loader arms 3, 3 moving forwardly in the upper half of the lift pattern to provide a vertical lift path for the tool).

Finally, the remaining claims 55-63 are met as set forth below.

55. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis (Dingo, Fig 9, depicted Dingo 322 mini skid steer) and a mass of less than about 1500 kg (Dingo, p. 10, mass of 711 kg.):

a loader having an arm (Dingo, Fig. 9, arm 3), the loader being adapted to carry a tool (Dingo, p. 10, the referenced "std. bucket");

a mainframe for supporting the loader (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4), the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe (Dingo Parts Catalog, p. 4, the engine bracket ahead of the operator platform), each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader (Komatsu, the pivot 11a of front linkage 11 and the frame pivot (unnumbered) of Dingo's cylinder 4 as positioned low on the mainframe as taught by Komatsu), the loader not being directly attached to the mainframe (Komatsu, the teaching of a loader arm 13 having no fixed pivot);

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Komatsu, front linkage 11);

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm (Dingo, Fig. 9, cylinder 4);

a drive mechanism comprising tracks for propelling the compact tool carrier over a supporting surface (Vermeer Brochure, pg. 3, the tracked drive system), the drive mechanism having a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D1 (Komatsu, Fig. 1, D1=0.625 inches), the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5 (Komatsu, Fig. 1, D5=0.250 inches), the rotational axis and the pivot point at which the linkage is attached to the mainframe being separated by a vertical distance D2 (Komatsu, Fig. 1, D2=0.250 inches), the rotational axis and the pivot point at which the actuator is attached to the mainframe being separated by a vertical distance D4 (Komatsu, Fig. 1, D4=0.0625 inches), both D2 and D4 being less than D1 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than the D1 value of 0.6250 inches) and being less than 1.5 D5 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than 0.375 inches which is the result of 1.5 times the D5 value of 0.250 inches); and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader (Dingo, Fig. 9, control panel 10), the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

56. The compact tool carrier as set forth in claim 55 wherein D2 and D4 are each less than 0.75 D1 (Komatsu, Fig. 1, D2 of 0.250 inches and D4 of 0.0625 inches are each less than 0.46875 inches which is the result of 0.75 times the D1 value of 0.625 inches).

57. The compact tool carrier as set forth in claim 55 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, the rotational axis and the pivot point at which the second linkage is attached to the

mainframe being separated by a vertical distance D3 (Komatsu, Fig. 1, D3=0.6875 inches), D3 being less than 1.5 times D1 (Komatsu, Fig. 1, D3 of 0.6875 inches is less than 0.9375 inches which is the result of 1.5 times the D1 value of 0.625 inches).

58. The compact tool carrier as set forth in claim 55 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, Fig. 1, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe, (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point[13], a vertical distance between the rotational axis and the forward-most pivot point being less than D1 (Komatsu, Fig. 1, the D2 value of 0.250 inches of the forward-most pivot 11a is less than D1of 0.625 inches).

59. The compact tool carrier as set forth in claim 55 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, Fig. 1, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe. (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point, a vertical distance between the rotational axis and the forward-most pivot point being less than 0.75 D1 (Komatsu, Fig. 1, the D2 value of 0.250 inches of the forward-most pivot 11a is less than 0.46875 inches which is the result of 0.75 times the D1 value of 0.625 inches).

60. The compact tool carrier as set forth in claim 55 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage (Komatsu, Fig. 1, rear linkage 12) pivotally attached to the first side of the mainframe at a pivot point and pivotally

[13] It is very close as to whether the pivot 11a of Komatsu's front linkage 11 or the lower pivot of Komatsu's cylinder 15 is the forwardmost pivot. Since the distance D2 of Komatsu's pivot 11a relative to rotational axis R is greater than the distance D4 of the pivot of the cylinder relative to rotational axis 2, Toro will assume that pivot 11a of Komatsu's front linkage 11 is the forwardmost pivot. This is the least favorable interpretation of Komatsu for Toro and the most favorable interpretation for the Patent Owner. This assumption also applies to claims 59 and 60.

attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe. (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point, a vertical distance between the rotational axis and the forward-most pivot point being less than 0.75 D1 (Komatsu, Fig. 1, the D2 value of 0.250 inches of the forward-most pivot 11a is less than 0.46875 inches which is the result of 0.75 times the D1 value of 0.625 inches).

61. The compact tool carrier as set forth in claim 55 wherein the drive mechanism comprises a drive sprocket (Vermeer Brochure, pg. 3, the rear drive sprocket of the tracked drive system), the drive sprocket rotating about the rotational axis.

62. The compact tool carrier as set forth in claim 55 further comprising an operator platform (Dingo, Fig. 9, operator platform 7) for standing operation of the operator controls of the control station.

63. The compact tool carrier as set forth in claim 55 wherein the mainframe incorporates a single weldment (Dingo Parts Catalog, p. 1, Frame & Decal Assy. 4 comprises a single part No. 99-3145).

G. Analysis of Objective Evidence in First Reexamination (Control No. 90/013,915)

1. Patent Owner's Showing of Alleged Unexpected Results

The entire basis for the Patent Owner's showing of unexpected results in the first reexamination is one paragraph in a Declaration by Louis Hartke, one of the joint inventors of the '386 patent. That paragraph is reproduced below.

> "10. By using a linkage and actuator to support the loader (i.e., a vertical lift loader) as set forth in claim 1 of the '386 Patent, the lift capacity of an embodiment of the invention was increased by 32% relative to the radial lift S450TX compact tool carrier without increasing the weight of the machine. The lift capacities were measured in accordance with ISO Standard 14397-1:2007 entitled "Earth-moving Machinery - Loaders and backhoe loaders -Part 1: Calculation of rated operating capacity and test method for verifying calculated tipping load."
> (Yellow Highlighting Added) (Hartke Declaration of 10/25/2017 , pg. 3)

This bare statement is insufficient to support a finding of unexpected results for the following reasons.

a. What Was Tested?

Other than for referring to "an embodiment of the invention", Mr. Hartke did not describe what was tested when "the lift capacities were measured". Was it the Patent Owner's CTX50 mini skid steer that corresponds directly to what is disclosed in the '386 patent? Was it a CTX50 whose weight was adjusted in some way and, if so, where was the weight placed during the test? Was it some other structure that, while technically falling within the limitations of claim 1, was custom made for the test? There is absolutely no way of knowing. Given the lack of detail about what was tested, Mr. Hartke's Declaration lacks sufficient factual support to accept the conclusion of a 32% increase in lift capacity.

b. The Variance With the Patent Owner's Published Statements

What we do know about the increase in lift capacity for the Patent Owner's CTX50 mini skid steer is what the Patent Owner has been willing to repeatedly publicly disclose - that it is 20% and not 32%. For example, the spec sheet provided in the first reexamination for the radial

lift S450TX weighing 2100 pounds lists a rated operating capacity of 500 pounds while the spec sheet in the first reexamination for the equivalently powered vertical lift CTX50 weighing 2135 pounds lists this capacity at 600 pounds. A 100 pound increase in lift capacity on a 500 pound base is a 20% increase in lift capacity.

In addition, the Patent Owner **repeated** this 20% lift increase claim in a press release entitled "Vermeer Has Launched the Newest Mini Skid Steer, the CTX100." A complete copy of this press release is being submitted herewith. A portion of the press release is reproduced below and highlights the claim of a 20% increase in yellow.

Vermeer has launched the newest mini skid steer, the CTX100

PELLA, Iowa — Vermeer has extended its CTX mini skid steer product line with the addition of the CTX100 compact utility loader. The CTX100 features vertical lift boom arms, which offer a higher lift capacity than a similarly sized radial lift arm machine. In addition, Vermeer has increased the hinge pin height to help landscape contractors load and transport materials more efficiently.

"The CTX100 uses the same vertical lift geometry as the Vermeer CTX50 compact utility loader," said Matt Hutchinson, product manager — Tree Care, Rental & Landscape at Vermeer. "Because the CTX line uses vertical lift boom arms, which are designed to keep the load closer to the machine, the compact utility loaders have almost 20 percent more lift capacity than a radial lift machine with the same footprint."

The new CTX100 has a tipping capacity of 2,958 pounds (1,341.7 kg) and a rated operating capacity of 1,035 pounds (469.5 kg).



Thus, time and time again, the Patent Owner confirms that its vertical lift mini skid steers provide a 20% increase in lift capacity. Mr. Hartke's stated increase of 32% is some 60% higher than the Patent Owner's published statements such as the 20% contained in the press release above. Significantly, this press release was not disclosed by the Patent Owner to the Examiner in the first reexamination at the time he was asked to assess the credibility of Mr. Hartke's Declaration.

c. What Were the Expectations of Those of Ordinary Skill in the Art?

For results to be "unexpected", they must be measured against the expectations of a person of ordinary skill in the art. A number of courts have held that in order for a result to be sufficiently "surprising" for purposes of a non-obviousness analysis, it must be surprising to one skilled in the art. *E.g.*, *In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995) ("One way for a patent applicant to rebut a *prima facie* case of obviousness is to make a showing of 'unexpected results,' *i.e.*, to show that the claimed invention exhibits some superior property or advantage *that a person of ordinary skill in the relevant art would have found surprising or unexpected.*") (emphasis added); *Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (same); *Eli Lilly & Co. v. Zenith Goldline Pharm., Inc.*, 364 F. Supp. 2d 820, 907–08 (S.D. Ind. 2005), *aff'd*, 471 F.3d 1369 (Fed. Cir. 2006) ("In order for a showing of unexpected results to be probative of non-obviousness, such evidence must at least establish that (1) . . . , and (2) the difference actually obtained would not have been expected by one skilled in the art at the time of the invention.").

The skid steer loader art had long known that a vertical lift loader by keeping the load closer to the front of the machine would permit an increase in lift capacity over a comparable radial lift loader. What percentage increase was expected by those of ordinary skill in the art? Tellingly, Mr. Hartke had every opportunity to state what his own expectations were but did not do so. In fact, there is absolutely no evidence from anyone of ordinary skill in the art of what the expectations were. Accordingly, there is no basis to conclude that Mr. Hartke's 32% figure, even inflated as it is from the Patent Owner's figure of 20%, was unexpected to Mr. Hartke or anyone else of ordinary skill in the art.

d. The Flawed Base of Comparison Does Not Support Unexpected Results

In an attempt to provide a base of comparison by which the vertical lift increase achieved by the Patent Owner could be measured, whether it was the 20% figure the Patent Owner had long published to the world or the 32% figure Mr. Hartke provided later in the first reexamination of the '386 patent, the Patent Owner created one using a sample size of one. In its Amendment and Response dated October 25, 2017, the Patent Owner compared the vertical lift loader of Mustang, known as the 2700V, to the radial lift loader of Mustang, known as the 2600R, which was closest in weight to the 2700V in the following chart which has been reproduced below. (Control No. 90/013,915, Amendment and Response, 10/25/2017, pg. 40). In doing so, it found that the lift increase of the 2700V was only 3.8% higher than that of the 2600R. This then became the base against which the Patent Owner's attorneys argued that the 32% increase claimed by Mr. Hartke produced unexpected results.

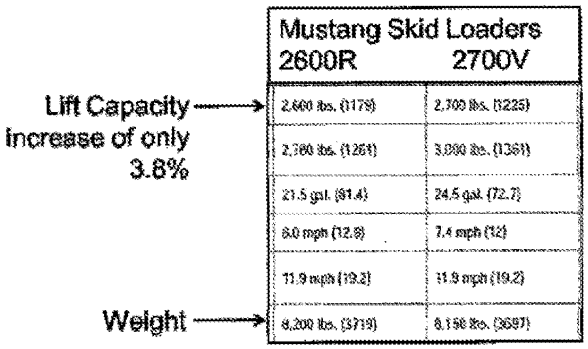


Table 1

The flaw in this methodology is apparent. It is no more valid to take this one example and then generalize it to the entire art of skid steer loaders than it would be to take a political poll of one person and then generalize his or her answer to all people. It does not mean that the 3.8% increase from this single example is what those of ordinary skill in the art would have expected for all vertical lift loaders versus radial lift loaders. If you are going to use statistics, you need at the very least an average value for how much lift capacity radial lift loaders would provide per pound of machine weight versus how much lift capacity vertical lift loaders provide per pound of machine weight. In fact, when you take the Mustang brochure[14] on which the Patent Owner based the above comparison and average the data across the entire line of Mustang radial lift

[14] This is the brochure entitled "Mustang Skid Steer Loaders – Radial & Vertical Lift" dated 2014 that was the secondary teaching reference in the first reexamination. Toro has resubmitted the Mustang brochure herein to support the data analysis Toro will show below. The data in the table on the following page appears in the model by model Specifications contained on pgs.22 and 23 of the Mustang brochure.

loaders and Mustang vertical lift loaders, you get a very different base of comparison, as shown by Toro below.

