

Fig. 1

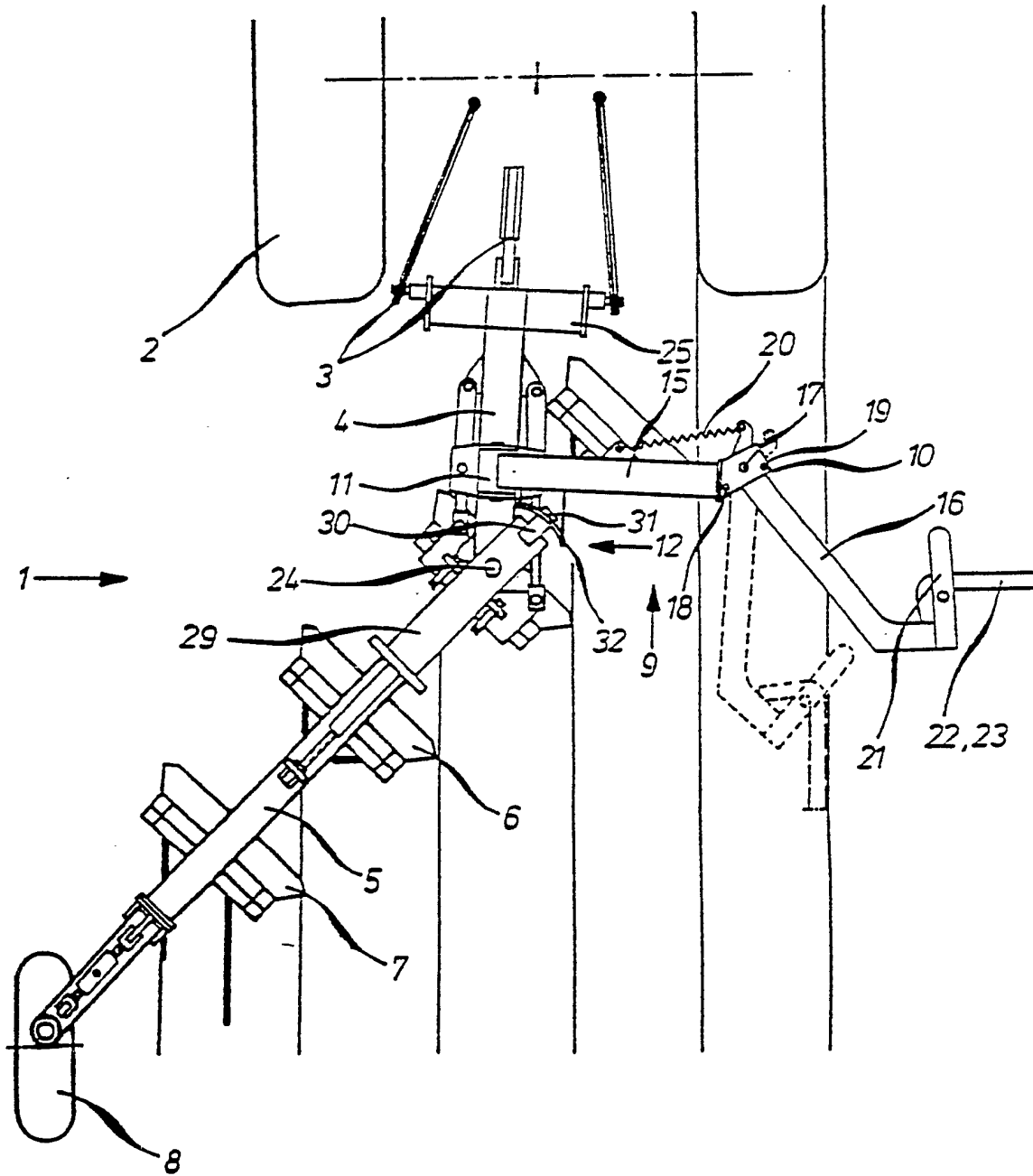
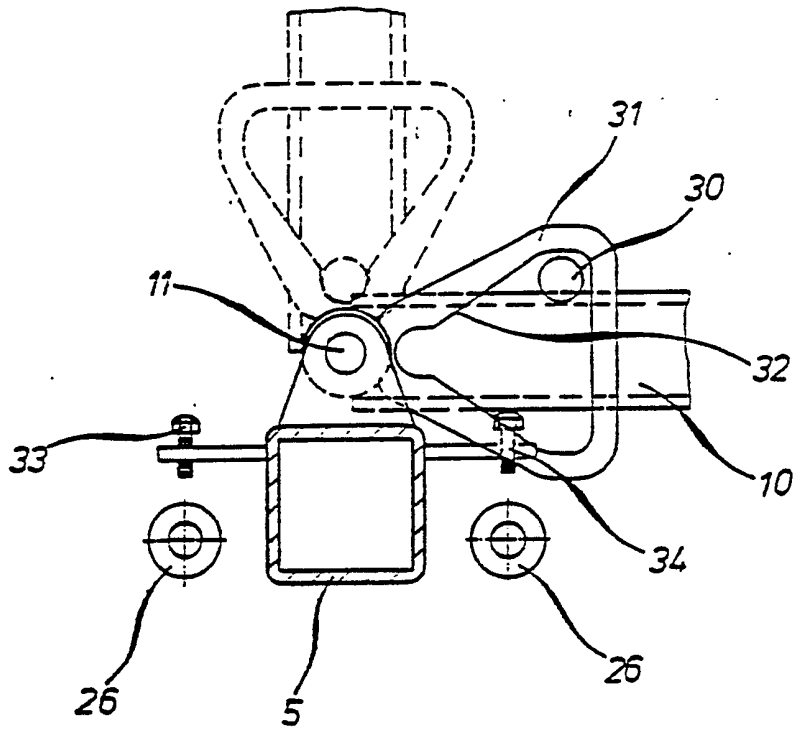


