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Hay-making machine

The present invention relates to a hay-making machine in the form of a merger for raking and/or transversely moving crops, comprising at least two merger units, which
5 each comprise a collecting conveyor for collecting the crops from the ground and a cross conveyor for transversely conveying the collected crops transversely to the travel direction, wherein the merger units are each suspended so as to swing about a horizontal swing axle pointing in the travel direction to adapt to the ground, and wherein at least one of the merger units is suspended to be adjustable transversely to the travel
10 direction in order to set down a side swath or a centre swath as desired.

Mergers which can set down side swaths or a centre swath as desired are known from the documents EP 2 962 540 A1 or WO 2020/222664 A1, for example, wherein the first-mentioned document EP 2 962 540 A1 proposes laterally moving two cross
15 conveyor belts away from one another relative to a continuously present pick-up in order to set down a centre swath, which is fed from the two moved-apart cross conveyor belts and also directly from the central portion of the pick-up, which stays together. By contrast, the second-mentioned document WO 2020/222664 A1 proposes providing a third, narrower merger unit in the centre between two lateral merger units,
20 which third unit can be moved away upwards into an inactive position in order to then set down a centre swath just using the two lateral merger units. Furthermore, EP 3066910 A1 discloses a combine harvester comprising a crop picking head, which comprises two side wings, which can be pivoted away upwards by means of a central wing and can be pivoted into a working position laterally outwards beside the central
25 wing by means of a parallelogram suspension link, wherein coupling halves are rigidly mounted both on the side wings and on the central wing and each result in a jointed connection when the side wings are brought together with the central wing.

Mergers of this kind are usually attachments that can be attached to a tractor and can
30 collect up stalk-shaped or leaf-shaped crops such as cut grass, hay or straw from the ground and set it down in swaths. Unlike with rotary rakes, in this case the crops are not raked together into a swath while lying directly on the ground, but instead are first

collected from the ground and then transversely conveyed in order to be set down in a swath. In this case, the collecting conveyor can be a tine conveyor comprising front tines that can be driven to revolve, in particular in the form of a so-called pick-up comprising a spiked roller, in which conveyor tines project between scrapers and are driven in a controlled or uncontrolled manner on annular circumferential paths in upright circumferential paths. The cross conveyors of such mergers can be configured as continuous conveyors comprising a continuously revolving conveying means, in particular in the form of a belt conveyor; cf. for example EP 3 058 804 B1 or DE 10 2010 010 862 A1. Instead of a continuously revolving conveyor belt, a conveyor floor can also be provided, over which separate conveyor tools extend in the transverse conveying direction; cf. EP 0 255 458 A1. Mergers of this kind are characterised by high forage quality or crop quality, since it is less likely that contaminants, such as stones or clumps of earth, will get into the swath when the crop is lifted from the ground before being transversely conveyed.

To allow for greater working widths, but at the same time to allow for good ground adaptation on uneven ground and also to ensure that road transport is possible, the working width of the merger can be divided into a plurality of merger units, which are arranged beside one another transversely to the travel direction and can tilt or swing individually in order to be able to adapt to uneven areas of ground. For road transport, the merger units can be pivoted out of the horizontal working position into an upright transport position where necessary in order to comply with the permissible transport width, wherein one or more merger units can potentially also be raised and optionally pivoted just to a sufficient extent to permit the transport. Intermediate positions can also be used for headlands in this case.

In addition, facilitates the division into a plurality of merger units arranged beside one another, but also setting down of a side swath and a centre swath as desired, wherein, to do this, the merger units can be moved together or moved apart and at least one of the merger units has a reversible-direction conveying drive. If a centre swath is to be set down, the two merger units are moved apart transversely to the travel direction such that a set-down gap results between the merger units, wherein the merger units

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are driven in opposite directions to one another such that the crop is conveyed by both merger units towards the centre and is set down in the set-down gap provided there. In order to set down a side swath, however, the two merger units are moved together and are driven to convey in the same direction, such that one merger unit transfers
5 "its" crop to the other merger unit, which transversely conveys the received crop, together with the crop coming from its own collecting conveyor, on further and then sets it down at the outer lateral end. For example, EP 3 058 804 B1 discloses a merger comprising transversely adjustable merger units. DD 136917 B also discloses a similar swather comprising transversely adjustable conveyor belts.

10 In the moved-together state, when a side swath is to be set down, transfer problems can arise if the merger units are suspended so as to swing individually and the merger units move away from one another at their end portions facing one another which form the transfer interface, or if they tilt up and down to different extents due to uneven
15 areas of ground, thus resulting in a step-like height offset. This kind of swing offset at the transfer interface is particularly critical if the transferring merger unit is positioned to be lower at the transfer interface than the receiving merger unit, since the crop to be transferred has to be conveyed one step up, so to speak. Depending on the magnitude of the swing offset, there may be a transfer jam or material accumulations, but there
20 may also be material crop losses or the crop may be dropped when the crop to be transferred does not reach the receiving cross conveyor, but instead falls into the resulting gap therebelow.