The table below shows the data for all the radial and vertical lift loaders contained in the Mustang brochure from which the Patent Owner took the isolated example above in which it concluded that those of ordinary skill in the art would expect a 3.8% increase in lift capacity.

	Operating Weight	**Rated Operating Capacity (ROC) without counterweight**	**ROC/Weight**
Radial Lift Model			
2012	2980	850	0.2852
2026	4000	1050	0.2625
1350R	5078	1350	0.2659
1500R	5887	1500	0.2548
1650R	6122	1650	0.2695
1900R	6880	1900	0.2762
2200R	7980	2200	0.2757
2600R	8200	2600	0.3171
		Mustang Radial Lift Ratio Average	**0.2759**
Vertical Lift Model			
2700V NXT2	8150	2700	0.3313
3300V NXT2	9090	3300	0.3630
4000V	11100	4000	0.3604
		Mustang Vertical Lift Ratio Average	**0.3516**
		Gain in Vertical Lift Ratio Average compared to Radial Lift Ratio Average	**27%**

However, when the data is averaged as shown above across all the units in brochure, one sees that the average increase in the amount of weight per pound that Mustang's vertical lift loaders could lift is 27% more than what could be lifted by Mustang's radial lift loaders. A 20% increase in lift as set forth by the Patent Owner in its published documents for the mini skid steers corresponding to the '386 patent, or even the 32% Mr. Hartke claimed, is hardly an unexpected result compared to the 27% one of ordinary skill in the art would have expected from the above. Put quite simply, the incomplete and inconsistent facts and the flawed methodology used by the Patent Owner in the first reexamination does not establish unexpected results.

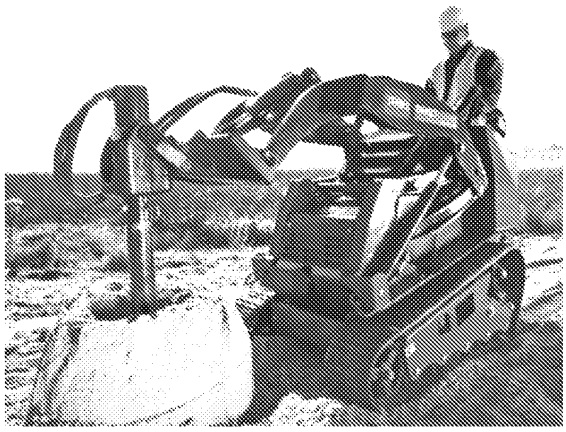
2. Patent Owner's Showing of Alleged Skepticism by Toro

In the first reexamination, the Patent Owner offered a single sentence from a patent application that Toro had written relating to its Dingo TX 1000 loader as proof of skepticism by Toro which the Patent Owner argued should overcome the prior art rejection then before the Examiner in the first reexamination, namely Vermeer in view of Mustang. That sentence reads as follows:

> "While high lift loader arms are known on full size skid steer loaders as disclosed in U.S. Pat. No. 5,542,814, the use of such high lift loader arms on a compact utility loader has been considered difficult if not impossible due to size and durability constraints."

That sentence first appeared in provisional application Serial No. 62/115,854 filed on February 20, 2015. That sentence was relied upon by the Examiner in the first reexamination, along with the showing of unexpected results that Toro has demonstrated above is flawed, to justify withdrawing the rejection based on Vermeer in view of Mustang. Toro respectfully submits that critical context for this sentence was missing in the first reexamination. Toro will provide that additional context now.

Toro is submitting herewith a Toro Rental Bulletin dated February 10, 2015 introducing the Dingo TX 1000 loader to the rental market in advance of an upcoming show at which the product was further shown. As shown in the picture of the TX 1000 on the front page of the brochure which is reproduced to the right hereof, the Dingo TX 1000 had been reduced to a fully commercialized form that was ready to be shown to potential customers. This picture and the Toro Rental Bulletin in which it appears proves that the design, development, and product refinement work on the TX 1000 had all been done **before** the alleged expression of skepticism by Toro which appeared in the later filed provisional application.



If Toro had truly been skeptical about whether or not a vertical lift loader system could be used on a mini skid steer, such skepticism would have kept Toro from ever starting the project that led to the TX 1000. However, the statement of alleged skepticism came after all the work was done and the TX 1000 was ready to go to market and then appeared only in a patent application seeking to patent that product. In view of this timing, the statement does not justify the weight accorded to it in the first reexamination.

In addition, the statement must also be read in the context of the objective of the design project which led to the TX 1000. The target at which the TX 1000 was aimed was to provide a loader with substantially higher lift capacity than any loader then in Toro's product line. At the time Toro was developing the TX 1000, its radial lift Dingo loader line had rated operating capacities as high as the mid 500 pound range. By contrast, the TX 1000 achieved a doubling of that to a rated operating capacity of 1000 pounds or more. The Toro Rental Bulletin highlights that design objective in the context of maintaining the small size of a mini skid steer loader.

"Dingo TX 1000 features and benefits
Rated Operating Capacity

- Maximum jobsite efficiency requires that CULs lift and transport extremely heavy loads, and the Dingo TX 1000 goes a long way in helping operators achieve their goal of wanting to lift as much weight as possible. In fact, the TX 1000 name refers to its rated operating capacity. The Dingo TX 1000 features an industry leading rated operating capacity of 1000 lbs on the Narrow Track unit and 1075 lbs on the Wide Track unit."
  (Emphasis in Original) (Toro Rental Bulletin, bottom pg. 1 – top pg. 2)

"*Smaller footprint*

- Although its (sic) Toro's biggest Dingo yet, the TX 1000 stays true to the original intention of CULs - being able to do more with a smaller footprint. No other CUL can lift as much as the TX 1000 while maintaining the relatively shorter length and height dimensions and relatively lower weight of this product."
  (Emphasis in Original) (Toro Rental Bulletin, bottom pg. 3)

Toro had no doubt that one could adapt vertical lift linkages to a min skid steer, but Toro's objective was not mere adaptation. The statement that allegedly expresses Toro's skepticism must be read while keeping what Toro was trying to accomplish in mind - not mere adaptation but a leap forward. The statement itself alludes to that at the very end when it states that the difficulty arises from "size and durability constraints". The design objective of the TX 1000 was

making a loader having the small **size** of a mini skid steer loader but that would be **durable** when lifting substantially more weight than any of Toro's previous loaders.

When reading Toro's statement in this context, which context cannot be gleaned from the patent application in which it appears, it is clear that the statement is NOT a reflection on the obviousness or practicality of adapting a vertical lift loader to a mini skid steer while being satisfied with a small increase in lift capacity. Instead, the statement is a simple acknowledgment that adapting a vertical lift loader to a mini skid steer with a substantial increase in lift capacity in mind is not the same as attempting a much smaller increase.

It is misleading at the very least for the Patent Owner to use Toro's statement in an abstract fashion divorced from a disclosure and consideration of the very different design objectives the Patent Owner and Toro each had. Toro's TX 1000 achieved an approximate doubling in operating capacity over the operating capacity of its **largest** radial lift loader. By contrast, the Patent Owner's CTX50 mini skid steer corresponding to what is shown in the '386 patent achieved a 20% increase, according to the Patent Owner's public statements on the matter, over the operating capacity of its **smallest** radial lift loader, i.e., the S450TX. Toro's statement of alleged skepticism simply cannot be read as skepticism to the use of a vertical lift loader on a mini skid steer when one fully considers the real world backdrop existing at the time Toro made that statement, namely the very different design objectives of Toro and the Patent Owner.

3. Patent Owner's Showing of Alleged Failure by Others/Long Felt Need

In the Patent Owner's argument entitled "Long Felt Need and Attempts by Others"[15], the Patent Owner points to the use of counterweights on radial lift mini skid steers as comprising failed attempts by others to produce a mini skid steer with a vertical lift linkage. The Patent Owner would have the Examiner infer that the addition of counterweights was essentially the only path that one of ordinary skill in the art would have taken to provide additional lift capacity on mini skid steers. However, as Toro will show below, such an inference is clearly improper as it completely ignores the actual reasons that counterweights are used on skid steer loaders, whether large or small.

[15] Patent Owner Amendment and Response of October 25, 2017, pp. 40-43.

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Counterweights have long been used on skid steer loaders as a simple way to increase the upper end of the lift capacity of a given loader. This is discussed in an article entitled "Size-Up Skid-Steer Loaders"[16] as follows:

> "The rated operating capacity can often be slightly increased by using an optional factory counterweight package. 'For customers at the upper end of the rated operating capacity, one model counterweight can add an additional 150 lbs. of capacity,' says Moore, discussing Gehl's skid-steer models. 'In addition, it serves as a bumper and hitch. The counterweight on our two larger E Series loaders increases the rated operating capacities by 300 lbs.'
>
> Similarly, Bobcat offers factory-approved counterweight packages through its dealers. 'Loader owners can add counterweights — available from their dealership — to the machine for an increase in the loader's rated operating capacity,' says Fitzgerald."
>
> (Yellow Highlighting Added) (Pg. 3/5).

The rationale inherent in this use of counterweights is one of common sense practicality and simple cost effectiveness. A particular skid steer model may work splendidly in most applications but may become unstable when that model is asked to lift loads at or slightly above the very top end of its rated lifting capacity. In this situation, an owner or potential owner of such a model has two choices: buy the next bigger skid steer model in the OEM manufacturer's line or add a counterweight to the smaller model skid steer to bump up the top end of the lift capacity to something sufficient to lift the heaviest loads it will occasionally be asked to do. In many cases, the owner will make the obvious and cost effective choice, namely use a counterweight to get a marginally higher lift capacity rather than buy a larger machine that would be overkill for most of its tasks.

This common sense, cost effectiveness rationale for counterweight use on a skid steer loader is expressed by a skid steer owner in the following post from an online skid steer chat forum[17]:

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[16] Available online at the following link https://www.forconstructionpros.com/equipment/earthmoving-compact/skid-steers/article/10304897/sizeup-skidsteer-loaders . A copy of this article is also being submitted herewith.

[17] https://www.plowsite.com/threads/bobcat-weight-kit.3745/ . A copy of this chat forum dialogue is also being submitted herewith.

"I have a 763 bobcat and in the winter all I use it for is for loading trucks with pallets of salt/calcium. My problem is I can't lift a full pallet with riding a wheelie on my front tires. A pallet of rock salt is 2400 lbs. if I install a weight kit on it will help/solve my problem. I really don't want to buy a larger skid steer because it is the perfect size for me in non-snowing months. Thanks!
alfman, Oct. 7, 2001"
(Yellow Highlighting Added)

Moreover, the use of counterweights on skid steer loaders as a simple way to increase the upper end of the lift capacity of a given loader has been applied to **both radial lift loaders AND vertical lift loaders**. This is discussed in a press release from CNH Industrial entitled "Case Upgrades Its Skid Steer And Compact Tracked Loader Line-Up", a copy of which is being submitted herewith, which states as follows:

"**Broader Range**

The extended Case line-up now includes five radial lift skid steers (SR), two radial lift tracked loaders (TR), two vertical lift skid steers (SV) and one vertical lift path tracked machine (TV). With operating weights of 2,300 kg to 3,765 kg for the skid steers and 3,720 kg to 4,625 kg for the tracked loaders, there is a machine to suit every application. The compact machines deliver rated operating capacities (50%) of 590kg through to 1,723 kg and tipping loads of 1,179 kg to 3,447 kg. ***Operating capacities on every model can be further increased by mounting additional counterweights on the rear part of the machine***."
(Yellow Highlighting and Bold Italics Added).

