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(71) Applicant: TIRTH AGRO TECHNOLOGY PVT. LTD.
IN/IN; "SHAKTIMAN", Survey No.-108/1, Plot No. B,
NH-27, Nr. Bharudi Toll Plaza, Bhunava, Gondal, Rajkot
Gujarat 360311 (IN).

(72) Inventor: APARNATHI, Bhavesh Prabhatgiri; "SHAK-
TIMAN", Survey No.-108/1, Plot No. B, NH-27, Nr.
Bharudi Toll Plaza, Bhunava, Gondal, Rajkot Gujarat
360311 (IN).

(74) Agents: ACHARYA, Rajeshkumar H. et al; H K
ACHARYA & COMPANY, Advocates-Patent & Trade-
marks Attorneys, HK Avenue, 19, Swastik Society,
Navrangpura, Ahmedabad, Gujarat 380009 (IN).

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kind of national protection available): AE, AG, AL, AM,
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MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
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Declarations under Rule 4.17:
— as to the identity of the inventor (Rule 4.17(i))
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
— as inventorship (Rule 4.17(iv))

[Continued on next page]

(54) Title: A QUICK FIT MECHANISM FOR POWER HARROW BLADE

(57) Abstract: The present invention relates to a quick fit mechanism for power harrow blade having
an easily replaceable power harrow blade assembly
(1) carried by a rotor to transmit power and rotation
using the driving shafts (7, 10, 13) and various gears
(8, 9, 11, 12, 14) to rotate the power harrow blade
(2) to cultivate the soil of land. The power harrow
blade assembly (1) comprises at least a pair of power
harrow blades (2) which are mounted at the fixed
angle on the rotatable blade mount housing (3) each
one fastening with a double pin (4) fastened in the
holes of the power harrow blade (2) and blade mount
housing (3), the double pin (4) having a single pin
(5) as a supporting part which is locked by a linchpin
(6) thereby inserting in the hole of single pin (5) to
hold the power harrow blade assembly (1). The as-
sembly of the power harrow blades (1) reduces main-
tenance time by quick replacing the power harrow
blades (2) and increases the field efficiency.

FIG. 1
Published.

— with international search report (Art. 21(3))

— with amended claims and statement (Art. 19(1))
A QUICK FIT MECHANISM FOR POWER HARROW BLADE

Field of Invention:

The present invention relates to a Quick Fit Mechanism for Power Harrow Blade to easily replacing the blade for minimize downtime and hence to increase the field efficiency.

Background of the Present Invention:

A number of different implements are known which incorporate weeding or cutting knives, sometimes known as sweeps or sweep blades, which in use operate below the surface of soil and which are design to severe the roots or stems of plants such as weed or trees as they travel through the soil. In one form the implements are decided tools and comprise rigid cutting blades. Alternatively, weeding implements can be in the form of the rod which may be supported from a toolbar trailed from a prime mover such as a tractor so as to extend transversely relative to the direction of travel and which can be driven to rotate about its longitudinal axis.

A convention power harrow comprises a transverse beam or full form which depends, at a number of spaced positions along the length of the beam pairs of soil working blades. The beam which is hollow accommodates a drive train which drives each blade pair about a vertical axis from the power take-off shaft of an agricultural tractor as the latter pulls the harrow across the land to be worked.

US 1299291 relates to a power harrow having a frame that is normally substantially horizontal and at least one rotor. A rotatable shaft is journalled near one end in a bearing secured to the frame. The rotor is in driven connection with the other end of the shaft, and is rotated about a normally upright axis, so as to make contact with the soil to work it. A protective shield surrounds the bearing from below.
EP 1208729 discloses a blade assembly for a power harrow, the assembly comprising support means formed with two recesses, two harrow blades each having a support flange receivable in a respective recess, the support means carrying two retaining members each movable between an operative position in which the retaining member locks the corresponding blade in position in the corresponding recess, and an inoperative position allowing insertion of the flange into the recess or withdrawal of the flange from the recess, each retaining member being biased towards the operative position.

The soil working experienced huge amount of force while working in the field and have to replace frequently. The time taken in replacing the blades was too much in the earlier machine because of their complex mechanism. Hence, there is a need of an invention or a machine having a simple mechanism for replacing blades in a short time to overcome the above problems and to increase its efficiency by maintain the machine.

Object of the Present Invention:

The main object of the present invention is to provide a quick fit mechanism for power harrow blade having a power harrow blade assembly to easily replace blade for maintaining the machine.

Furthermore, object the present invention increases the field efficiency of the machine.