25 In order to avoid these kinds of transfer problems with individually swinging merger units, EP 2 731 414 B1 proposes interconnecting the adjacent merger units on the transfer interface in a jointed manner, such that the cross conveying units can no longer swing or tilt up and down independently of one another, but instead are held on the transfer interface at approximately the same height. To do this, a finger and a fork-shaped finger receptacle are each rigidly fastened to the opposite end portions of the
30 merger units, in order to guide the merger units on one another in the vertical direction on the transfer interface, but at the same time to make it possible to even out any transverse offset arising from the swinging movements.

However, in merger units that can be moved apart and together for setting down a centre swath or a side swath as desired, a connecting joint of this kind is laborious to handle. Either a joint pin needs to be dismantled to move the units apart and has to be meticulously threaded back in once they have been moved together, or the merger units have to be precisely aligned to the same height when they are moved together, which, owing to the swinging suspension, is almost impossible or requires two-person operation with an assistant at the attachment.

The problem addressed by the present invention is therefore to provide an improved hay-making machine of the type mentioned which avoids the drawbacks of the prior art and develops the prior art in an advantageous manner. In particular, it is intended to be made simple to switch from a side swath to a centre swath without sacrificing reliable, loss-free forage transfer in the moved-together position for the side swath in the process.

According to the invention, the stated problem is solved by a hay-making machine according to claim 1. Preferred configurations of the invention are found in the dependent claims.

It is therefore proposed to provide, between the merger units in the region of the transfer interface, a couplable and uncouplable joint comprising at least one adjustable coupling half, which is mounted on one of the merger units so as to be movable between a coupling position and an uncoupling position in order to close and open the joint connection by adjusting the coupling part relative to the merger unit to which it is fastened. According to the invention, between the merger units, a couplable and uncouplable joint comprising two coupling parts that can be brought into and out of engagement is provided, of which at least one coupling part is mounted on one of the merger units so as to be movable between a coupling position and an uncoupling position. By configuring one coupling half to be adjustable, the connection of the two merger units for setting down a side swath is considerably simpler in particular, since the connecting joint can be closed more easily, even if the merger units for setting

down a side swath are already moved together and are not completely precisely aligned. Unlike joint connections comprising two rigidly mounted joint halves, the coupling engagement position can be reached more easily owing to the adjustment movement of the coupling half relative to the corresponding merger unit. In addition, the coupling parts can be moved out of the setting-down region of the centre swath in the uncoupling position in order to avoid the crop to be set down in the centre swath becoming tangled in the projecting coupling parts.

In a development of the invention, the adjustable coupling half can be actuated by a motor in order to move the coupling half out of the uncoupled position into the coupling position, or vice versa, out of the coupled position into the uncoupled position. In a development of the invention, a control actuator is provided for adjusting the coupling half relative to the merger unit on which the coupling half is movably mounted. As a result, when reconfiguring from the centre swath to the side swath or, vice versa, from the side swath to the centre swath, the joint connection between the merger units can be disconnected or closed without having to apply high manual forces.

In principle, a control actuator of this kind can be designed in various ways, wherein an electric or hydraulic control actuator, for example in the form of an electric motor or a hydraulic motor, can preferably be provided for the adjustment of the coupling half. In particular, in an advantageous development of the invention, a pressure medium actuator, in particular a hydraulic cylinder unit, can be provided in order for it to be possible to move said coupling half between its uncoupling position and its coupling position and bring it into engagement with the other coupling half. By using a hydraulic cylinder, a simple connection can be obtained to the hydraulic supply system that is found in many hay-making machines or the tractors to which the hay-making machines are attached.

In principle, however, it would also be possible to provide manual adjustment of the coupling half, for which the machine driver could dismount or an assistant could lend a hand at the transfer interface between the merger units. Optionally, this kind of manual actuation can be provided as an additional actuation option, in order for it to

still be possible to actuate the coupling and disconnect or close the joint connection if the hydraulic or energy supply system has failed. For example, said control actuator can be switched into an idle mode or uncoupled for this purpose. So that excessive forces cannot be applied during manual actuation of this kind, it may be advantageous to fit a force-transmitting adjusting lever mechanism to the adjustable coupling part in order for it to be possible to exert a high control force on the coupling part with a limited manual force.

In an advantageous development of the invention, said control actuator can be configured to be double-acting in order to adjust the adjustable coupling part both into the coupling position and into the uncoupling position in an active or motor-driven manner. By means of a double-acting control actuator of this kind, for example a double-acting pressure medium or hydraulic cylinder, the movably mounted coupling half can be moved or adjusted in opposite directions in a targeted and controlled manner in order to close or open the jointed connection as desired.