The Patent Owner's argument entitled "Long Felt Need and Attempts by Others" in the pending first reexamination is not supported by sufficient evidence. Other than asserting that there was a long felt need, the Patent Owner provides no evidence that such a need was both long felt in the art and unmet. There is no evidence that anyone ever attempted to convert a typical mini skid steer from its usual radial lift configuration to a vertical lift and was unsuccessful in doing so. As Toro will show in a moment, the only evidence actually of record is the fact that both the Patent Owner and Toro working independently of one another began engineering projects at the conclusion of the Great Recession and both the Patent Owner and Toro were successful at adapting vertical lift linkage technology to mini skid steers. Such simultaneous invention is proof of non-obviousness but is entirely ignored by the Patent Owner.

Returning to the use of counterweights, the use of such counterweights on radial lift mini skid steers is simply the same common sense, cost effective choice long known with respect to larger skid steers. Why buy a bigger radial lift skid steer when adding a counterweight to a

smaller model would extend the lift capacity of the smaller and more cost effective model enough to handle the heaviest loads the owner anticipates lifting? In addition, since larger skid steers actually apply counterweights to **both radial as well as vertical lift models**, their application to radial lift skid steers cannot logically be turned on its head to suggest that this is a failed attempt by others to produce a vertical lift loader. It simply means that there are good practical and economic reasons for using counterweights on any loader, whether a mini skid steer loader or a full size loader, that have nothing to do with believing that they could not be converted to vertical lift loaders. Those reasons are simply to extend the lift capacity of a loader that is otherwise the perfect size for a particular use to more comfortably handle lift applications at the high end of the operating capacity range.

Accordingly, the Patent Owner has established neither long felt need nor failed attempts by others to produce a mini skid steer with a vertical lift linkage.

4. Patent Owner's Showing of Alleged Commercial Success

Courts often note that commercial success is "usually" proven by evidence of "significant sales in relevant market." *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997). Courts routinely find that commercial success is relevant to an obviousness inquiry "only if there is proof that [product] sales were a direct result of the unique characteristics of the claimed invention—as opposed to other economic and commercial factors unrelated to the quality of the patented subject matter." *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996); *see also Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 740 (Fed. Cir. 2013) (same); *In re Metz*, 173 F.3d 433, 1998 WL 670185, at *6 (Fed. Cir. 1998) (affirming PTAB's finding of obviousness even where party raised, as evidence of non-obviousness, secondary considerations of commercial success indicated in sales figures because those figures were "essentially meaningless" since they demonstrated only that the party "sold products and that the volume of those sales increased with time" and did not "indicate the size of the market or the market share achieved"). As courts hold, there must be a "nexus" between sales and the merits of the claimed invention. *In re Huang*, 100 F.3d at 140.

In that section of the Patent Owner's Amendment dealing with commercial success[18], there is not a sales number to be found. There is NO evidence by the Patent Owner of its own sales for its vertical lift loaders or whether its sales met expectations, are growing, shrinking or comprise any relevant percentage of any market. Certainly, if the Patent Owner had sales that were probative of non-obviousness, it would have introduced them as evidence. Simply put, there is NO evidence of commercial success.

Instead, the Patent Owner refers to various press coverage in certain online magazines that occurred when the various vertical lift mini skid steers of the Patent Owner (the CTX50) and of Toro (the TX1000) were simultaneously introduced in February 2015 or shortly thereafter. It is not uncommon for new product introductions to get some buzz when they occur. In this case, the product introductions were even more likely to attract some attention because they represented the first time vertical lift loader technology had been adapted to a mini skid steer platform. However, this new product type press coverage is not a strong indicator of non-obviousness since it happens routinely each year as manufacturers update their product lines and add new models. It happens even when there is nothing patentably different between the new product introduction and the prior art. That is why a showing of commercial success must be founded on sales volume information placed into the context of a relevant market.

The Patent Owner has not attempted to properly prove commercial success, but rather simply attempts to bootstrap new product press coverage into such a showing. This is not a proper showing of commercial success and is not probative of non-obviousness.

5. Toro's Undisputed Showing of Simultaneous Invention

Toro has a pending U.S. patent application relating to its TX 1000 mini skid steer loader that was published by the PTO as US-2016-0244937-A1. Both the Toro application and the application that led to the '386 patent at issue herein claim priority to provisional applications that were filed by Toro and the Patent Owner on the same day, namely on February 20, 2015. Toro's provisional application was filed four minutes earlier that the Patent Owner's provisional application. The filing date of February 20, 2015 was a few days prior to the beginning of the 2015 Rental Show of the American Rental Association at which both the Patent Owner and Toro

[18] Patent Owner Amendment and Response of October 25, 2017, pp. 44-47.

showed their respective versions of a mini skid steer equipped with a vertical lift linkage to the public.

The Court of Appeals for the Federal Circuit discussed the probative value of simultaneous invention in *Ecolochem, Inc. v. Southern California Edison Co.*, 227 F.3d 1361 (Fed. Cir. 2000). In upholding the District Court's finding that simultaneous invention by different parties favored a finding of obviousness, the CAFC noted the following:

> "The fact of near-simultaneous invention, though not determinative of statutory obviousness, is strong evidence of what constitutes the level of ordinary skill in the art." *The Int'l Glass Co. v. United States,* 187 Ct.Cl.376, 408 F.2d 395, 405 (1969). "[T]he possibility of near simultaneous invention by two or more equally talented inventors working independently, ... may or may not be an indication of obviousness when considered in light of all the circumstances." *Lindemann,* 730 F.2d at 1460, 221 USPQ at 487." 227 F.3d at 1379.

A number of cases after *Ecolochem* have held that simultaneous invention is an indicium of obviousness. *E.g.*, *Geo. M. Martin Co. v. All. Mach. Sys. Int'l LLC*, 618 F.3d 1294, 1306 (Fed. Cir. 2010) ("The district court was therefore correct to conclude that the invention of the Tecasa machine, occurring only a year later than the earliest possible reduction-to-practice date of the claimed invention, qualified as a simultaneous invention. As such, 'though not determinative of statutory obviousness, [it is] strong evidence of what constitutes the level of ordinary skill in the art.'") (quoting *Ecolochem*, 227 F.3d at 1379); *Warner Chilcott Co., LLC v. Teva Pharm. USA, Inc.*, 89 F. Supp. 3d 641, 671 (D.N.J. 2015), *aff'd*, 642 F. App'x 996 (Fed. Cir. 2016).

The fact that Toro and the Patent Owner, working independently of one another and without knowledge of the other's work, simultaneously invented a mini skid steer loader with a vertical lift linkage provides strong evidence of the obviousness of the invention to one of ordinary skill in the art at the time of the invention. Both Toro and the Patent Owner had to have embarked substantially simultaneously on engineering projects to design, prototype, test, and refine the mini skid steers that became Toro's TX 1000 and the Patent Owner's CTX50, respectively. Incredibly, both Toro and the Patent Owner filed provisional applications on the same day **only four minutes apart** to protect their work and showed their respective products at the same trade show a week or two later. A more simultaneous case of simultaneous invention cannot be found. This is strong objective evidence of the obviousness of the invention disclosed and claimed in the '386 patent.

H. Strong Prima Facie Obviousness Not Outweighed by Objective Evidence

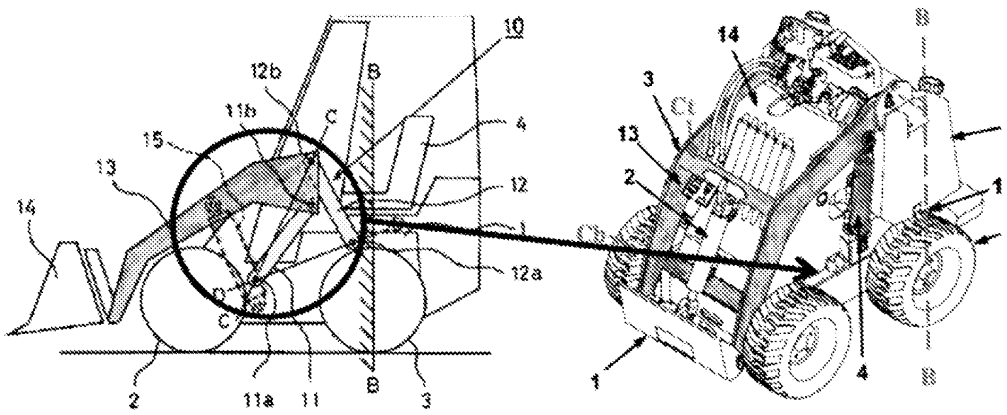
In reaching a conclusion on the ultimate question of the obviousness of the invention recited in claims 1, 15, 17 and 20-63 of the '386 patent, the prima facie case of obviousness must be weighed against the objective evidence relating to non-obviousness.

However, when weighing the two against one another, many courts have found that when a party presents a strong *prima facie* case of obviousness, even a strong showing of secondary considerations or objective evidence of non-obviousness is insufficient to overcome the prima facie case. *E.g.*, *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) ("[S]econdary considerations of nonobviousness—considered here by the district court—simply cannot overcome a strong prima facie case of obviousness."); *Leapfrog Enterprises, Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (agreeing with the district court that patentee "had provided substantial evidence of commercial success, praise, and long-felt need, but that, given the strength of the prima facie obviousness showing, the evidence on secondary considerations was inadequate to overcome a final conclusion that claim 25 would have been obvious"); *In re Inland Steel Co.*, 265 F.3d 1354, 1366 (Fed. Cir. 2001) (agreeing with the PTAB that patentee's "proffered commercial success, even when combined with other objective indicia of non-obviousness [including unexpected results], is insufficient to overcome the strong prima facie obviousness case" and citing *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 719 (Fed. Cir. 1991)).

In this particular case, the prima facie case of obviousness is very strong. As shown below, it involves adapting a vertical lift linkage as taught by Komatsu to replace a radial lift linkage as taught in Dingo to achieve the advantages that Komatsu expressly taught, namely to increase vehicle stability and to provide further forward reach at maximum lift height. The combination simply involves adapting the vertical lift linkage of Komatsu to Dingo in the same location where Komatsu teaches that it be placed, namely forwardly of a line B-B through the center of the rear wheel. The combination is again depicted below to show how the two references literally invite the modification since Dingo had already located its radial lift linkage ahead of a corresponding line B-B through the center of Dingo's rear wheel. This is undoubtedly a very strong prima facie case of obviousness.

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Komatsu **Dingo**

Against this very strong prima facie case of obviousness, one must weigh all objective evidence both pro and con that relates to the ultimate determination of obviousness. "..(H)e complied with the basic requirement that *all* evidence touching the obvious-nonobvious issue be fully considered before a conclusion is reached on that issue." *Kansas Jack, Inc. v. Kuhn*, 719 F.2d 1144, 1150 (Fed. Cir. 1983) (emphasis in original).

While the Examiner in the first reexamination relied on two secondary considerations in withdrawing the prima facie case of obviousness based on Vermeer in view of Mustang in the first reexamination, the Dingo in view of Komatsu combination is a far stronger one than the prior art combination the Examiner had before him in the first reexamination. Specifically, Komatsu shows that a vertical lift linkage could be downsized into a smaller form without a rear cross member. Komatsu further teaches placing that linkage forwardly of an operator who is more rearwardly located, including to a position "to the rear of the rear wheel". A position that is "to the rear of the rear wheel" is precisely where the operator is located in Dingo. The obviousness of the Dingo and Komatsu combination is simply apparent on its face as shown above. Accordingly, even if one accepts the Patent Owner's showing of unexpected results and alleged skepticism by Toro at face value, it would not outweigh the far stronger prima facie case of obviousness that Dingo in view of Komatsu presents.