Summary of the Present Invention:

The present invention relates to a quick fit mechanism for power harrow blade having an easily replaceable power harrow blade assembly carried by a rotor to transmit power and rotation using the driving shafts and various spur gears to rotate the power harrow blade to cultivate the soil of land. The power harrow blade assembly comprises at least a pair of power harrow blades which are mounted at the fixed angle on the rotatable blade mount housing each one fastening with a double pin fastened in the holes of the power harrow blade and blade mount housing, the double pin having a single pin as a
supporting part which is locked by a linchpin thereby inserting in the hole of single pin to hold the power harrow blade assembly. The assembly of the power harrow blades reduces maintenance time by quick releasing and/or attaching the power harrow blades and increases the field efficiency.

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**Brief Description of Drawings:**

Fig. 1 is schematic diagram of a quick fit mechanism for power harrow blade. Fig.2 is exploded view of a quick fit mechanism for power harrow blade.

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**Detailed Description of Present Invention:**

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of the construction and arrangement of parts illustrated in the accompany drawings. The invention is capable of other embodiments, as depicted in different figures as described above and of being practiced or carried out in a variety of ways. It is to be understood that the phraseology and terminology employed herein is for the purpose of description and not of limitation.

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The present invention relates to a quick fit mechanism for power harrow blade having a power harrow blade assembly (1) which is carried out by a rotor. As shown in fig. 1, the power harrow blade assembly (1) comprises at least a pair of sharp edge power harrow blades (2) for cultivating soil which are mounted on the rotatable sealed bearing blade mount housing (3) at fixed angle. Each power harrow blade (2) having two hole to be fastening by a u-shaped double pin (4). The double pin (4) having a hole in which the single pin (5) is fastened to provide a form-fitting connection and to hold it through a linchpin (6) by passing via hole of the single pin (5) thereby locking the power harrow blade assembly (1).

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As shown in the fig. 2, the rotor comprising driving shafts (7, 10, 13) and various gears (8, 9, 11, 12, 14) which are connected to the power harrow blade assembly (1). The driving shafts having an input shaft (7) from where the power is transferred and a pair of spur gears (8, 9) to rotate the relative parts by transmitting large amount of power. The rotor also comprises an intermediate shaft (10) and main drive shaft (13) to pass the rotation and power and a pair of bevel gears ((pinion) 11, (crown) 12) which drive in a 90° angle towards the other gears.

Said power harrow blade (2) having sharp edge cultivating knife manufactured from high resistance forge steel material to optimise for lower power requirement to consume minimum diesel while it is in working position. The said power harrow blades (2) are long enough to till depths of any soil and improve its organic structure.

Said power harrow blade (2) is mounted on the blade mount housing (3) which is also manufactured form high resistance forge steel material and securely fixed with the spur gear (14) using the retaining members to rotate on its fixed axes.

The power harrow blade (2) and the blade mount housing (3) are connected through the u-shaped double pin (4), a single pin (5) and a linchpin (6). The double pin (4) is a fastening part of the present invention having two ends to insert in the mounting holes and a hole in the middle place at which the single pin (5) is attached. Said single pin (5) is also another mounting pin with a hole of the present invention to fix in the form-fitting manner to the power harrow blade (2) and locking though a linchpin (6) which holds various element of the said present invention.

The power harrow blade assembly (1) provides easily and quickly replaceable power harrow blades (2), so the power harrow blades (2) can no longer be implemented in conjunction with dirt and soil. To remove the power harrow blade (2), the linchpin (6) is removed from the single pin (5) by removal from said assembly (1). Said single pin (5) is a supporting part of the double pin (4) which is withdrawn from the corresponding slot after removing of the linchpin (6), so that the power harrow blade (2) is removed from
the blade mount housing (3) and placed another power harrow blade (2) on it. To mount the power harrow blade (2), the blade is placed on the blade mount housing (3) and inserted the double pin (4) in the holes to be fastening the blade with the housing (3) and then double pin hole to be inserted into the single pin (5) and locked it with the linchpin (6).

In the working, the rotor transmits power through the input shaft (7) to the pair of spur gears (8, 9), which are reducing the speed and transmitting power to the bevel gears (pinion (11), crown (12)) which are changing the direction of the rotation at 90° through the intermediate shaft (10) to pass the rotation. After passing through the bevel gears (11, 12), the main drive shaft (13) pass the power to the spur gear (14) to rotate the rotatable blade mount housing (3). Hence, the power harrow blades (2) are rotating and cultivating land.
We Claim:

1. A quick fit mechanism for power harrow blade having a power harrow blade assembly (1) carried by a rotor through driving shafts (7, 10, 13) and gears (8, 9, 11, 12, 14) to transfer power and rotation for rotating the attached power harrow blade assembly (1); wherein said power harrow blade assembly (1) comprises at least a pair of power harrow blades (2) mounted on a rotatable blade mount housing (3) at fixed angle through the holes provided on said power harrow blade (2) and blade mount housing (3) to be fastening with a double pin (4), said double pin (4) having a hole wherein a single pin (5) to be treated as a supporting part which is locked by linchpin (6) thereby inserting in the hole of a single pin (5) to lock and to hold the power harrow blade assembly (1).