In this case, configurations are possible in which both control directions are brought about hydraulically or electrically, for example. Alternatively or additionally, however, mixed forms are also possible, in which one control direction can be brought about by a spring preload and the opposite control direction is effected by the pressure medium, for example.

In principle, it would be possible to mount both coupling parts of the joint connecting the merger units so as to be movable on the relevant merger unit. Advantageously, however, just one of the coupling parts is mounted so as to be movable on its merger unit, while the other coupling part is rigidly fastened to its merger unit. As a result, on one hand the structure of the couplable and uncouplable joint is kept simple, and on the other hand the actuation for coupling and uncoupling is also simplified.

In principle, the adjustable coupling part can be mounted so as to be adjustable on the relevant merger unit in various ways in order to facilitate the movement between the coupling and uncoupling positions. For example, the coupling part could be mounted

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so as to be pivotable on the merger unit in order to perform a circular-path-shaped or curved coupling movement.

Alternatively or additionally, however, the adjustable coupling part can also be linearly adjustable or slidably mounted by means of a sliding guide, in order for it to be able to be coupled to or uncoupled from the other interacting coupling part. In particular, a sliding guide of this kind can provide an at least approximately linear sliding movement in one direction, which is directed towards or away from the other coupling part. Advantageously, when the merger units are moved together as intended for setting down a side swath, the adjustable coupling part can be slidably mounted in a direction horizontally transverse to the travel direction.

In an advantageous development of the invention, the adjustability of the coupling can be configured to prevent the coupling parts from protruding beyond the contours of the merger unit in the uncoupling position, at least in the direction of the centre swath to be set down. In particular, when viewed in the travel direction, the coupling parts can be arranged to be hidden, so to speak, within the contours of the associated merger units in the uncoupling position, in order not to impair a centre swath being set down and to prevent crops from becoming tangled in projecting coupling parts. In particular, said adjustable coupling part can move between a protruding coupling position, in which the coupling part protrudes beyond "its" merger unit towards the adjacent merger unit to be coupled, and a non-protruding coupling position, in which the coupling part does not protrude beyond its merger unit towards the setting-down region of the centre swath. In the coupled state, the protrusion of said coupling part is not disruptive, and is even required or at least helpful for obtaining the coupling engagement, since, in the coupled position, the crop is transported over the interface between the merger units. In the moved-apart position of the merger units, however, when a centre swath is intended to be set down between the merger units, the moved-back or uncoupled position can prevent the crop set down in the centre swath from becoming tangled.

The two coupling parts are advantageously configured to interlock. For example, one of the coupling parts can comprise coupling jaws that are open towards one side, into

which the other coupling part, which can for example comprise a coupling claw or a coupling finger, can be inserted. In the working position of the two merger units intended for setting down a side swath, coupling jaws of this kind can be vertically oriented such that the jaws are open towards the opposite merger unit and the sides of the coupling jaws leading to the jaw opening are horizontally oriented, in particular arranged one above the other, such that the other coupling part interacting therewith can be inserted between said sides and is caught in the jaws in the vertical direction in the inserted position, but has play horizontally transverse to the travel direction.

Advantageously, the coupling parts are configured such that the joint has play between the merger units in a direction horizontally transverse to the travel direction, in order for it to be possible to compensate for or permit relative movements that occur during swinging movements of the merger units. In the vertical direction, the coupling parts can engage in one another without play or with relatively little play in order to keep the two merger units at least approximately at the same height at the transfer interface even in the event of swinging movements, or at least to prevent a relatively great height offset.

A control device for controlling the coupling and uncoupling movement can fully automatically or semi-automatically actuate the control actuator, wherein a control device of this kind can for example be actuated from a machine driver's cab using a corresponding input means.

Alternatively or additionally, however, the control device can also operate in a sensor-controlled manner, wherein at least one sensor can detect a machine and/or operating parameter which indicates a side swath being set down and/or is present when the hay-making machine is in its moved-together configuration for setting down a side swath.

For example, a sensor of this kind can detect the presence of a side swath that is set down from an outer end of one of the two merger units, wherein the sensor can be configured to operate visually, for example, or can also sense the side swath by

ultrasound. Alternatively or additionally, a sensor can also be provided which detects the position of the merger units relative to one another, in particular if they are in a moved-together state. For example, a sensor of this kind can detect the clearance between the two merger units and/or in particular also the position of the coupling parts relative to one another.

Alternatively or additionally, a sensor can also be provided which detects a position and/or a pressure of the transverse-adjustment apparatus.

If a sensor signal from the at least one sensor indicates that the machine is operating to or is ready to set down a side swath, the control device can actuate the control actuator in order to move the coupling parts together and interconnect the merger units via the joint.