However, as Toro has shown above in its rebuttal, one cannot take the Patent Owner's showing of unexpected results and alleged skepticism by Toro at face value. The showing of

unexpected results is insufficient for various reasons among which is a cherry picked base of comparison for the results, i.e. assuming that a vertical lift linkage produces only 3.8% more lift capacity than a radial lift linkage because that is what one sample indicated. When the same document is used to arrive at average values across an entire line of radial lift loaders and vertical lift loaders, one sees that a 27% increase is a more appropriate base. When measured against that more appropriate base, the showing of unexpected results vanishes.

Similarly, Toro's statement of alleged skepticism cannot be accorded significant weight since it fails to take into account that Toro had already been successful in implementing a vertical lift linkage on a mini skid steer platform when that statement was made. The statement was also previously read out of context without the Examiner being aware of the doubling in lift capacity objective that Toro had in mind when developing its vertical lift mini skid steer. The statement is far more innocuous when read in context.

Finally, even if one gives the Patent Owner the benefit of the doubt and accords the evidence of unexpected results and the alleged skepticism by Toro some evidentiary basis, one must remember the guidance of the courts that "*all*" evidence bearing on the ultimate conclusion of obviousness must be considered. This would include the undisputed evidence of simultaneous invention in which the parties filed their patent applications four minutes apart on the same day and showed their products together at the same trade show days later. Such evidence of simultaneous invention offsets the evidence of secondary considerations presented by the Patent Owner in the first reexamination. Accordingly, the strong prima facie case of obviousness presented by Dingo in view of Komatsu is simply not outweighed by the objective evidence of non-obviousness when such evidence is offset by the undisputed fact of simultaneous invention.

V. No Admissions

The fact that this Request for Reexamination addresses only claims 1, 15, 17 and 20-63 of the '386 patent is not an admission by Toro that the other untreated claims of the '386 patent are valid or would be patentable over the prior art relied upon in this Request or other prior art. In addition, the manner in which the prior art relied upon in this Request as applied to claims 1, 15, 17 and 20-63 of the '386 patent herein is not an admission by Toro that this is the only way such references could have been applied. Moreover, the selection and use of the particular

references relied upon in this Request is not an admission by Toro that the prior art relied upon in this Request is the only prior art that could be applied to the claims of the '386 patent.

VI. Conclusions

Clearly, the prior art relied upon in this Request raises substantial new questions of patentability as to claims 1, 15, 17 and 20-63 of the '386 patent. Just as clearly, the prior art relied upon in this Request presents extremely strong and well supported prima facie proposed obviousness rejections of claims 1, 15, 17 and 20-63 of the '386 patent as set forth above in Ground 1. To the extent objective evidence relating to obviousness exists, such evidence is weak at best and is further offset by the fact of simultaneous invention as Toro has shown above in Sections IV(G) and 1V(H) hereof. Accordingly, the prima face case of obviousness under 35 U.S.C. §103(a) must stand.

All the requirements for *ex parte* reexamination have been met. It is respectfully requested that the PTO order such reexamination and find that claims 1, 15, 17 and 20-63 of the '386 patent are unpatentable. In addition, this Request for *Ex Parte* Reexamination addresses various new claims 21-63 added to the '386 patent through the Reexamination Certificate of April 12, 2018 while pending Reexam Control No. 90/014,109 addresses, inter alia, original claims 1-13 of the '386 patent. Accordingly, it is respectfully requested that the PTO consider merging any reexamination proceeding resulting from the grant of this Request with Reexam Control No. 90/014,109 such that claims 1-13, 15, 17 and 20-63 of the '386 patent are reexamined together in the merged proceedings.

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(12) **United States Patent**
Thomas et al.

(10) **Patent No.: US 9,321,386 B1**
(45) **Date of Patent: Apr. 26, 2016**

(54) **LOW PROFILE COMPACT TOOL CARRIERS**

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(73) Assignee: **Vermeer Manufacturing Company**, Pella, IA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/691,649**

(22) Filed: **Apr. 21, 2015**

Related U.S. Application Data

(60) Provisional application No. 62/118,860, filed on Feb. 20, 2015.

(51) **Int. Cl.**

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B66F 9/075	(2006.01)
B66F 9/22	(2006.01)
B66F 9/06	(2006.01)

(52) **U.S. Cl.**
CPC ... ***B60P 1/50*** (2013.01); ***B66F 9/06*** (2013.01); ***B66F 9/07572*** (2013.01); ***B66F 9/22*** (2013.01)

(58) **Field of Classification Search**
CPC B60P 1/50; B66F 9/06; B66F 9/07572; B66F 9/22; E02F 3/34; E02F 3/3405; E02F 3/3414
USPC 414/685, 686, 722, 909; 180/89.1, 311
See application file for complete search history.

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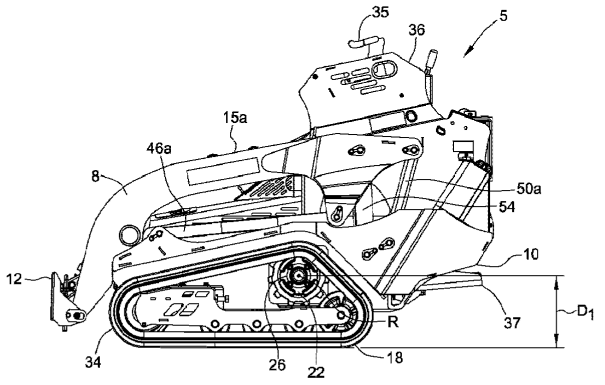
(Continued)

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(57) **ABSTRACT**

Compact tool carriers having a loader mounted to a low-profile mainframe are disclosed. In some embodiments, the pivot points of the mainframe about which the loader is pivoted are low relative to the mainframe to reduce the mainframe size and to lower the center of gravity to improve the stability of the compact tool carrier during use.

