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(54) **A coupling system for tractor implements such as front loaders.**

(57) A system for snap locking the coupling parts (6) of a tractor implement to holding parts (2) of the tractor in response to the tractor being driven against these coupling parts (6). By the final driving phase of the tractor the coupling parts (6) are raised by cooperation with an inclined edge (10) on the holding parts (2), up to a maximum raised position, from which, in response to the very last motion of the tractor, they are lowered into holding engagement with respective notches (12) at the end of the inclined edge. Just prior to the very last tractor motion an upwardly directed pivot pawl plate (18) on the coupling part (6) is forced to be swung rearwardly by a frontal engagement with a locking nose portion (40, 42) on the holding part (2), but also to be released from this engagement in response to the final lowering of the coupling part (6), whereby the pawl plate (18), with snap action, pivots forwardly into a locking position underneath the locking nose (40,42) portion so as to be locked against being raised, by way of its engagement with the lower side (40) of the locking nose (40,42). Hereby the coupling part (6) will be effectively locked to the holding part (2), until the pawl (18) is manually swung into a spring stabilized released position. Upon the separation of the respective coupling and holding parts (6 and 2) the pawl members (18) may be swung back into their potential locking positions prior to the next coupling together of the said parts (6,2).

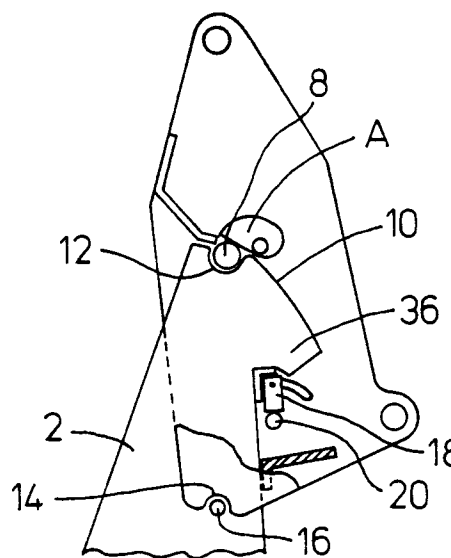


FIG. 2.

The present invention relates to a tractor implement of the type specified in the introductory clause of claim 1, primarily a front loader. For such an implement it is customary that subsequent to the said coupling together the coupling parts are anchored against being released from the holding parts of the tractor by a manual insertion of a locking bolt through interflashing holes in the respective coupling and holding parts, whereas these bolts will then have to be removed manually for a subsequent separation between the tractor and the implement.

It is the purpose of this invention to provide an arrangement such that an effective locking together of the parts is automatically achievable already by the driving together of the relevant tractor and implement parts, even though it may be required that a manual release function be effected for a subsequent separation of the joined units.

The invention is based on the consideration that by the final lowering of the coupling parts for establishing the joint it is possible to provoke an actuation of blocking means, which will thereafter prevent an upwardly directed release motion of the coupling parts, such that these will be effectively blocked against being released until, manually or otherwise, the blocking means are switched over so as to enable a release of the blocking function.

According to the invention the system is arranged as specified in the characterizing clause of claim 1. After the said lowering the coupling parts can then not be raised again, and thereby a total locking engagement will be established between the discussed main parts.

The locking engagement, which will thus be automatically established by the driving together, is easily disengageable, viz. by the locking pawl being pivoted, manually or otherwise, into its temporarily stabilized forward position, whereby the coupling parts can be freely raised for releasing the locking engagement.

In the following the invention is described in more detail with reference to the drawing, in which:

Fig. 1 is a schematic perspective view of a tractor and a front loader modified according to the invention,

Fig. 2 is a detailed lateral view of the relevant coupling means, shown coupled together,

Fig. 3 is a perspective view of the lower end of a coupling part of the front loader, seen from one side,

Fig. 4 is a plan view thereof, seen from the other side,

Figs. 5 and 6 are plan side views illustrating the progress of the coupling movement, and

Fig. 7 is a perspective view of a locking means for the said pivot pawl plate.