Depending on the configuration of the control actuator, it can be actuated and controlled by a switching valve, for example. In an electrical configuration, the control actuator can be controlled by an electrical circuit or a switch, for example.

Optionally, the control actuator can also be actuated or activated by sequential control, which operates on the basis of a pressure state of the transverse-adjustment apparatus. For example, the control actuator can be connected to the pressure supply system of the transverse-adjustment apparatus, in particular such that, when the transverse-adjustment actuators undergo a pressure increase when the moved-together position is reached, this pressure increase results in actuation of the control actuator in order to close the coupling parts.

The invention is explained in greater detail in the following on the basis of a preferred exemplary embodiment and the associated drawings, in which:

Fig. 1 is a perspective rear view of a hay-making machine in the form of a merger comprising two merger units arranged beside one another according to an advantageous configuration of the invention, wherein the two merger units are moved

together for setting down a side swath and are interconnected in a jointed manner by a joint in the region of the transfer interface,

Fig. 2 is a rear view of the hay-making machine from Fig. 1 showing the merger units coupled to one another in a jointed manner at the same height,

Fig. 3 is a perspective view of a detail of the couplable and uncouplable joint between the two merger units in a coupled position, and

Fig. 4 is a view of a detail of the couplable and uncouplable joint between the two merger units showing the sliding guide of a coupling part and the associated control actuator for adjusting the coupling part.

As shown in the drawings, the hay-making machine 1 can be configured as an attachment which can be attached to a tractor (not expressly shown), for example by means of a headstock and a three-point linkage or a drawbar, wherein the hay-making machine can be supported on the ground by means of a chassis 2, for example.

In this case, the hay-making machine 1 comprises a plurality of merger units 3, which each comprise a collecting conveyor 4, which collects crops lying on the ground and transfers them to a cross conveyor 5, which conveys the collected crops transversely to the travel direction 6 and sets them down on the ground again in a swath.

In this case, when viewed as a whole, said merger units 3 are horizontally oriented in the working position and their elongate contour extends transversely to said travel direction 6. Said collecting conveyor 4 can comprise a spiked rotor, which can be rotationally driven about a horizontal transverse axis, wherein the spikes can be controlled or uncontrolled along the circumferential path, as is known per se for pick-ups. The cross conveyor 5 following said collecting conveyor 4 in each case can be configured as a belt conveyor comprising a continuously revolving conveyor belt, for example. Alternatively, however, said cross conveyor 5 can comprise a cross-feeding auger, which transversely conveys the collected crop and sets it down in a swath.

As shown in Fig. 1 and 2, the merger units 3 are each suspended so as to swing about a swing axle 7, which extends horizontally approximately in parallel with the travel direction and can be provided at the height of or in the region of the cross conveyor 5, preferably approximately centrally, in order to facilitate agile swinging and precise ground adaptation to inclined or undulating ground contours.

As shown in Fig. 1 and 2, the suspension 8 of the merger units 3 can comprise support arms 10 which protrude from a machine frame 9 and from which the merger units 3 are suspended by means of a support frame or a suspension arm 11; cf. Fig. 1.

Said support arms 10 can be tilted up and down about horizontal pivot axes that are approximately in parallel with the travel direction in order for it to be possible to bring the merger units 3 out of the lowered working position shown in the drawings into an upright headland and/or road transport position. To do this, lifting actuators 12 can be provided, which act on the machine frame 9 and the relevant support arm 10. Optionally, a weight-load reducing means 12 can also pull the support arms 10 upwards, in order to relieve the load on the merger units and facilitate agile ground adaptation.

Said suspension arms 11, by means of which the merger units 3 are suspended from the support arms 10, can be mounted on the support arms 10 so as to likewise be pivotable about horizontal pivot axes that are approximately in parallel with the travel direction, in order for it to be possible to pivot said suspension arms 11 further inwards or further outwards, so that the merger units can move together for setting down a side swath and move apart for setting down a centre swath. For this purpose, transverse-adjustment actuators 13, for example in the form of hydraulic cylinders, can be provided, which form a transverse-adjustment apparatus 14 together with the suspension arms 11, by means of which the merger units 3 can be moved together and apart in order to set down a side swath or a centre swath as desired.

In order to prevent an undesired offset between the two merger units 3 in the region of

the transfer interface in the moved-together position for setting down a side swath, a couplable and uncouplable joint 15 is provided between the merger units 3, which joint does allow the merger units 3 to be angled relative to one another and thus allows for swinging movements of the merger units 3 about their respective swing suspension
5 axles 7, but prevents or limits a height offset of the merger units 3 relative to one another in the region of the transfer interface 16 in order to prevent forage from becoming jammed or even lost in the transfer region.