20 Claims, 7 Drawing Sheets



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FIG. 1

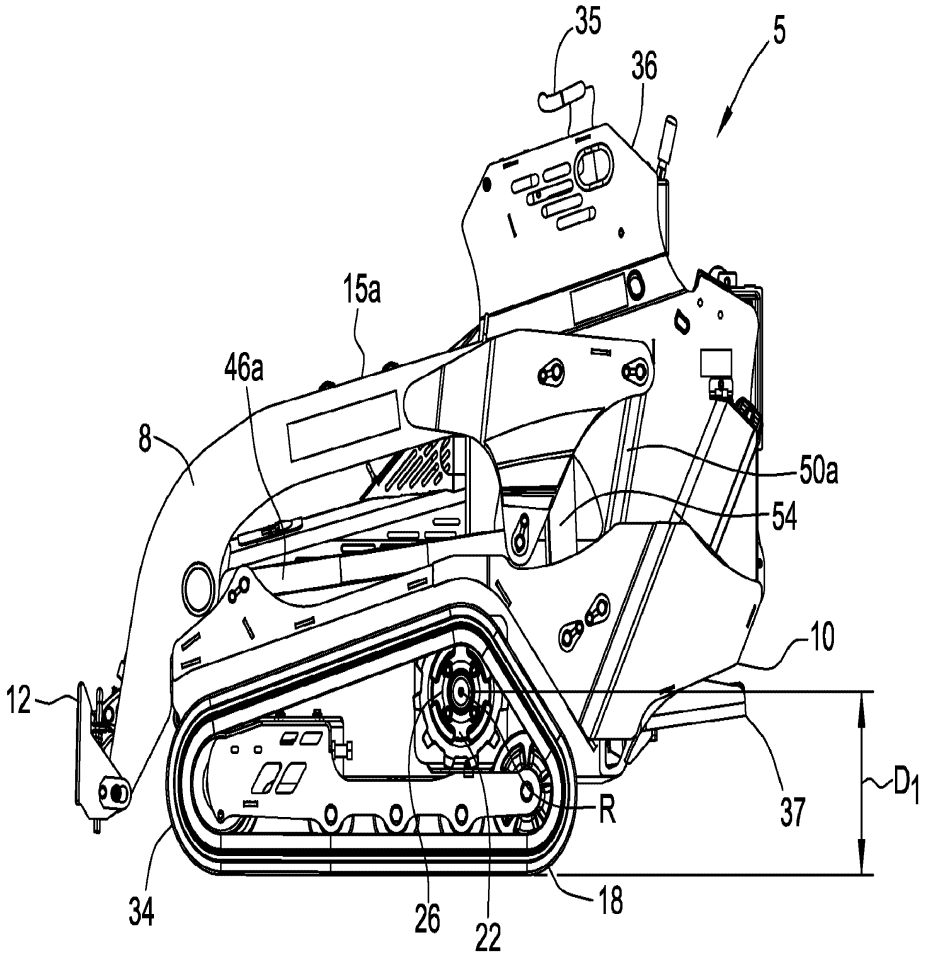


FIG. 2

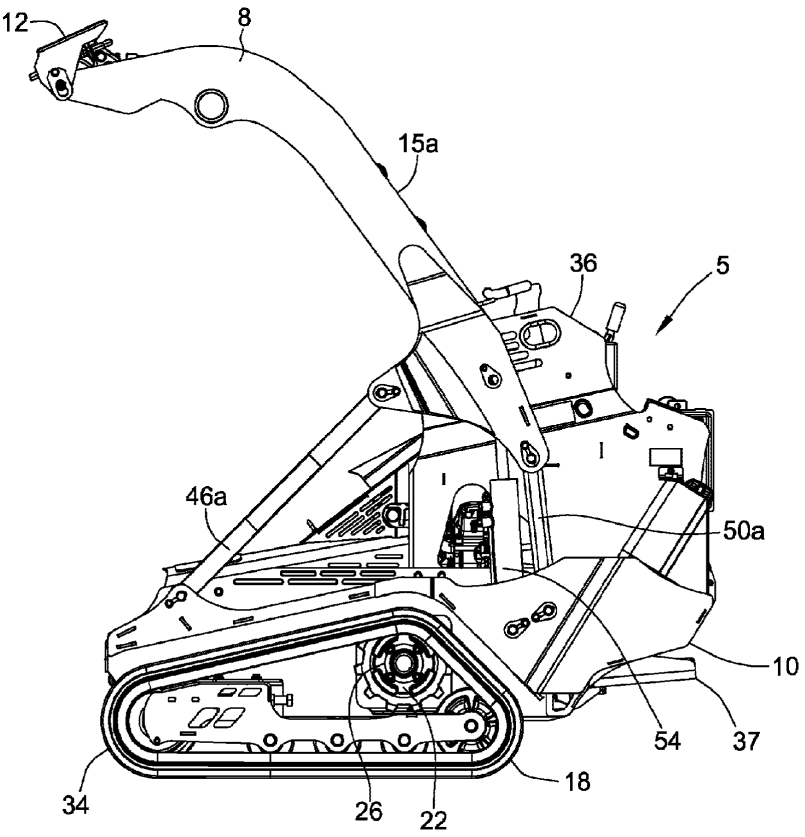


FIG. 3

FIG. 4

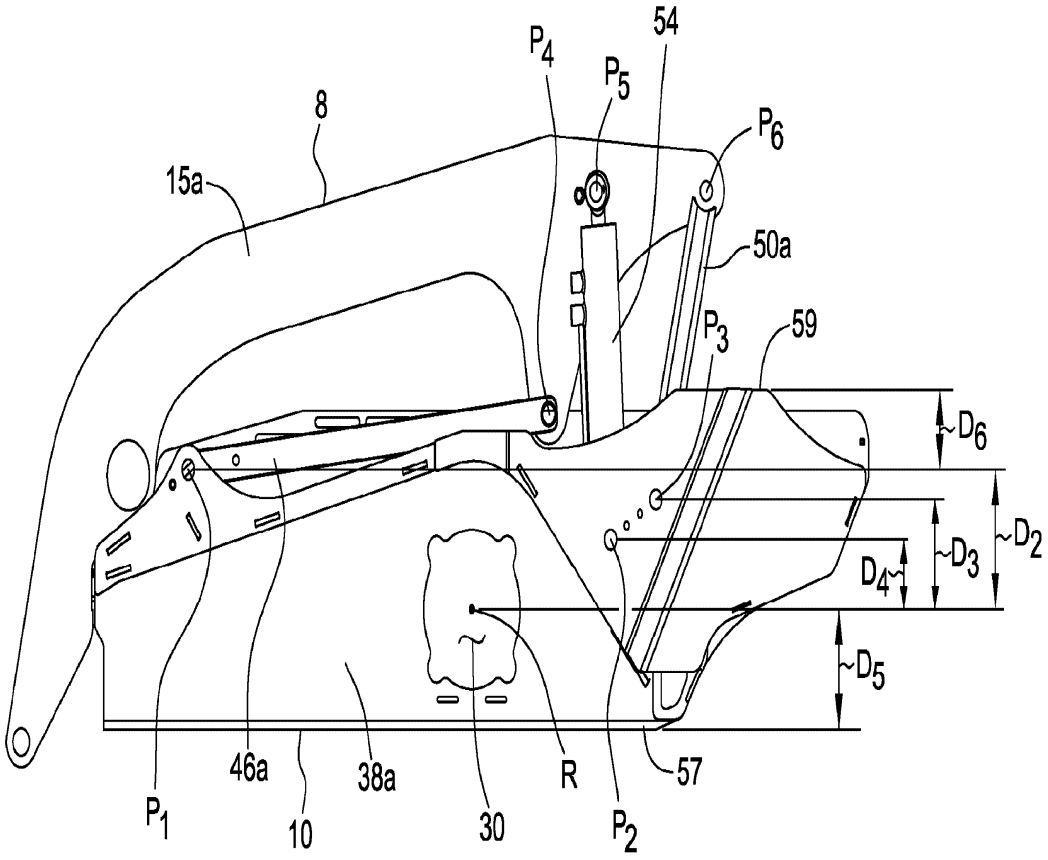


FIG. 5

FIG. 6

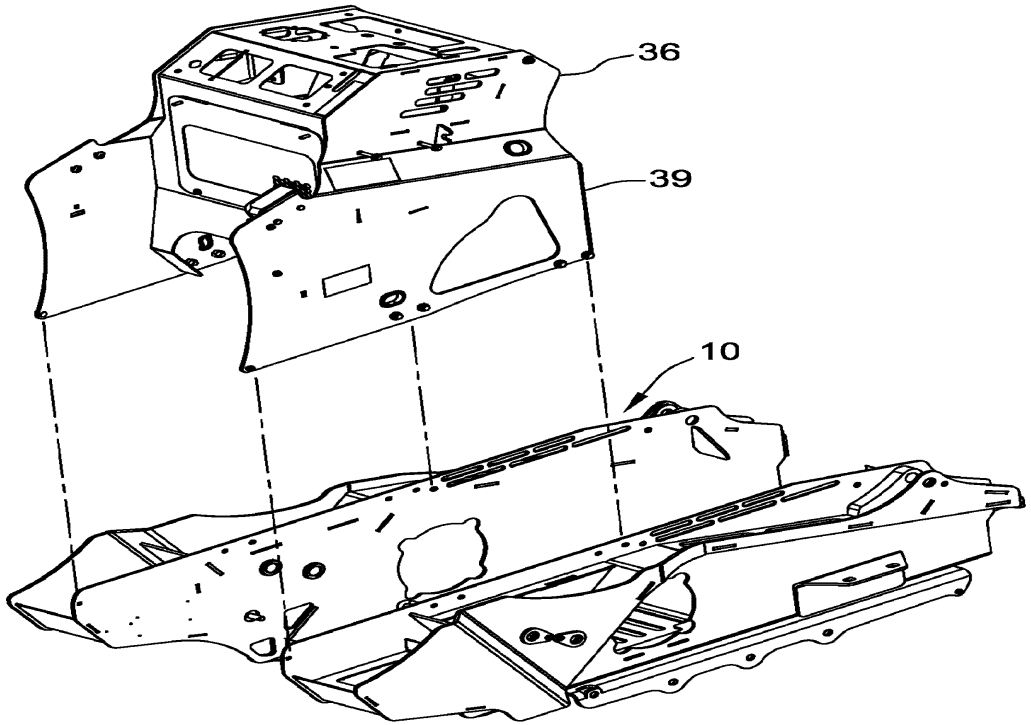


FIG. 7

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Kubota North America Corporation et al

LOW PROFILE COMPACT TOOL CARRIERS

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application No. 62/118,860. filed Feb. 20, 2015, which is incorporated herein by reference in its entirety.

FIELD OF THE DISCLOSURE

The field of the disclosure relates to compact tool carriers having a loader mounted to a low-profile mainframe.

BACKGROUND

Compact tool carriers are tool-mounted machines that are capable of working in tight spaces for utility or do-it-yourself home projects. Compact tool carriers are walk-behind units or include a platform on which the operator may stand during use. Compact tool carriers are generally defined (e.g., ISO 6165 (2012) and SAE J2752) as "a self-propelled crawler or wheeled machine having an operating mass of less than 1500 kg with a rigid frame, having either a pedestrian operating position or a standing operator platform at the rear of the machine and either front-mounted interchangeable equipment or lift arms with an attachment bracket capable of coupling to interchangeable, front-mounted attachments." The tool carriers may be attached to a variety of interchangeable tools such as buckets, augers, forks, stump grinders, tillers, rollers and the like.

Compact tool carriers may be distinguished from much larger conventional skid steers in which an operator is seated in the operating position. Compact tool carriers pose difficulty in design relative to full-size skid steers due to variation in weight, complexity and size.

A continuing need exists for compact tool carriers with a relatively low-profile, compact design and/or that are characterized by a more effective loader lifting profile.

This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the disclosure, which are described and/or claimed below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

SUMMARY

One aspect of the present disclosure is directed to a compact tool carrier configured for standing or walk-behind operator control. The carrier has a mass of less than about 1500 kg and includes a loader having an arm and a linkage pivotally attached to the loader arm. An actuator is pivotally attached to the loader arm. The carrier includes a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader. The control station is configured for remote operation or is mounted toward the rear of the compact tool carrier and is adapted to allow for standing or walk-behind operation.

Another aspect of the present disclosure is directed to a compact tool carrier. The carrier comprises a loader and a mainframe for supporting the loader. The mainframe has a first side and a second side with each side having a top and a bottom. The first side of the mainframe has at least two pivot points relative to the loader. The carrier includes a drive mechanism comprising tracks or wheels for propelling the apparatus over a supporting surface. The drive mechanism is attached to the mainframe about a rotational axis. The compact tool carrier has a bottom at which the drive mechanism contacts the supporting surface. The rotational axis and bottom of the compact tool carrier are separated by a vertical distance D1. The rotational axis and each pivot point are separated by a vertical distance. Each vertical distance between the rotational axis and a pivot point is less than 1.5 times D1.

Various refinements exist of the features noted in relation to the above-mentioned aspects of the present disclosure. Further features may also be incorporated in the above-mentioned aspects of the present disclosure as well. These refinements and additional features may exist individually or in any combination. For instance, various features discussed below in relation to any of the illustrated embodiments of the present disclosure may be incorporated into any of the above-described aspects of the present disclosure, alone or in any combination.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a compact tool carrier with the loader in a down position:

FIG. **2** is a side view of the compact tool carrier with the loader in a down position;

FIG. **3** is a side view of the compact tool carrier with the loader in a raised position;

FIG. **4** is a perspective view of a mainframe of the compact tool carrier;

FIG. **5** is a side view of the mainframe and loader of the compact tool carrier;

FIG. **6** is a cross-section side view of the mainframe; and

FIG. **7** is an exploded perspective view of the mainframe and an upper frame of the compact tool carrier.

Corresponding reference characters indicate corresponding parts throughout the drawings.

DETAILED DESCRIPTION

An embodiment of a compact tool carrier is generally referred as "**5**" in FIG. **1**. The compact tool carrier **5** includes a loader **8** supported by a mainframe **10**. The loader **8** includes an attachment plate **12** for interchangeably attaching any one of a number of tools (not shown). In this regard, such interchangeable tools do not form part of the compact tool carrier **5** unless stated otherwise. The attachment plate **12** is connected to an actuator **14** for tilting of tools connected to the attachment plate **12**. The loader **8** has a first arm **15***a* and a second arm **15***b* generally opposite the first arm **15***a*. Each arm **15***a*, **15***b* may be a single weldment or may include various components attached by fasteners (e.g., nuts and bolts). The first and second arms **15***a*, **15***b* each include a bracket portion **17***a*, **17***b* (FIG. **1**) for fastening various linkages.

As used herein, "compact tool carrier" refers to machines that are self-propelled and are capable of carrying interchangeable equipment and that generally have a mass (not including the interchangeable tool) of less than about 1500 kg (about 3307 lb). Use of the term "compact tool carrier" herein is intended to exclude full size skid steers (e.g., seat-operated units) due to a large variation in weight, complexity and size. In some embodiments, the compact tool carrier **5** meets the definition of a compact tool carrier provided in ISO 6165

(2012) and SAE J2752 set forth above, both standards being incorporated herein by reference for all relevant and consistent purposes.

The compact tool carrier **5** includes a longitudinal axis A that is parallel to the direction of travel of the carrier (i.e., parallel to its length). The compact tool carrier **5** is generally longitudinally symmetrical (i.e., relative to the longitudinal axis A) in that several components have a corresponding component with the same function opposite the component (i.e., across the axis A). Corresponding components of the pair may be indicated herein by use of a reference number followed by "A" and "B" and may be referred to as a "first" component and a "second" component, respectively. While the compact tool carrier **5** may be described herein with reference to the components of one side of the compact tool carrier **5**, any component designated by "A" or "B" herein or shown in FIGS. **1-7** includes a corresponding component with the same function opposite the component.

The compact tool carrier **5** includes a drive mechanism **18** attached to the mainframe **10**. In the illustrated embodiment, the drive mechanism **18** is directly mounted (i.e., connected without intermediary parts) to the mainframe **10** by way of drive sprocket **22** connected to a hub **26** (FIG. **2**). The hub **26** is attached to a shaft (not shown) that extends through a drive opening **30** (FIG. **4**) of the mainframe **10**. The sprocket **22**, hub **26** and shaft (not shown) rotate about a rotational axis R (FIG. **5**). As shown, the drive mechanism **18** includes tracks **34**. In other embodiments, the drive mechanism **10** includes wheels.

The compact tool carrier **5** includes a control station **36** (FIG. **1**) which may include controls (not all controls being shown) for propelling the compact tool carrier **5** forward and/or for raising and lowering the loader **8**. The control station **36** may be mounted toward the rear of the compact tool carrier **5** (i.e., opposite the attachment plate **12**) and is generally adapted to allow for standing or walk-behind operation. As used herein, "standing operation" generally refers to operation in which the operator stands on a platform attached to the compact tool carrier while "walk-behind operation" generally refers to operation in which the operator stands on the surface supporting the compact tool carrier **5**. In the illustrated embodiment, the compact tool carrier **5** includes an operator platform **37** (FIG. **2**).

In embodiments in which the compact tool carrier **5** includes an operator platform **37** for standing operation, the difference between the height of the control station **36** (e.g., as measured from the highest control for operating the loader or propelling the apparatus forward) and the platform **37** may be at least about 90 cm (e.g., from about 90 cm to about 130 cm). In embodiments in which the operator walks behind the compact tool carrier **5**, the control station **36** may be at least about 90 cm (e.g., from about 90 cm to about 130 cm) from the surface supporting the compact tool carrier. Such a range generally complies with the zones of comfort and reach for controls in earth-moving equipment set forth in ISO 6682 (2008) as determined from the physical dimensions of operators and minimum operator space envelope as set forth in ISO 3411 (2007), both of which are incorporated herein by reference for all relevant and consistent purposes.