Fig. 2



PIVOT PLOUGH WITH DRAW ARM

The invention relates to a pivot or swing plough. More particularly the invention relates to a pivot plough with a support frame representing a part of the front mount of the plough and with a plough frame closely articulated thereto and having symmetrical laevorotatory and dextrorotatory members with a draw means for attachments entrained by the plough.

Pivot ploughs of this type differ from the reversible ploughs usually used nowadays in that symmetrical plough members are arranged on the plough frame, and the plough frame and a vertical shaft can each be pivoted into the laevorotatory or dextrorotatory operating position. To reduce the number of tractor passes with individual implements, it is known to carry or connect further attachments or implements on or to the plough. To enable an attachment to be towed or carried it is necessary to provide an appropriate tow hitch or hook. Draw arms are arranged on the left and right of a plough tower or on a plough frame of a pivot plough and are pivotal about vertical shafts (GB-A-2 248 537). The draw arms are connected to the pivotal frame via connecting rods. The catch arms are then brought into their respective catch positions or into a rest position

by the frame pivoting. This arrangement has the disadvantage that two draw arms are required, with each draw arm having a hydraulic catch and release device which require two hydraulic units. A pivot plough with draw arms which are arranged rigidly on the plough tower and are not pivotal is known from DE-GM 91 14 189. These draw arms have the drawback that they cannot lead a following implement such as a compacter close enough to the tractor during operation. Furthermore, the inactive draw arm projects far beyond the tractor and plough, particularly in the case of, for example, a three-furrow plough.

An object of the invention is accordingly to provide an inexpensive draw means which can easily be brought into a position suitable for transportation and guides an attachment close to the plough.

According to the invention there is provided a pivot plough comprising a support and a plough frame closely articulated thereto and having symmetrical laevorotatory and dextrorotatory members attached thereto and draw means wherein is designed as a pivot arm which is provided for both sides of the plough and is pivotal round a pivot shaft lying substantially horizontally via a drive mechanism from one operating position to the other.

Considerable costs are saved and unnecessary weight is avoided by using a single draw arm. The draw arm is invariably brought into the opposite position by the pivoting movement of the plough frame via an appropriate powered guide means. The pivot arm can easily be pivoted away over the carrying frame or plough frame owing to the pivot shaft lying horizontally or substantially horizontally. It has been found that a single pivot arm suffices.