In its coupled position, said joint 15 can hold the two merger units 3 against one another
10 in the vertical direction relative to one another without play or with very limited play, such that the conveyor surfaces in the transfer region of the merger units 3 are approximately at the same height, as shown in Fig. 3 and 4. In addition, the joint 15 can advantageously be configured to be flexible in a direction horizontally transverse to the travel direction and/or in a horizontal plane or can have play or allow for
15 movements of the coupling halves relative to one another, in order for it to be possible to even out any transverse offset arising from the swinging movements of the merger units 3.

As shown in Fig. 3 and 4, said joint 15 comprises two coupling halves 17 and 18 or
20 parts, which can be brought into interlocking engagement with one another in order to close the jointed connection between the two merger units 3, and can also be brought out of engagement in order to disconnect the jointed connection.

Advantageously, one of the coupling parts 17 can comprise a coupling fork or coupling
25 jaws, which is/are open towards the opposite coupling part 18; cf. Fig. 3 and 4. The coupling jaws can be delimited towards a lower face and an upper face by horizontally oriented sides, between which the opposite coupling part 18 can be inserted, which can be a coupling finger or a coupling claw, for example, which can be inserted into the coupling fork or the coupling jaws of the other coupling part at least somewhat
30 precisely.

One of the coupling parts 18 can be rigidly mounted on "its" merger unit 3, while the

other coupling part 17 is movably mounted on “its” merger unit 3, in order to be able to move back and forth between a coupling and uncoupling position.

In particular, a sliding guide 19 for the adjustable coupling part 17 can be provided on the merger unit 3 in order to be able to move or slide the adjustable coupling part 17 towards and away from the opposite coupling part 18. The sliding guide 19 can slidably guide the coupling part 17 in a direction horizontally transverse to the travel direction when the two merger units 3 are in their intended, lowered working position.

As shown in Fig. 3 and 4, a control actuator 20 can be provided for adjusting the movable coupling part 17, wherein the control actuator 20 can for example comprise a hydraulic cylinder and/or can be configured to operate hydraulically. The control actuator 20 can be articulated both to a frame part of the merger unit 3 and to the adjustable coupling part 17, in order for it to be possible to adjust the coupling part 17 relative to the merger unit 3.

A control device 21 for controlling the coupling and uncoupling movement can fully automatically or semi-automatically actuate the control actuator 20, wherein a control device 21 of this kind can for example be actuated from a machine driver’s cab using a corresponding input means.

Alternatively or additionally, however, the control device 21 can also operate in a sensor-controlled manner, wherein at least one sensor 22 can detect a machine and/or operating parameter which indicates a side swath being set down and/or is present when the hay-making machine is in its moved-together configuration for setting down a side swath.

For example, a sensor 22 of this kind can detect the presence of a side swath that is set down from an outer end of one of the two merger units, wherein the sensor can be configured to operate visually, for example, or can also sense the side swath by ultrasound. Alternatively or additionally, a sensor 22 can also be provided which detects the position of the merger units 3 relative to one another, in particular if they

are in a moved-together state. For example, a sensor 22 of this kind can detect the clearance between the two merger units 3. Alternatively or additionally, a sensor 22 can also be provided which detects a position and/or a pressure of the transverse-adjustment apparatus 14.

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If a sensor signal from the at least one sensor 22 indicates that the machine is operating to or is ready to set down a side swath, the control device 21 can actuate the control actuator 20 in order to move the coupling parts 17 and 18 together and to interconnect the merger units 3 via the joint 15. In this case, the control device 21 can be configured such that the coupling parts 17, 18 are only coupled when the merger units 3 are moved together. Alternatively, however, the control device 21 can also move the coupling parts 17, 18 into the coupling position or into the coupling-ready position even when the merger units 3 have just started to be moved together, wherein, in this case, the coupling parts 17, 18 are locked or brought into engagement at least in part by moving the merger units 3 together.

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Depending on the configuration of the control actuator 20, it can be actuated and controlled by a switching valve, for example. In an electrical configuration, the control actuator 20 can be controlled by an electrical circuit or a switch, for example.

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Optionally, the control actuator 20 can also be actuated or activated by sequential control, which operates on the basis of a pressure state of the transverse-adjustment apparatus 14. For example, the control actuator 20 can be connected to the pressure supply system of the transverse-adjustment apparatus 14, in particular such that, when the transverse-adjustment actuators 13 undergo a pressure increase when the moved-together position is reached, this pressure increase results in actuation of the control actuator 20 in order to close the coupling parts 17 and 18.