In the illustrated embodiment, the control station **36** is attached to an upper frame **39** (FIG. **7**) that is attached and supported by the mainframe **10**. In other embodiments, rather than being integrated as one unit in the compact tool carrier **5**, the control station **36** is separate from the body (e.g., mainframe) of the carrier and is operated remotely. In such embodiments, the control station **36** may be wired or may operate wirelessly to propel the carrier **5** and/or raise and lower the loader **8**.

The mainframe **10** includes a first side **38***a* and a second side **38***b* generally opposite the first side **38***a*. As used herein, the term "mainframe" generally refers to a single weldment to which the loader **8** is attached, optionally through one or more pivotal linkages. The mainframe **10** includes bracket portions **40***a*, **40***b* (FIG. **4**) through which various pivot linkages are attached. In the illustrated embodiment, the engine (not shown) and the drive mechanism **18** comprising tracks or wheels are directly connected to the mainframe **10**.

The first loader arm **15***a* is pivotally connected to the first side **38***a* of the mainframe **10**, and the second loader arm **15***b* is pivotally connected to the second side **38***b* of the mainframe **10**. The loader arms **15***a*, **15***b* and sides **38***a*, **38***b* of the mainframe **10** each include three pivot points for pivoting the loader **8** relative to the mainframe **10**. The first side **38***a* of the mainframe **10** includes a forward pivot point P_1 (FIG. **5**) a rear pivot point P_3 and a central pivot point P_2 between the forward pivot point P_1 and the rear pivot point P_3. Similarly, the first arm **15***a* includes a forward pivot point P_4, a rear pivot point P_6 and a central pivot point P_5 between the forward pivot point P_4 and the rear pivot point P_6. The compact tool carrier **5** includes a first forward linkage **46***a* attached to the first side **38***a* of the mainframe **10** at its forward pivot point P_1 and attached to the first arm **15***a* at its forward pivot point P_4. A first rear linkage **50***a* is attached to the first side **38***a* of the mainframe **10** at its rear pivot point P_3 and is attached to the first arm **15***a* of the loader **8** at its rear pivot point P_6. While the carrier **5** is shown with two loader linkages **46***a*, **50***a* on each side of the carrier **5**, in other embodiments the carrier **5** includes a single linkage.

An actuator **54**, shown as a hydraulic cylinder, is attached to the first side **38***a* of the mainframe **10** at its center pivot point P_4 and is attached to the loader arm **15***a* at its center pivot point P_5 to raise the loader **8**. The compact tool carrier **5** may include a single actuator **54**, or, as in other embodiments, a second actuator (not shown) is connected to the second side **38***b* (FIG. **4**) of the mainframe **10** and the second arm **15***b* (FIG. **1**). The actuator **54** is powered to raise the loader **8** and, in some embodiments, is also powered to lower the loader **8** (as opposed to a one-way actuator lowered by gravity alone).

The second side **38***b* (FIG. **4**) of the mainframe **10** may include a forward pivot point and a rear pivot point to which a second forward linkage **46***b* (FIG. **1**) and second rear linkage (not shown) are respectively attached. The second arm **15***b* may also include a forward pivot point and rear pivot point to which the second forward linkage **46***b* and second rear linkage are attached. In embodiments in which the compact tool carrier **5** includes a second actuator (not shown), the second side **38***b* of the mainframe **10** includes a central pivot point between its forward pivot point and its rear pivot point, and the second arm **15***b* also includes a central pivot point between its forward pivot point and its rear pivot point. The second cylinder may be attached to the central pivot point of the second side **38***b* of the mainframe **10** and the central pivot point of the second arm **15***b*.

In some embodiments, the first and second ends **38***a*, **38***b* of the mainframe **10** and the first and second loader arms **15***a*, **15***b* do not include more than three pivot points at which the mainframe **10** and loader **8** pivot relative to each other. While the actuator **54** is shown as being attached between the other two linkages **46***a*, **50***a*, in other embodiments the actuator **54** is forward to both linkages **46***a*, **50***a* or rearward to both

linkages **46***a*, **50***a*. Further, each side of the carrier **5** having an actuator **54** may include a single linkage rather than two linkages.

In some embodiments, the mainframe **10** is characterized by a relatively low profile (i.e., the pivot points are positioned relatively low on the mainframe allowing its height to be reduced). The rotational axis R (FIG. **5**) and the bottom of the compact tool carrier **5** (FIG. **2**) are separated by a distance D**1**. Generally, the bottom of the compact tool carrier **5** corresponds to the point at which the drive mechanism **18** contacts the surface supporting the compact tool carrier **5**. The rotational axis R and the forward pivot point P_1 of the first side **38***a* of the mainframe **10** are separated by a vertical distance D**2**. The rotational axis R and the rear pivot point P_3 are separated by a vertical distance D**3**. The rotational axis R and the central pivot point P_4 are separated by a vertical distance D**4**. Each of D**2**, D**3** and D**4** is less than about 1.5 times D**1** (1.5×D**1**). In some embodiments, each of D**2**, D**3** and D**4** is less than D**1** or even less than about 0.75 times D**1** (0.75×D**1**).

The mainframe **10** profile may also be expressed relative to the distance D**5** between the rotational axis R (FIG. **5**) and the bottom **57** of the mainframe **10**. Each of D**2**, D**3** and D**4** is less than about twice D**5** (2×D**5**). In some embodiments, each of D**2**, D**3** and D**4** is less than about 1.75 times D**5** (1.75×D**5**) or less than about 1.5 times D**5** (1.5×D**5**). P**2** and P**3** may be relatively lower than P**1** and their distances D**3**, D**4** from the rotational axis R may be even less than about 1.25 times D**5** (1.25×D**5**). The distance D**6** between the top **59** of the first side **38***a* of the mainframe **10** and the highest pivot point (P_1 in the illustrated embodiment), is less than about 1.5 times D**5**, less than about D**5** or less than about 0.75 times D**5**.

The second side **38***b* (FIG. **1**) of the mainframe **10** may have a similar pivot point arrangement. The rotational axis R and the forward pivot point of the second side **38***b* are separated by a vertical distance D**2'** (not shown). The rotational axis R and the rear pivot point of the second side are separated by a vertical distance D**3'** (not shown). The rotational axis R and the central pivot point (if any) of the second side **38***b* of mainframe **10** are separated by a vertical distance D**4'** (not shown). Each of D**2'**, D**3'** and D**4'** is less than about 1.5 times D1 (1.5×D**1**) or less than D**1** or even less than about 0.75 times D1 (0.75×D**1**). The rotational axis R and the bottom of the second side **38***b* of the mainframe **10** are separated by a vertical distance D**5'** (not shown). Each of D**2'**, D**3'** and D**4'** is less than twice D**5'** (2×D**5'**) or less than about 1.75 times D**5'** (1.75×D**5'**) or less than about 1.5 times D**5'** (1.5×D**5'**). D**3'** and D**4'** may be even less than about 1.25 times D**5'** (1.25×D**5'**). The distance D**6'** between the top of the second side **38***b* of the mainframe **10** and the highest pivot point is less than about 1.5 times D**5'**, less than about D**5'** or less than about 0.75 times D**5'**.

The compact tool carrier **5** includes an engine (not shown) for propelling the drive mechanism **18**. As shown in FIG. **6**, the engine may be mounted to an engine bracket **60** that forms part of the mainframe **10**. The engine may drive a hydraulic pump that powers hydraulic motors (not shown) which drive the drive mechanism **18** (FIG. 1) and which provide hydraulic power to actuator **54**. The mainframe **10** includes a reservoir **64** for storing and cycling of hydraulic fluid.

Compared to conventional compact tool carriers, embodiments of the compact tool carrier **5** described above have several advantages. By positioning the pivot points relatively low on the mainframe **10**, the mass of the mainframe **10** and the resulting cost of the carrier **5** may be reduced. Further, such a low-profile mainframe **10** improves visibility for the operator and allows the center of gravity of the carrier **5** to be lowered which improves its stability. In embodiments in which the carrier **5** includes an actuator **54** (FIG. **5**) for lifting the loader **8** that is disposed between forward linkage **46***a* and a rear linkage **50***a* on at least one side **38***a*, **38***b* of the mainframe **10**, the loader **8** is characterized by an travel path in which the loader travels vertically rather than over a radial path. The vertical travel path of the loader **8** is more effective relative to conventional travel paths for compact tool carriers **5** as the carrier **5** may operate closer to other structures.

As used herein, the terms "about," "substantially," "essentially" and "approximately" when used in conjunction with ranges of dimensions, concentrations, temperatures or other physical or chemical properties or characteristics is meant to cover variations that may exist in the upper and/or lower limits of the ranges of the properties or characteristics, including, for example, variations resulting from rounding, measurement methodology or other statistical variation.

When introducing elements of the present disclosure or the embodiment(s) thereof, the articles "a", "an", "the" and "said" are intended to mean that there are one or more of the elements. The terms "comprising," "including," "containing" and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements. The use of terms indicating a particular orientation (e.g., "top", "bottom", "side", etc.) is for convenience of description and does not require any particular orientation of the item described.

As various changes could be made in the above constructions and methods without departing from the scope of the disclosure, it is intended that all matter contained in the above description and shown in the accompanying drawing[s] shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

2. The compact tool carrier as set forth in claim **1** wherein the mainframe incorporates a single weldment.

3. The compact tool carrier as set forth in claim **1** wherein the loader arm is a first loader arm and the linkage is a first linkage, the loader comprising a second loader arm and the compact tool carrier comprising a second linkage pivotally attached to the second side of the mainframe and pivotally attached to the second loader arm.

4. The compact tool carrier as set forth in claim **3** wherein the actuator is a first actuator, the compact tool carrier comprising a second actuator, the second actuator being pivotally

attached to the second side of the mainframe and pivotally attached to the second loader arm.

5. The compact tool carrier as set forth in claim **1** comprising a drive mechanism comprising tracks or wheels, the drive mechanism being attached to the mainframe.

6. The compact tool carrier as set forth in claim **1** comprising an engine to propel a drive mechanism, the engine being attached to the engine bracket.

7. The compact tool carrier as set forth in claim **1** wherein the actuator is a hydraulic cylinder.

8. The compact tool carrier as set forth in claim **1** wherein each loader arm incorporates a single weldment.

9. The compact tool carrier as set forth in claim **1** wherein the control station is mounted toward the rear of the compact tool carrier, the compact tool carrier comprising an operator platform for standing operation of the compact tool carrier, the difference between the height of the control station and the height of the platform being at least 90 cm.

10. The compact tool carrier as set forth in claim **1** wherein the control station is mounted toward the rear of the compact tool carrier, and the height of the control station from a surface supporting the compact tool carrier is at least 90 cm.

11. A method for operating the compact tool carrier as set forth in claim **1**, the method comprising standing behind the compact tool carrier and operating the control station to propel the compact tool carrier forward and/or raise or lower the loader.

12. The method as set forth in claim **11** wherein the control station is operated while standing on an operator platform or while standing on a surface supporting the compact tool carrier.

13. The compact tool carrier as set forth in claim **1** further comprising a tool attached to the loader, the tool being selected from the group consisting of a bucket, auger, fork, stump grinder, tiller and roller.

14. The compact tool carrier as set forth in claim **1** wherein a single linkage is attached to the first side of the mainframe and pivotally attached to the loader arm.

15. A compact tool carrier comprising:

a loader adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

an actuator pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

a drive mechanism comprising tracks or wheels for propelling the compact tool carrier over a supporting surface, the drive mechanism being attached to the mainframe about a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D**1**, the rotational axis and each pivot point being separated by a vertical distance, each vertical distance between the rotational axis and a pivot point being less than 1.5 times D**1**; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and/or lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

16. The compact tool carrier as set forth in claim **15** wherein the rotational axis and the pivot point at which the linkage is attached are separated by a vertical distance D**2**, the rotational axis and the pivot point at which the actuator is attached are separated by a vertical distance D**3**, both D**2** and D**3** being less than 1.5 times D**1**.

17. The compact tool carrier as set forth in claim **16** wherein the second side of the mainframe comprises two pivot points, each vertical distance between the rotational axis and a pivot point being less than 1.5 times D**1**.