The tractor shown in Fig. 1 has at either side a holding part 2 for receiving a coupling part 4 of the front loader. In a well known manner each of the hold-

ing parts 2 is constituted by a singular plate member, while each of the coupling parts 4 consists of two mutually spaced plate members, see particularly Fig. 3, between which there is provided various cross pins as described below.

A primary cross pin on the coupling parts 4 is designated 8. When the tractor is driven against the parked front loader an upper inclined edge 10 of the holding part will be hit by this pin, such that by the further driving together the coupling part will be raised along the inclined edges 10, until it reaches an upper position, from which, in a final phase of the operation, it will be brought to be lowered, viz. by the pin 8 being guided into an upper holding recess 12 in the holding part. By this lowering the parts 2 and 4 are coupled together, and a further locking engagement is established by a lower recess 14 in the plate members 6 of the coupling part being brought to descend over pin portions 16 laterally projecting from the holding part 2, whereby the coupling parts 4 are stabilized as desired in a non-pivotable manner relatively to the holding parts.

The coupling parts can be released from the holding engagement by being raised relative to the holding parts 2, and it is this movement which in the known art has been blocked by manually inserting a locking bolt through laterally interflashing holes in the respective plate members.

In connection with the invention such holes can be avoided, as use is instead made of an automatically operating locking pawl member 18, which is provided as a plate member radially protruding from a rotatable cross pin 20 held between the coupling plates 6. At one side edge this pawl plate has an outwardly projecting handle pin 22, which extends through an arched slot 24 in the adjoining coupling plate 6 and is provided with an outer handle knob 26, see Fig. 3. The slot 24 is arched with the pin 20 as the center, and at one end it has a circular widening 28 located almost just above the pin 20, while from there the slot 24 extends rearwardly and downwardly, see also Fig. 2. The handle knob 26 is mounted axially displaceably on its pin 22, biased axially inwardly by spring means not shown, but it is also provided with an internal ball lock system for locking it temporarily in an outermost position on the pin 22. Thus, when the pawl plate is swung upwards the cylindrical handle knob may snap into a locking engagement with the slot widening 28, unless it has in advance been pulled out so as to be held by the ball lock.

At its opposite side edge the pawl plate 18 has a corresponding pin 22' projecting out through a correspondingly arched slot 24' in the other coupling plate 6, see Fig. 4. At its exposed end this pin is connected with a contraction spring 32, which is pivotally held by a fixed pin 34 on the plate 6. As apparent from Fig. 4 this pin 34 is located at the other side of the shaft pin 20 such that the spring 32 will generally seek to move

the pin 22' upwardly and forwardly in the slot 24', i.e. to pivot the pawl plate 38 towards the position, in which it may be snap locked by the engagement between the handle knob 26 and the slot widening 28. However, it will also appear from Fig. 4 that in the maximum swung down position of the pin 22' the spring 32 will extend with a direction and location just underneath the pivot pin 20 of the pawl plate, such that the spring will here stabilize the swung down position of the pawl plate in a releasable manner.

As seen most clearly in Fig. 2 the pawl plate 18 cooperates with the lower side of a projecting nose portion 36 on the holding part 2 of the tractor. This underside is reinforced by a transverse, welded-on angle piece 38, the upper leg 40 of which constitutes the lower side of the nose portion. The front side of this portion 36 is designated 42.

Prior to the tractor being driven against the parked front loader care is taken that the pawl plate 18 is swung to its upper position with the handle knob 26 pulled outwardly into its ball locked position, the pawl plate thus being held by the spring 32 and not by the knob 26 engaging the slot widening 28. By the forward driving of the tractor the pin 8, as mentioned, will hit against the inclined edge 10 and then be guided upwardly therealong, whereby also the pawl plate 18 on the coupling plate 6 will be moved upwardly and - relatively - inwardly towards the nose portion 36 on the holding part 2. By this movement the lower front edge area 42 of the nose portion 36 is approaching the upper end of the pawl plate 18, which will thereby be forced to swing rearwardly, confer Fig. 6. This swinging or pivoting is readily possible, because the handle knob 26 is held out of engagement with the slot widening 28.