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Patentkrav

1. Høfremstillingsmaskine i form af en sammenlægning til rivning og/eller tværgående flytning af afgrøder, omfattende mindst to sammenlægningsenheder (3), som hver især omfatter en opsamlingstransportør (4) til opsamling af afgrøderne fra jorden og en tværtransportør (5) til tværgående transport af de indsamlede afgrøder på tværs af kørselsretningen, hvor sammenlægningsenhederne (3) hver især er ophængt svingende omkring en horisontal svingaksel (7), der peger i kørselsretningen for at tilpasse sig jorden, og hvor mindst en af sammenlægningsenhederne (3) er ophængt for at kunne indstilles på tværs af kørselsretningen (6) for at nedsætte en sideskår eller et midterskår efter ønske, således at de to sammenlægningsenheder (3) kan flyttes sammen og flyttes fra hinanden efter ønske, hvor der i den sammenflyttede position til nedsættelse af et sideskår kan overføres afgrøder fra den ene sammenlægningsenhed til den anden sammenlægningsenhed, og i den fraflyttede position til nedsættelse af et midterskår kan afgrøder fra begge sammenlægningsenheder (3) nedsættes i et nedsætningsmellemrum mellem de to fraflyttede sammenlægningsenheder (3), **kendetegnet ved, at** der mellem sammenlægningsenhederne (3) er tilvejebragt mindst et sammen- og frakobleligt led (15), der omfatter to koblingsdele (17, 18), der kan bringes ind og ud af indgreb, hvoraf en koblingsdel (17) er monteret på en af sammenlægningsenhederne (3), således at den kan bevæges mellem en koblingsposition og en frakoblingsposition, således at den ved justering af den bevægelige koblingsdel (17) i forhold til sammensmeltningssenheden (3), hvortil den bevægelige koblingsdel (17) er fastgjort, kobles og frakobles leddet (15), hvor leddet (15) i koblet tilstand tillader sammenlægningsenhederne (3) at være vinklet i forhold til hinanden og giver mulighed for svingende bevægelser af sammenlægningsenhederne (3) omkring deres respektive svingaksler (7), mens på den anden side forhindrer eller i det mindste begrænser en højdeforskydning af sammenlæg-

ningsenhederne (3) i forhold til hinanden i området for en overføringsgrænseflade (16) mellem de to sammenlægningsenhederne (3).

5 **2.** Høfremstillingsmaskine ifølge det foregående krav, hvor en styreaktuator (20) er tilvejebragt til justering af koblingsdelen (17) i forhold til sammenlægningsenheden (3), hvorpå koblingsdelen (17) er bevægeligt monteret.

10 **3.** Høfremstillingsmaskine ifølge det foregående krav, hvor styreaktoren (20) er udformet til at være dobbeltvirkende til aktiv indstilling af koblingsdelen (17) både til koblingspositionen og til frakoblingspositionen.

15 **4.** Høfremstillingsmaskine ifølge et af de to foregående krav, hvor styreaktoren (20) omfatter mindst én trykmediecyylinder og/eller er udformet til at arbejde hydraulisk.

20 **5.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor af de to samvirkende koblingsdele (17, 18) er kun en koblingsdel (17) bevægeligt monteret på sin sammenlægningsenhed (3), og den anden koblingsdel (18) er stift monteret på sin sammenlægningsenhed (3).

25 **6.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor den bevægeligt monterede koblingsdel (17) er forskydeligt monteret på en sammenlægningsenhed (3) ved hjælp af en glideføring (19), hvor glideføringen (19) sørger for glidning af koblingsdelen (17) i retning mod og væk fra den anden koblingsdel (18).

30 **7.** Høfremstillingsmaskine ifølge det foregående krav, hvor glideføringen (19) tilvejebringer en glidende bevægelse af koblingsdelen (17) i en retning horisontalt på tværs af kørselsretningen.

5 **8.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor en af koblingsdelene (17) omfatter en koblingskæbe, der er åbne mod den anden koblingsdel (18), og hvori den anden koblingsdel (18) kan indsættes med en koblingsfinger eller koblingsklo, hvor koblingskæben har et opretstående åbningstværsnit, fra hvilket to liggende anbragte kæbevægge med indbyrdes afstand strækker sig væk.

10 **9.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor en styreindretning (21) er tilvejebragt til automatisk aktivering af styreaktuatoren afhængigt af et sensorsignal fra en sensor (22), som angiver sideskårets nedsættelsesdrift eller parathed til nedsættelse af sideskår af sammenlægningsenhederne (3).

15 **10.** Høfremstillingsmaskine ifølge det foregående krav, hvor sensoren (22) er udformet til

- at detektere et sideskår, der er sat ned fra en ydre ende af en sammenlægningsenhed (3), og/eller
- at detektere en afstand mellem de to sammenlægningsenheder (3), og/eller
- at detektere en driftsparameter, især en position og/eller en tryktilstand, af et

20 tværjusteringsindretning (17) til tværjustering af sammensmeltningssenhederne (3).

25 **11.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor en styreindretning eller styreindretningen (21) til aktivering af styreaktuatoren (20) er udformet til kun at koble koblingshalvdelene (17, 18) eller bringe dem ind i koblingsklar position, når sammenlægningsenhederne (3) flyttes sammen for at nedsætte et sideskår.