18. The compact tool carrier as set forth in claim **16** wherein the rotational axis and the bottom of the first side of the mainframe are separated by a vertical distance D**5**, both D**2** and D**3** being less than twice D**5**.

19. The compact tool carrier as set forth in claim **18** wherein the first side of the mainframe comprises a top most pivot point, the top most pivot point and the top of the first side of the mainframe being separated by a vertical distance D**6**, D**6** being less than about 1.5 times D**5**.

20. The compact tool carrier as set forth in claim **15** further comprising a tool attached to the loader, the tool being selected from the group consisting of a bucket, auger, fork, stump grinder, tiller and roller.

* * * * *

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(12) **EX PARTE REEXAMINATION CERTIFICATE** (11288th)

United States Patent
Thomas et al.

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(45) **Certificate Issued: Apr. 12, 2018**

(54) **LOW PROFILE COMPACT TOOL CARRIERS**

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(51) **Int. Cl.**

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B66F 9/075	(2006.01)
B66F 9/22	(2006.01)
B66F 9/06	(2006.01)
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E02F 3/96	(2006.01)
E02F 9/20	(2006.01)
B60P 1/48	(2006.01)
B66F 9/065	(2006.01)

(52) **U.S. Cl.**
CPC ***B66F 9/06*** (2013.01); ***B60P 1/483*** (2013.01); ***B66F 9/065*** (2013.01); ***B66F 9/0759*** (2013.01); ***B66F 9/07572*** (2013.01); ***B66F 9/07577*** (2013.01); ***B66F 9/22*** (2013.01); ***E02F 3/3405*** (2013.01); ***E02F 3/3414*** (2013.01); ***E02F 3/96*** (2013.01); ***E02F 9/08*** (2013.01); ***E02F 9/205*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

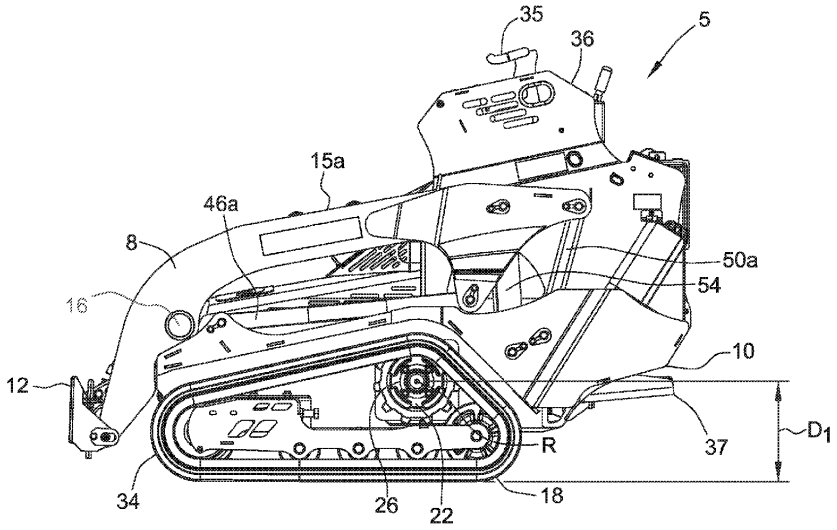
(56) **References Cited**

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/013,915, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

Primary Examiner — William Doerrler

(57) **ABSTRACT**

Compact tool carriers having a loader mounted to a low-profile mainframe are disclosed. In some embodiments, the pivot points of the mainframe about which the loader is pivoted are low relative to the mainframe to reduce the mainframe size and to lower the center of gravity to improve the stability of the compact tool carrier during use.



(AMENDED)

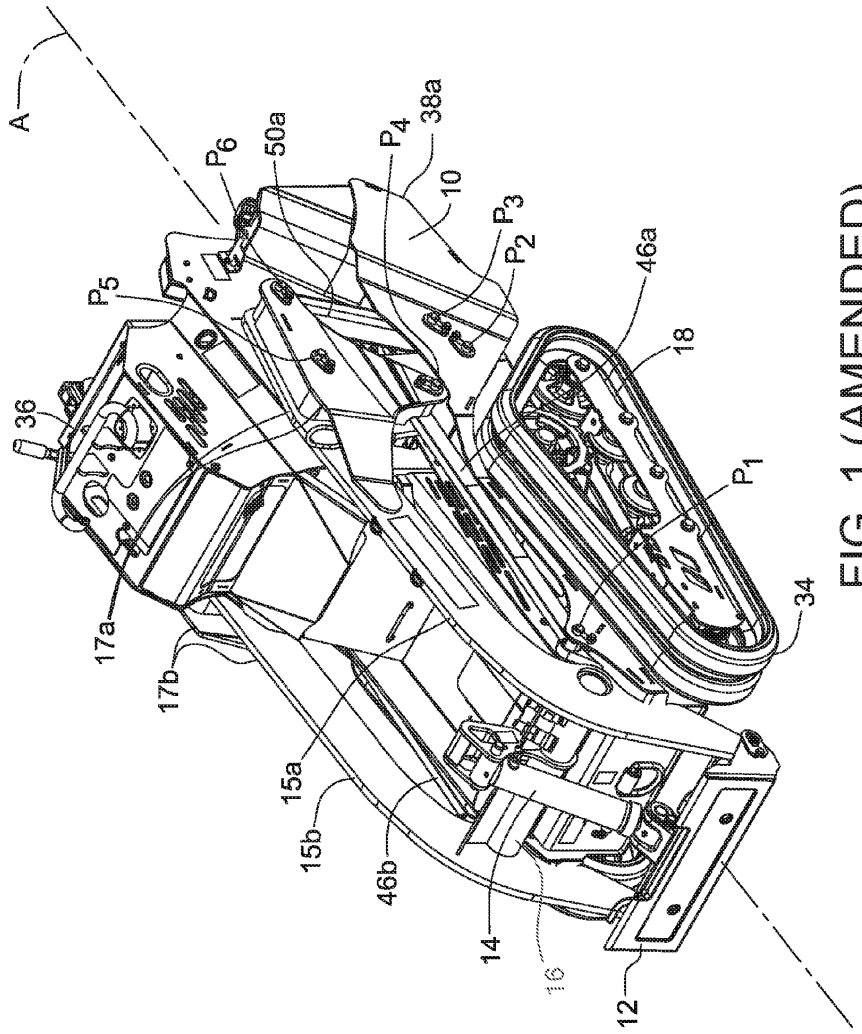


FIG. 1 (AMENDED)

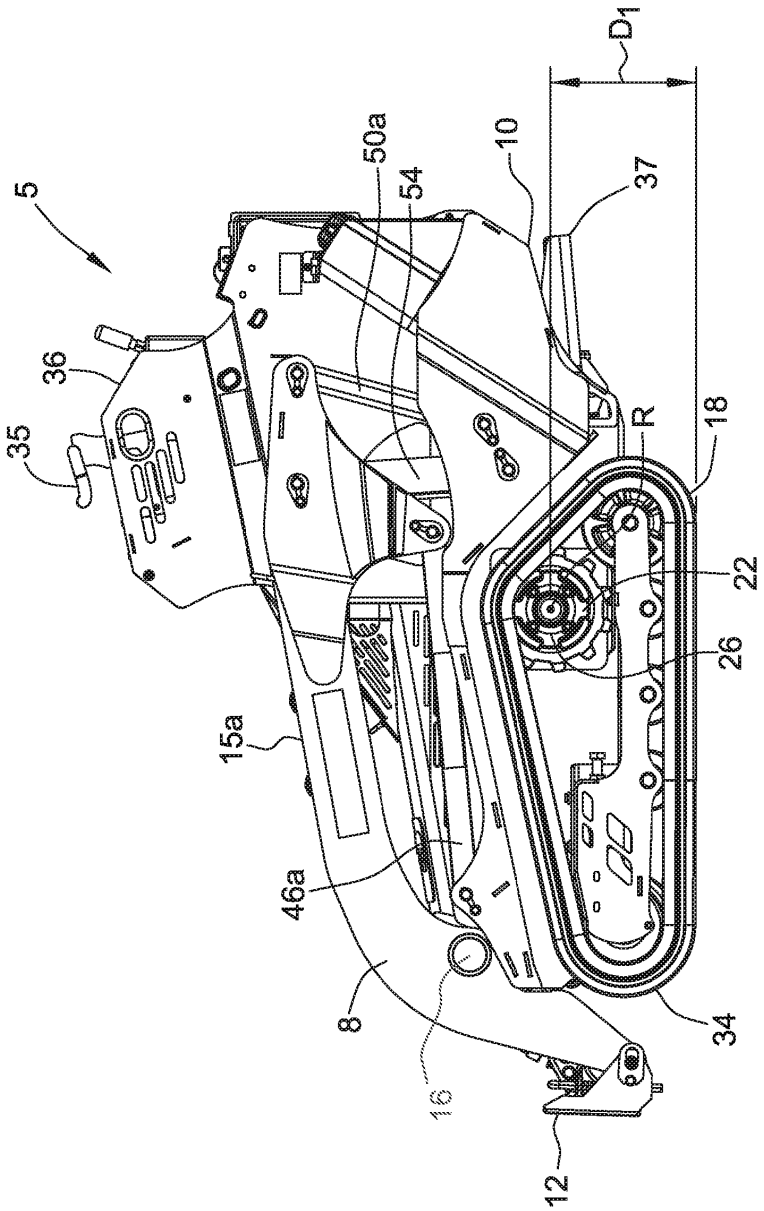


FIG. 2 (AMENDED)

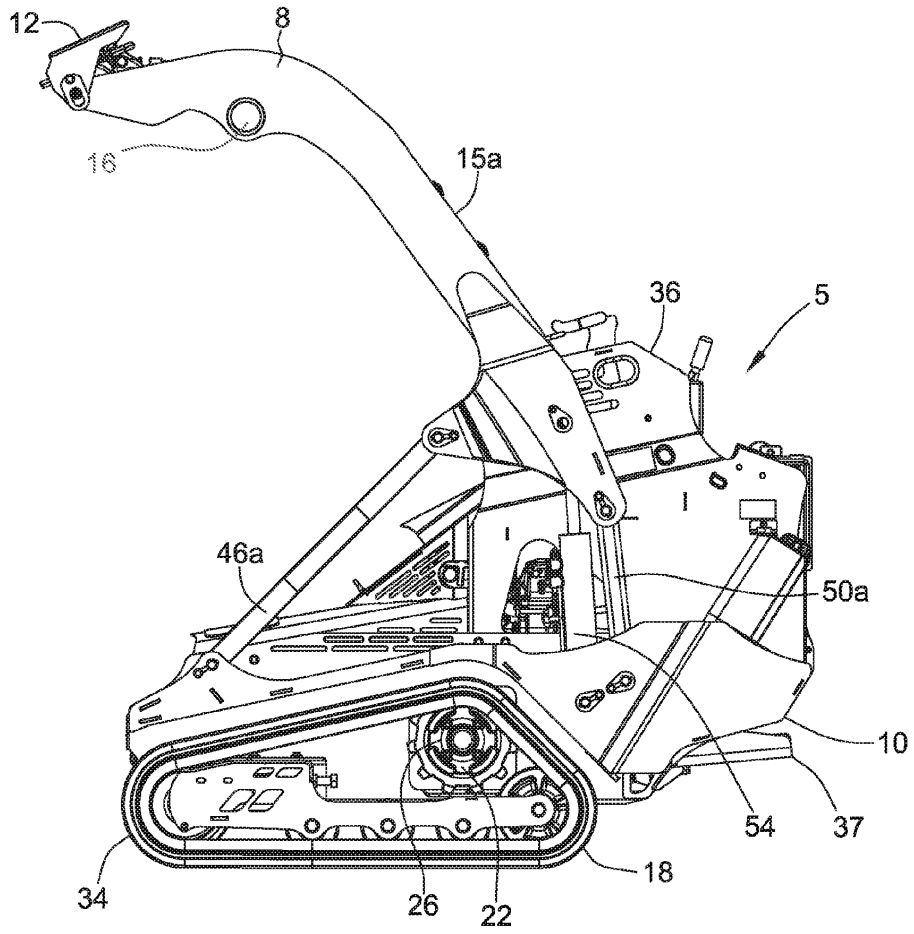


FIG. 3 (AMENDED)

EX PARTE REEXAMINATION CERTIFICATE

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

ONLY THOSE PARAGRAPHS OF THE SPECIFICATION AFFECTED BY AMENDMENT ARE PRINTED HEREIN.