Thereafter, by the following lowering of the pin 8 into the recess 12 and the associated lowering of the lower recess 14 over the pin portions 36, i.e. by the following lowering of the coupling part 4, the pawl plate 18 as already partly swung rearwardly will also be moved downwardly, whereby it will be disengaged from the front side 42 of the nose portion 36 and thus, by the action of the spring 32, be swung back to its foremost, upper position, Fig. 2. The design is such that the pawl plate will be released to swing forwardly upon a relatively short rearward pivoting, i.e. without having reached its lowermost position, in which it would be stabilized by the spring 32. In this swung-up position of the pawl plate the top edge thereof will snap inwardly under the leg portion 40 of the angle piece 38 on the holding part 2, whereby it is achieved that it will not thereafter be possible to lift the coupling parts 4 out of their holding engagement with the holding parts 2. Having finished the driving together the operator will leave the tractor cabin for externally arranging for a coupling together of the hydraulic systems of the tractor and the implement, respectively, and at the same time he will take the precaution of

pressing inwardly the handle member 26 so as to release it from its ball locked position and allow it to snap into engagement with the widened slot portion 28. Thereafter the pawl plate 18 will be positively locked against being incidentally pivoted out of its own locking position, and the implement will be ready for use.

Preparatory to a disengagement between the tractor and the implement the pawl plate 18 is swung entirely rearwardly by pulling out and moving the handle 26 such that the pawl plate is brought into its rear, spring stabilized swung down position, Fig. 4. Thereafter the operator, from the tractor, can affect the coupling parts to be raised by the action of the hydraulic system, and the tractor can then be driven rearwardly out of its engagement with the implement, for a subsequent decoupling of the hydraulic connections.

In connection with a disengagement of the implement it will be practical if the operator, while being down from the tractor, resets the pawl plate into its upright spring held position, with the handle knob 26 pulled out, since by a later renewed coupling together it will then be possible to drive the tractor directly into the coupling parts, without the operator having to first stop and get down from the tractor. Another possibility will be that the actuator means of the pawl plate or a corresponding locking mechanism comprise parts that are exposed so as to be seizable from the pilot seat of the tractor, if required with the use of a suitable gripping aid.

The invention is not limited to the illustrated embodiment, as the disclosed locking and releasing functions may be achieved by means other than those disclosed. Thus, the desired locking can be obtained with the use of snap locking means that are movably arranged on the holding parts of the tractor for cooperation with rigid abutments on the coupling parts 4.

Claims

1. A coupling system for tractor implements, primarily front loaders, for releasable mounting on a tractor and having cantilever arms or corresponding implement parts connected with coupling parts, which are releasably fixable to holding parts on the tractor, the coupling parts being raisable, in response to the tractor being driven against the parked implement, by a raising sliding engagement between a fixed portion of one of said parts and an inclined guiding surface of the other of said parts, such that the coupling parts can thereby be brought into a maximum raised position, from which, in a final driving phase of the tractor, they are lowered into a holding position in holding notch connection with the holding parts of the tractor, and of the type comprising a pawl lock system operable by the driving together of the

parts to interlock the parts in a releasable manner, characterized in that the pawl lock system is designed such that a locking nose portion on one of said parts during the final phase of the raising movement of the coupling part engages a spring loaded pivot pawl on the other part so as to tilt it away from a first, potential locking position, while this engagement is released by snap action in response to the final lowering of the coupling parts in such a manner that the pivot pawl will thereby swing back to said locking position, in which, by an engagement with an adjacent surface portion of the locking nose portion, the pivot pawl prevents the coupling part from being raised from the lowered final position thereof.