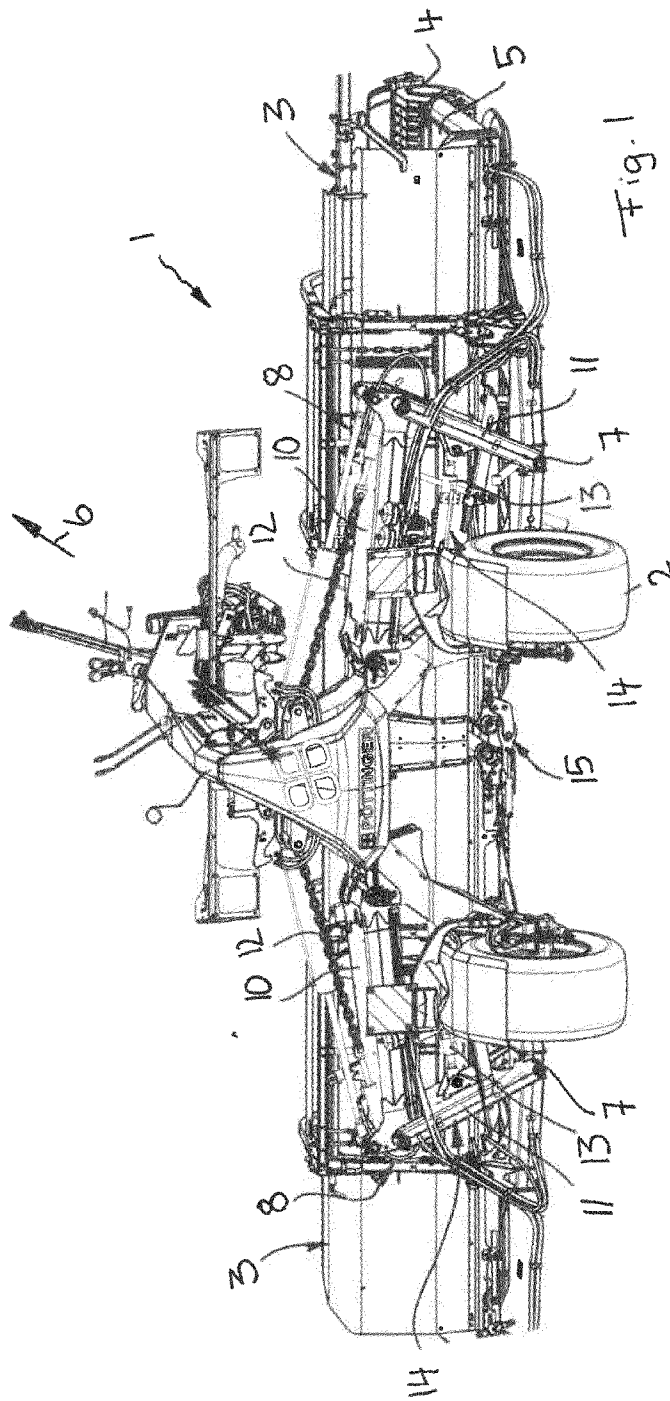
30 **12.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor sekventiel styring er tilvejebragt til aktivering af styreaktuatoren (20) og er udformet til at koble og frakoble koblingshalvdelene (17, 18) afhængigt af et trykmedietryk,

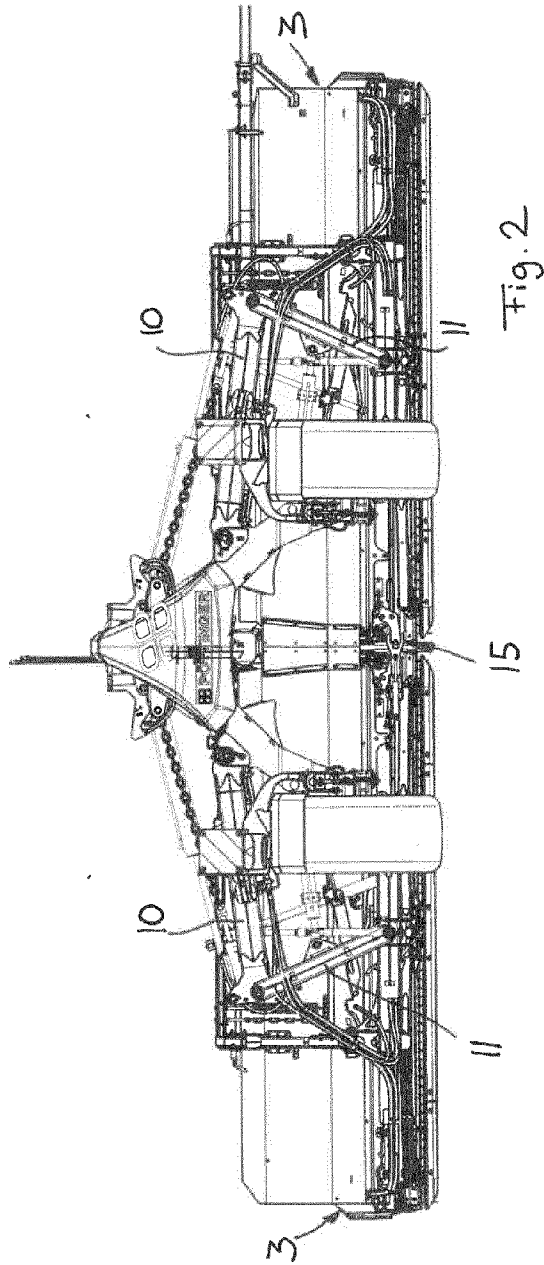
især et hydraulisk tryk af et tværjusteringsindretning (14) til tværgående justering af sammensmeltningssenhederne (3).