2. The quick fit mechanism for power harrow blade as claimed in claim 1, wherein the power harrow blade assembly (1) increases the field efficiency by providing easily replaceable power harrow blade assembly (1).
AMENDED CLAIMS
received by the International Bureau on 19 October 2016 (19.10.2016)

1. **A quick fit mechanism for power harrow blade** having a power harrow blade assembly (1) carried by a rotor through driving shafts (7, 10, 13) and gears (8, 9, 11, 12, 14) to transfer power and rotation for rotating the attached power harrow blade assembly (1); wherein said power harrow blade assembly (1) comprises at least a pair of power harrow blades (2) having two holes, a rotatable blade mount housing (3) having three holes, a double pin (4) having a hole in centre to accommodate a single pin (5) from top and a linchpin (6) to lock and to hold the power harrow blade assembly (1).

2. *(Cancelled).*
D1 relates to the improved and quick agricultural machine tool fixing. The blades are fastened in the housing with a double pin which comprises a hole in the bond bridge between the two pins. A single pin is inserted in this hole at the bottom side and locked by a fastening member. While, in the present invention the double pin is inserted in the hole at the bottom side and the double pin having a hole in which the single pin is inserted is at top side and locked by linchpin.

D2 relates to rotary hollow with transverse machine housing has tool holder with recess for harrow tine mounting plate which is covered by clamp fixed by bolts to holder. In D2 the blades are mounted in recess with two pins which inserted from the underside of the housing to hold the blades in position. While, in the present invention the double pin is inserted in the hole at the bottom side and the double pin having a hole in which the single pin is inserted is at top side and locked by linchpin.

D3 relates to the soil-tilling implement. In D3 the blades are hold in a recess of the housing by two bolts which are secured by splints. While, in the present invention the double pin is inserted in the hole at the bottom side and the double pin having a hole in which the single pin is inserted is at top side and locked by linchpin.

None of the cited documents discloses that the double pin is inserted in the hole at the bottom side and the double pin having a hole in which the single pin is inserted at top side of the housing and locked by linchpin. Further, present invention reduces maintenance time by quick releasing and increases the field efficiency.
The present invention relates to a quick fit mechanism for power harrow blades which comprises at least a pair of sharp edge power harrow blades for cultivating soil which are mounted on the rotatably sealed bearing blade mount housing at fixed angle. Each power harrow blade having two holes to be fastening by a double pin at the bottom of the machine. The double pin having a hole in which the single pin which is mounted on the top is fastened to provide a form-fitting connection and to hold it through a linchpin by passing via hole of the single pin thereby locking the power harrow blade assembly.

Hence D1 to D3 does not disclose aforesaid technically advanced features. The cited documents are different from the present invention. Hence, from above explanation, it is clear that present invention is novel and inventive over D1 to D3.
### A. CLASSIFICATION OF SUBJECT MATTER

**IPC:** A01B 33/14 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC.

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPDOC, WPIAP

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<td>EP 0891688 A1 (KUHN S.A) 20 January 1999 (20.01.1999) column 5: lines 22-34, 44-49; column 6: lines 21-44; fig. 1, 6, 7</td>
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<td>Y</td>
<td>DE 4310750 A1 (ALOIS POETTINGER MASCHINENFABRIK GES.M.B.H., GRASESKIRCHEN, AT, ALOIS POETTINGER MASCHINENFABRIK GES.M.B.H., GPESKIRCHEN) 07 October 1993 (07.10.1993) column 1: lines 36-44; column 2: lines 1-7; column 3: lines 14-20, 36-42; fig. 1, 7</td>
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<td>A</td>
<td>EP 0211276 A2 (AMAZONEN-WERKE H. DREYER GMBH &amp; CO. KG) 25 February 1987 (25.02.1987) abstract; page 1, line 34 to page 2, line 12; page 12, line 5 to page 13, line 2; fig. 1-3</td>
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Further documents are listed in the continuation of Box C.

- Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
  - "E" earlier application or patent but published on or after the international filing date
  - "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  - "O" document referring to an oral disclosure, use, exhibition or other means
  - "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

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<th>Date of the actual completion of the international search</th>
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<td>19 August 2016 (19.08.2016)</td>
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Name and mailing address of the ISA/AT

Austrian Patent Office

Dresdner StraBe 87, A-1200 Vienna

Facsimile No. +43 / 1 / 534 24-535

Authorized officer

THURRIEDL, T.

Telephone No. +43 / 1 / 534 24-515
Box No. II  Observations where certain claims were found unssearchable (Continuation of item 2 of first sheet)

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

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

2. □ Claims Nos.: 2
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
   Claim 2 does not meet the requirement of Rule 6.3 (a) PCT according to which claims shall be in terms of the technical features of the invention. Claim 2 just names positive effects of the invention and should therefore be cancelled.

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

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

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

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. □ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims, it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant’s protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant’s protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (July 2009)
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