The pivot shaft of the pivot arm lies in the line of symmetry of a plough tower as seen in a plan view, more specifically horizontally or with a slight inclination to the horizontal. This arrangement ensures that the pivot arm reaches the same catch or operating position in both operating directions.

To allow simple pivoting of the pivot arm the guidance means or drive mechanism consists of a mechanism allocated to the plough frame and the plough.

Pivoting can be achieved by a mechanism comprising a cam and a guide element. During the pivoting process, the plough frame and therefore the guide element move such that the entrainer arm also moves over the cam and is pivoted round.

Instead of this powered draw means which is free

from an external drive, it is also possible for the drive mechanism to have a separate hydraulic unit which is dependent on or independent of the pivot hydraulics. This pivot or change-over unit acts, via a lever arm, on the draw arm so as to pivot round the draw arm as the pivoting process of the plough frame is initiated. It is also conceivable to operate the change-over unit separately and therefore independently of the pivot hydraulics and therefore to pivot about the draw arm.

To allow reliable co-operation with conventional attachments, the invention proposes that the pivot arm has a draw hook which is designed to receive the catch hook of an attachment and is preferably equipped with an unlocking device which is actuated by external means. This enables a further implement or attachment to be reliably connected, to be released before the towing vehicle and plough turn at the end of a field and to be re-connected after the towing vehicle has turned and the plough frame has pivoted.

The pivot arm according to the invention can also be designed such that it is connected to the attachment via a chain so that the further implement or attachment is also guideably entrained during manoeuvring, for example, at the end of a field. A compacter or other type of attachment can therefore be intentionally guided

together with the tractor and the plough in each case, even in the region before the turning area.

In the central position, the draw arm is located above the plough frame and does not therefore project laterally. This has the advantage that no means and/or conversions for transportation on public roads are required. The pivot arm and therefore a following implement is preferably pivotal in a known manner from the catch position into an operating position located closer to the plough.

The invention is distinguished, in particular, in that a pivot plough is provided which has an extremely simple pivot arm draw means. The pivot arm is pivoted almost automatically with the pivoting of the plough frame into the other respective operating position and then receives and guides the attachment. Considerable costs in addition to weight are saved by using a single draw arm with a corresponding hydraulic unit for releasing the entrained device. A further advantage of this plough arrangement is that the forces generated through the plough shares in use act substantially centrally with respect to the connection means. The special design of the draw arm also ensures that a following implement can be guided very close to the plough in each case, so that unnecessary lateral forces

are avoided. The drive for the pivoting movement of the pivot arm is provided by the pivoting movement of the plough frame, so this forcible guidance or this forcible drive simultaneously ensures that the draw arm is also located in the correct final position when the final position of the plough frame is reached. Although the draw arm or pivot arm is therefore automatically pivoted with forcible guidance, this pivoting movement can also be carried out by a separate hydraulic unit.

Further details and advantages of the subject of the invention will emerge from the following description of the accompanying drawings which show a preferred embodiment with the necessary details and individual parts.

Figure 1 is a plan view of a rear portion of a tractor with following pivot plough and draw means in accordance with the invention.

Figure 2 shows a detail of the pin and cam mechanism by means of which the pivot arm is forcibly driven and guided.

Figure 1 is a plan view of a pivot plough in which this pivot plough 1 is attached to a tractor 2 via the three-point linkage 3. Part of the plough tower is the carrying frame 4 which is rigidly connected thereto and on which the plough frame 5 is articulated and guided.

The plough frame 5 has members 6, 7 so that it can operate in a laevorotatory or dextrorotatory manner in each case. A supporting wheel is provided at the end of the plough frame 5.

To enable an attachment not actually shown here to be used together with the pivot plough 1, the pivot plough 1 has been equipped with a draw means 9. This draw means 9 consists of a pivot arm 10 which can pivot about a substantially horizontal pivot shaft 11 for which a drive mechanism 12 is provided. This drive mechanism 12 is designed as a positive guide in the embodiment illustrated. The pivot arm 10 is invariably pivoted into the new position by the pivoting movement of the plough frame 5 by means of this positive guide.

