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- **Boden, Shane M.**  
**Waverly, IA 50677 (US)**
- **Appleton, Andy B.**  
**Cedar Falls, IA 50613 (US)**
- **Cote, Bradley**  
**Waterloo, IA 50703 (US)**

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(71) Applicant: **Deere & Company**  
**Moline, IL 61265-8098 (US)**

(72) Inventors:  
• **Nelson, Darren J.**  
**Cedar Falls, IA 50613 (US)**

(74) Representative: **Löser, Iris**  
**Deere & Company**  
**European Office**  
**Global Intellectual Property Services**  
**John-Deere-Strasse 70**  
**68163 Mannheim (DE)**

(54) **Variable speed fan drive**

(57) The invention relates to a variable speed fan drive (10). There is a need for a variable speed fan drive (10) with fewer seals and bearings, which is operated by system hydraulic pressure, which has fewer parts and which is simpler to assemble. A variable speed fan drive (10) is provided for a vehicle powered by an internal combustion engine. The fan drive has a driver variable sheave unit (12), a driven variable sheave unit (14) and a belt (69) engaging both the driver and driven variable sheave units (12, 14). The driver variable sheave unit (12) includes a driver shaft (24) drivingly coupled to an engine output shaft (16), a first axially fixed half sheave (30) mounted for rotation with the driver shaft (24), and a first axially movable half sheave (40) member mounted for rotation with the driver shaft (24) and movable axially on the driver shaft (40). The first axially movable half sheave member (30) includes a belt engaging flange (44) formed integrally with an axially movable piston member mounted for rotation with the driver shaft (24) and movable axially in response to hydraulic pressure.

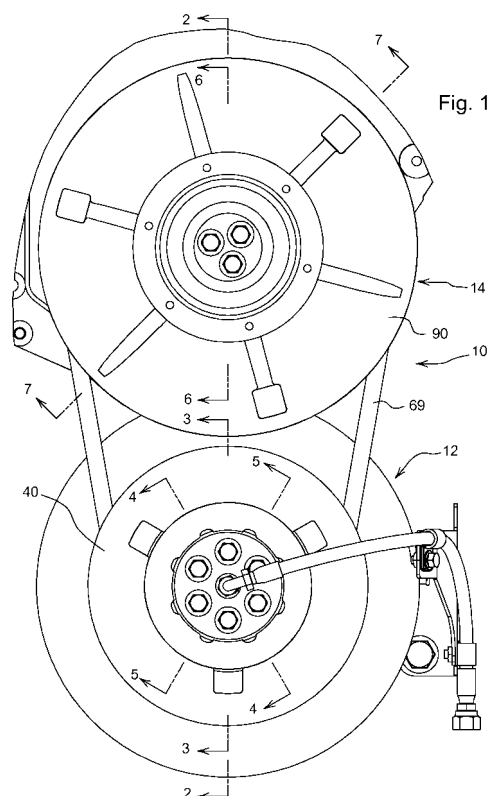


Fig. 1



## EUROPEAN SEARCH REPORT

Application Number  
EP 08 15 6535

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 3 403 567 A (RENE BRUET HENRI) 1 October 1968 (1968-10-01)	1,3	INV. F01P5/04 F01P7/04
Y	* column 2, line 62 * * column 4, lines 46-49 * * column 6, lines 16-35 * * column 7, lines 66-69 * * figures 6,8,8a,18,20 *	2	
Y	US 2 917 937 A (DODGE ADIEL Y) 22 December 1959 (1959-12-22) * column 1, lines 15-18 * * figure 3 *	2	
A,D	US 7 165 514 B2 (BOWMAN DENNIS A [US] ET AL BOWMAN DENNIS AARON [US] ET AL) 23 January 2007 (2007-01-23) * the whole document *	1-4	
A	JP 62 233415 A (KOMATSU MFG CO LTD) 13 October 1987 (1987-10-13) * the whole document *	1-4	
A	US 3 872 842 A (MEDLEY JACKSON C) 25 March 1975 (1975-03-25) * the whole document *	1-4	TECHNICAL FIELDS SEARCHED (IPC) F01P F16H
2		-The present search report has been drawn up for all claims	
Place of search Munich		Date of completion of the search 23 March 2012	Examiner Schwallier, Vincent
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)



Application Number

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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

see additional sheet(s)

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number

EP 08 15 6535

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**1. claims: 1-4**

A variable speed fan drive for a vehicle powered by an internal combustion engine, the fan drive having a driver shaft, a first axially fixed half sheave mounted for rotation with the driver shaft, the first axially movable half sheave member comprising a belt engaging flange formed integrally with an axially movable piston member.

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**2. claims: 5-9**

A variable speed fan drive for a vehicle powered by an internal combustion engine, the fan drive having a driven variable sheave assembly or unit, the driven variable sheave assembly being drivingly coupled to a fan.

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**3. claim: 10**

A variable speed fan drive for a vehicle powered by an internal combustion engine, the fan drive comprising a driven shaft supported for rotation on a housing of the engine.

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 15 6535

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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23-03-2012

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