2. A system according to claim 1, in which the pivot pawl is spring biased in a bistable manner, partly towards said locking position and partly towards a second, released position.
3. A system according to claim 1, in which the pivot pawl is arrestable in its locking position.
4. A system according to claim 3, in which the associated arresting means comprise a handle pin mounted laterally on said pivot pawl and projecting through an arched slot in a plate member serving as a holding means for the pivot shaft of the pivot pawl, said slot having a widening at its end corresponding to the locking position of the pivot pawl, and the handle pin having a handle knob, which is axially shiftable between a locking position, partly intruding into said widening, and a retracted free position.

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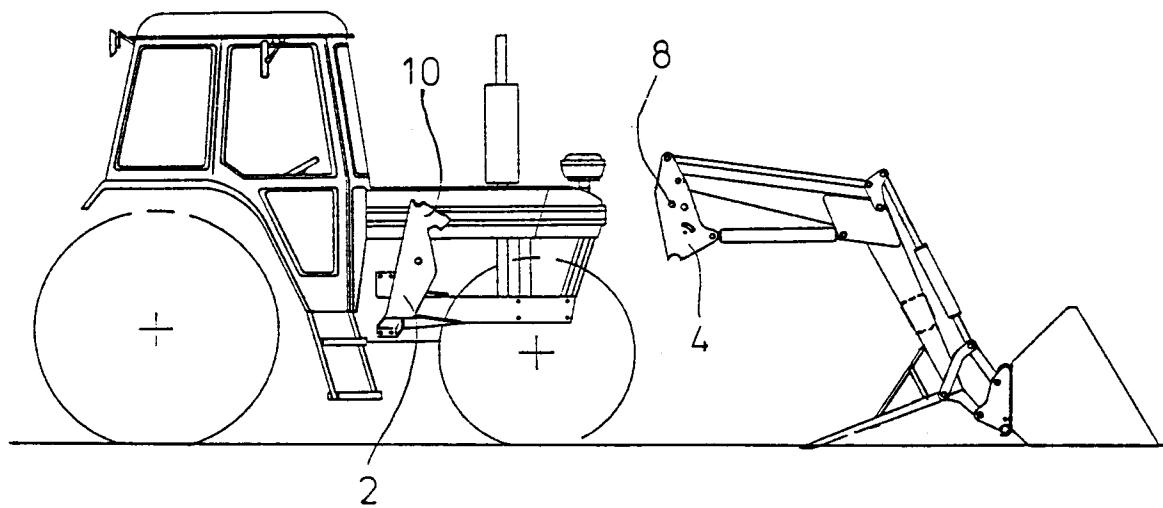


FIG. 1.

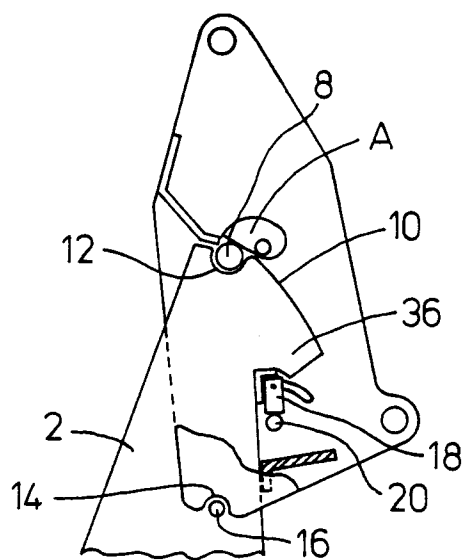


FIG. 2.

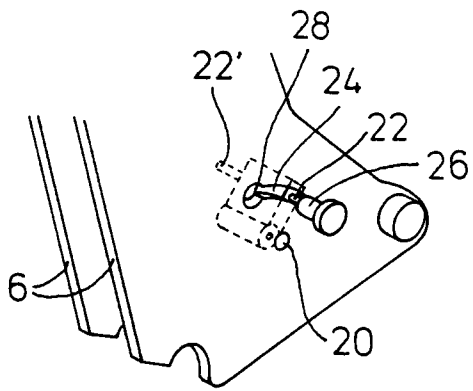


FIG. 3.