The pivot arm 10 itself is divided into two parts 15, 16 and is equipped with a pivot joint 17 as well as stops 18, 19. By means of a spring 20, the pivotal part 16 is brought into the catch position and, after catching the attachment 23 against the force of the spring 20, into the actual operating position. Close guidance of the attachment 23 on the pivot plough 1 is ensured in this arrangement.

The pivot plough 1 has a vertical pivot shaft 24 about which the plough frame 5 is pivoted relative to the plough tower 25 by means of the hydraulic cylinder 26.

Figure 2 shows a similar arrangement. The plough tower 25 carries the pivot bearing or the pivot shaft 11 of the pivot arm 10 which is pivoted away beyond the plough frame 5.

The drive is provided by the pivoting movement of the plough frame 5 having a plate 29 and a peg 30 above the bearing. This peg 30 engages in a guide element 31 with the cam 32. The draw arm or the pivot arm 10 is therefore pivoted with positive guidance.

The respective height of the pivot arm 10 is set by means of adjustable stops 33, 34. The pivotal part 16 of the pivot arm 10 is pivoted by means of the spring 20 into the catch position predetermined by the stop 19. After engaging the pivot arm 10 is placed against the stop 18.

Figure 2 shows the pivot portion of the pivot arm 10 denoted by continuous lines which is held at the appropriate height in each case by the stops 33, 34. Figure 2 also shows the pivot portion of the pivot arm 10, the transportation position or central position of the plough frame or the entire pivot plough 1 denoted by discontinuous lines

Figure 1 also shows the particular design of the pivot arm 10 which is equipped at its end optimally for receiving the catch hook 22 of the respective attachment

23 and, for this purpose, is equipped with a draw hook 21 which is hydraulically actuated to be opened.

All the above-mentioned features, including those emerging merely from the drawings, are considered essential to the invention alone and in combination.

CLAIMS

1. A pivot plough comprising a support, a plough frame closely articulated thereto and having symmetrical laevorotatory and dextrorotatory members attached thereto and draw means wherein the draw means is designed as a pivot arm which is provided for both sides of the plough and is pivotal about a pivot shaft lying substantially horizontal via a drive mechanism from one operating position to the other.
2. A pivot plough according to Claim 1, wherein the pivot shaft is arranged horizontally or with a slight inclination substantially in the direction of travel and/or in a plan view in the line of symmetry of a plough tower.
3. A pivot plough according to Claim 1 or 2, wherein the drive mechanism includes a drive mechanism associated with the plough frame.
4. A pivot plough according to Claim 3, wherein the drive mechanism consists of a cam and a guide element.
5. A pivot plough according to any one of Claims 1 to 4, wherein the drive mechanism has a separate hydraulic pivot unit.
6. A pivot plough according to any one of Claims 1 to 5, wherein implements may be attached to the draw means to be entrained by the pivot plough.
7. A pivot plough according to any one of Claims 1 to

5, wherein the pivot arm has a draw hook which is designed to receive a catch hook of an attachment and is preferably equipped with an unlocking device actuated by external power.

8. A pivot plough according to Claim 7, wherein the pivot arm is connected to an attachment via a chain.

9. A pivot plough according to any one of claims 1 to 7, wherein the pivot arm and any attachment are pivotal from a transport position to an operating position located close to the plough.

10. A pivot plough substantially as described herein with reference to any one or both of the Figures of the accompanying drawings.

Relevant Technical Fields

- (i) UK Cl (Ed.L) A1B (BA5, BPF, BPX)
- (ii) Int Cl (Ed.5) A01B 17/00; 49/00; 49/02

Search Examiner
K J KENNETT

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21 OCTOBER 1993

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
1-10

Categories of documents

- X:** Document indicating lack of novelty or of inventive step.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category.
- A:** Document indicating technological background and/or state of the art.
- P:** Document published on or after the declared priority date but before the filing date of the present application.
- E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- &:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
	None	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).