Column 2, lines 44-58:

An embodiment of a compact tool carrier is generally referred as "**5**" in FIG. **1**. The compact tool carrier **5** includes a loader **8** supported by a mainframe **10**. The loader **8** includes an attachment plate **12** for interchangeably attaching any one of a number of tools (not shown). In this regard, such interchangeable tools do not form part of the compact tool carrier **5** unless stated otherwise. The attachment plate **12** is connected to an actuator **14** for tilting of tools connected to the attachment plate **12**. The loader **8** has a first arm **15***a* and a second arm **15***b* generally opposite the first arm **15***a*. *A cross-member 16 extends from the first arm 15a to the second arm 15b. The actuator 14 is connected to the cross-member 16.* Each arm **15***a*, **15***b* may be a single weldment or may include various components attached by fasteners (e.g., nuts and bolts). The first and second arms **15***a*, **15***b* each include a bracket portion **17***a*, **17***b* (FIG. **1**) for fastening various linkages.

Column 3, lines 20-30:

The compact tool carrier **5** includes a drive mechanism **18** attached to the mainframe **10**. In the illustrated embodiment, the drive mechanism **18** is directly mounted (i.e., connected without intermediary parts) to the mainframe **10** by way of drive sprocket **22** connected to a hub **26** (FIG. **2**). The hub **26** is attached to a shaft (not shown) that extends through a drive opening **30** (FIG. **4**) of the mainframe **10**. The sprocket **22**, hub **26** and shaft (not shown) rotate about a rotational axis R (FIG. **5**). As shown, the drive mechanism **18** includes tracks **34**. In other embodiments, the drive mechanism **[10]** *18* includes wheels.

Column 4, lines 35-45:

An actuator **54**, shown as a hydraulic cylinder, is attached to the first side **38***a* of the mainframe **10** at its center pivot point **[**P_4**]** P_2 and is attached to the loader arm **15***a* at its center pivot point P_5 to raise the loader **8**. The compact tool carrier **5** may include a single actuator **54**, or, as in other embodiments, a second actuator (not shown) is connected to the second side **38***b* (FIG. **4**) of the mainframe **10** and the second arm **15***b* (FIG. **1**). The actuator **54** is powered to raise the loader **8** and, in some embodiments, is also powered to lower the loader **8** (as opposed to a one-way actuator lowered by gravity alone).

Column 5, lines 4-19:

In some embodiments, the mainframe **10** is characterized by a relatively low profile (i.e., the pivot points are positioned relatively low on the mainframe allowing its height to be reduced). The rotational axis R (FIG. **5**) and the bottom of the compact tool carrier **5** (FIG. **2**) are separated by a distance D**1**. Generally, the bottom of the compact tool carrier **5** corresponds to the point at which the drive mechanism **18** contacts the surface supporting the compact tool carrier **5**. The rotational axis R and the forward pivot point P_1 of the first side **38***a* of the mainframe **10** are separated by a vertical distance D**2**. The rotational axis R and the rear pivot point P_3 are separated by a vertical distance D**3**. The rotational axis R and the central pivot point **[**P_4**]** P_2 are separated by a vertical distance D**4**. Each of D**2**, D**3** and D**4** is less than about 1.5 times D**1** (1.5×D**1**). In some embodiments, each of D**2**, D**3** and D**4** is less than D**1** or even less than about 0.75 times D**1** (0.75×D**1**).

THE DRAWING FIGURES HAVE BEEN CHANGED AS FOLLOWS:

On FIGS. **1**, **2** and **3**, A reference numeral has been added (**16**) for the crossbar between the arms (**15**a and **15**b).

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1** and **3-13** is confirmed.

Claims **16** and **18** are cancelled.

Claims **15**, **17** and **19** are determined to be patentable as amended.

Claim **20**, dependent on an amended claim, is determined to be patentable.

New claims **21-63** are added and determined to be patentable.

Claims **2** and **14** were not reexamined.

15. A compact tool carrier comprising:

a loader adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, each side having a top and a bottom, the first side of the mainframe having at least two pivot points relative to the loader, the loader not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

an actuator pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader;

a drive mechanism comprising tracks or wheels for propelling the compact tool carrier over a supporting surface, the drive mechanism being attached to the mainframe about a rotational axis, the compact tool carrier having a bottom at which the drive mechanism contacts the supporting surface, the rotational axis and bottom of the compact tool carrier being separated by a vertical distance D**1**, *the rotational axis and the bottom of the first side of the mainframe being separated by a vertical distance D5,* the rotational axis and **[**each**]** *the* pivot point *at which the linkage is attached to the mainframe* being separated by a vertical distance *D2, the rotational axis and the pivot point at which the*

actuator is attached to the mainframe being separated by a vertical distance D4, **[**each vertical distance between the rotational axis and a pivot point**]** *D2 and D4 each* being less than 1.5 times D**1** *and each being less than twice D5*; and

a control station having operator controls for propelling the compact tool carrier forward and for raising and/or lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation.

17. The compact tool carrier as set forth in claim **[16]** *15* wherein the second side of the mainframe comprises two pivot points, each vertical distance between the rotational axis and a pivot point being less than 1.5 times D**1**.

19. The compact tool carrier as set forth in claim **[18]** *15* wherein the first side of the mainframe comprises a top most pivot point, the top most pivot point and the top of the first side of the mainframe being separated by a vertical distance D**6**, D**6** being less than about 1.5 times D**5**.

21. The compact tool carrier as set forth in claim 1 wherein the linkage is a first linkage, the first linkage being pivotally attached to the first side of the mainframe at a first pivot point and pivotally attached to the loader arm at a second pivot point, the actuator being attached to the mainframe at a third pivot point and pivotally attached to the loader arm at a fourth pivot point, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a fifth pivot point and pivotally attached to the loader arm at a sixth pivot point, wherein as the loader travels from a down position to a vertically raised position, the first, second, third, fourth, fifth, and sixth pivot points are (1) disposed between the operator controls and a bottom of the mainframe and/or (2) disposed forward of the control station.

22. The compact tool carrier as set forth in claim 21 further comprising an operator platform for standing operation of the operator controls of the control station, the operator platform being located toward a rear of the compact tool carrier such that the first pivot point, third pivot point, and fifth pivot point are disposed forward of the operator platform.

23. The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than 1.75 D5.

24. The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than 1.5 D5.

25. The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than D1.

26. The compact tool carrier as set forth in claim 15 wherein D2 and D4 are each less than 0.75 D1.

27. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, the rotational axis and the pivot point at which the second linkage is attached to the mainframe being separated by a vertical distance D3, D3 being less than 1.5 times D1.

28. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe, (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point, a vertical distance between the rotational axis and the forward-most pivot point being less than D1.

29. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe, (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point, a vertical distance between the rotational axis and the forward-most pivot point being less than 0.75 D1.

30. The compact tool carrier as set forth in claim 15 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe at a pivot point and pivotally attached to the loader, wherein the mainframe comprises a forward-most pivot point with (1) the pivot point at which the first linkage is attached to the mainframe, (2) the pivot point at which the actuator is attached to the mainframe, or (3) the pivot point at which the second linkage is attached to the mainframe being the forward-most pivot point, a vertical distance between the rotational axis and the forward-most pivot point being less than 1.5 D5.

31. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader adapted to carry a tool, the loader being moveable between a down position and a vertically raised position, the loader comprising:
a first loader arm;
a second loader arm; and
at least one cross-member that extends from the first loader arm to the second loader arm;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear end of the mainframe, the first loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm;

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing operation, each cross-member being disposed forward of the control station in the vertically raised position of the loader; and

an operator platform for standing operation of the operator controls of the control station.

32. The compact tool carrier as set forth in claim 31 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm.

33. The compact tool carrier as set forth in claim 31 wherein the mainframe incorporates a single weldment.

34. The compact tool carrier as set forth in claim 31 wherein each cross-member is disposed forward of the operator platform and forward of the control station in the down position of the loader.

35. The compact tool carrier as set forth in claim 31 further comprising an attachment plate for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

36. The compact tool carrier as set forth in claim 35 further comprising an actuator for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

37. The compact tool carrier as set forth in claim 31 further comprising a drive mechanism for propelling the compact tool carrier over a supporting surface, the drive mechanism having a drive sprocket, the cross-member being disposed forward of the drive sprocket in the vertically raised position and the down position.

38. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader being adapted to carry a tool, the loader comprising:

a first loader arm;

a second loader arm; and

a single cross-member that extends from the first loader arm to the second loader arm;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear of the mainframe, the first loader arm not being directly attached to the mainframe;

a linkage pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm;

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing operation; and

an operator platform for standing operation of the operator controls of the control station.

39. The compact tool carrier as set forth in claim 38 wherein the loader is moveable between a down position and a vertically raised position, the cross-member being disposed forward of the operator platform in the down position and the vertically raised position of the loader.

40. The compact tool carrier as set forth in claim 38 wherein the loader is moveable between a down position and a vertically raised position, the compact tool carrier further comprising a drive mechanism for propelling the compact tool carrier over a supporting surface, the drive mechanism having a drive sprocket, the cross-member being disposed forward of the drive sprocket in the down position and the vertically raised position of the loader.

41. The compact tool carrier as set forth in claim 38 wherein the linkage is a first linkage, the compact tool carrier further comprising a second linkage pivotally attached to the first side of the mainframe and pivotally attached to the first loader arm.

42. The compact tool carrier as set forth in claim 38 wherein the mainframe incorporates a single weldment.

43. The compact tool carrier as set forth in claim 38 further comprising an attachment plate for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

44. The compact tool carrier as set forth in claim 43 further comprising an actuator for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

45. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader having an arm, the loader being adapted to carry a tool;

a mainframe for supporting the loader, the mainframe having a first side and a second side, and having a front end and a rear end relative to the longitudinal axis, the mainframe comprising an engine bracket that extends from the first side toward the second side for mounting an engine to the mainframe, the engine bracket being spaced from the rear of the mainframe, the loader arm not being directly attached to the mainframe;

a first linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm at a first linkage pivot point;

a second linkage pivotally attached to the first side of the mainframe and pivotally attached to the loader arm at a second linkage pivot point, the loader being free of cross-members between the first linkage pivot point and the second linkage pivot point;

an actuator pivotally attached to the first side of the mainframe and pivotally attached to the loader arm at an actuator pivot point;

a control station having operator controls for propelling the compact tool carrier forward and for raising and lowering the loader, the control station being mounted toward the rear of the compact tool carrier and adapted to allow for standing or walk-behind operation; and

an operator platform for standing operation of the operator controls of the control station.

46. The compact tool carrier as set forth in claim 45 wherein the loader comprises:

a first arm;

a second arm; and

a cross-member that extends from the first arm to the second arm, the cross-member being disposed forward of the first linkage pivot point, the second linkage pivot point, and the actuator pivot point.

47. The compact tool carrier as set forth in claim 46 further comprising an attachment plate for removably attaching a tool to the compact tool carrier, the cross-member being spaced from the attachment plate.

48. The compact tool carrier as set forth in claim 47 further comprising an actuator for tilting of tools connected to the attachment plate, the actuator being connected to the cross-member and the attachment plate.

49. The compact tool carrier as set forth in claim 45 wherein the mainframe incorporates a single weldment.

50. A compact tool carrier configured for standing or walk-behind operator control and having a longitudinal axis and a mass of less than about 1500 kg, the compact tool carrier comprising:

a loader adapted to carry a tool, the loader comprising:

a first loader arm;

a second loader arm; and