5 **13.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor leddet (15),
især koblingsdelene (17, 18), også er udformet fleksibelt i en retning horisontalt på tværs af kørselsretningen i koblet tilstand og/eller har slør og er konfigureret til at overføre kraft i lodret retning og holde sammensmeltningssenhederne (3) i samme højde i forhold til hinanden.

10 **14.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor leddet (15) er
anbragt på en bagside af tværtransportøren (5), der vender væk fra opsamlingstransportøren (4).

15 **15.** Høfremstillingsmaskine ifølge et af de foregående krav, hvor koblingsdelene (17, 18) er anbragt inden for konturen af den relevante sammenlægningsenhed i frakoblingspositionen set i køreretningen og/eller ikke rager på tværs ud over sammenlægningsenheden mod midterskåret.





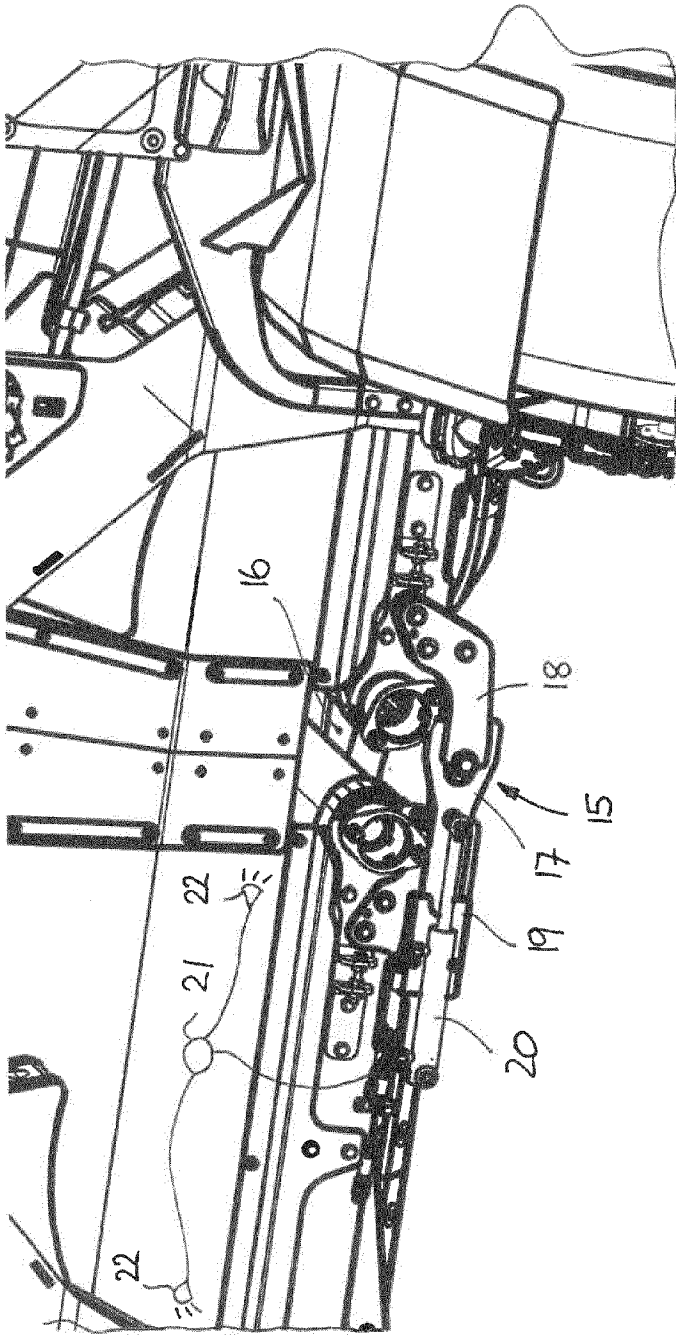


Fig. 3