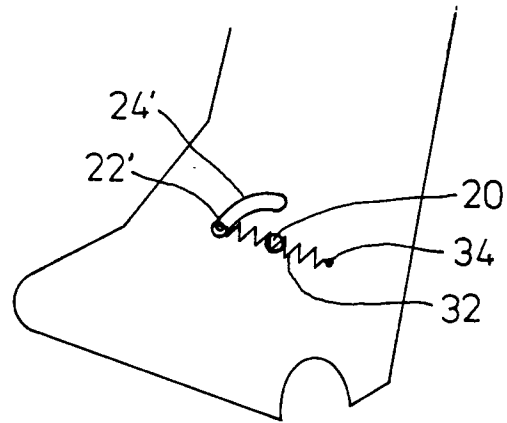


FIG. 4.

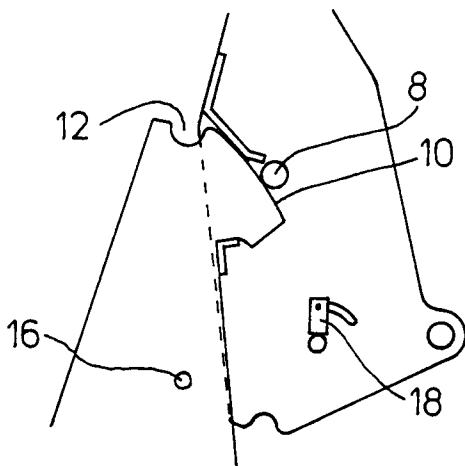


FIG. 5.

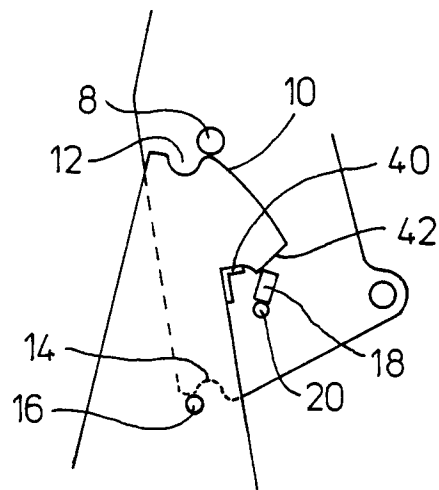


FIG. 6.

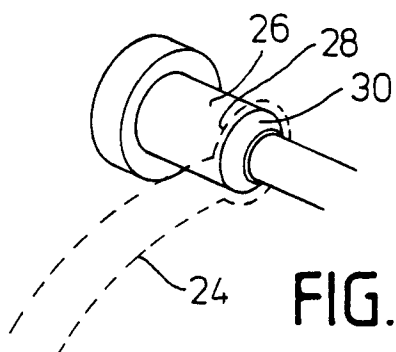


FIG. 7.



European Patent
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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 91610082.9
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	DE - A - 3 831 212 (FENDT & CO) * Abstract; fig. 1-5; columns 1-4; claims *	1-4	E 02 F 3/36 E 02 F 3/38 E 02 D 17/00
Y	AT - B - 374 857 (HAUER) * Fig. 1-5, 9-10; pages 2-4; claims 8 *	1-4	
A	FR - A - 2 537 182 (WILHELM STOLL MASCHINEN- FABRIK GMBH) * Abstract; fig. 1-3; claims *	1-4	
A	AT - B - 303 613 (HAUER) * Totality *	1, 3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 02 D E 02 F
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 16-12-1991	Examiner LANG
CATEGORY OF CITED DOCUMENTS 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 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 & : member of the same patent family, corresponding document			

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