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Wrapping apparatus and method with a security mechanism and a drive blocking mechanism

(57)

The invention refers to an apparatus and to a method for wrapping an object. The object is on an object support. A wrapping unit drive (8) rotates a wrapping unit part (3, 30.1) with a holder (30.1) for wrapping material around the object. A barrier (1.I) in a protecting position provides a mechanical safety mechanism (5.I, 7.I, 10.I, 17.I). When the barrier (1.I) is moved into a further position, an interrupter (7.I, 17.I) is moved into an interrupting position and interrupts a supply connection (6.1, 6.2) for the wrapping unit drive (8). Thereby the wrapping unit part (3, 30.1) is no longer rotated.

Fig. 3 of GB 2188587 A discloses a bale wrapper 10 which can be coupled with a tractor. The bale 12 to be wrapped is kept in a protecting casing comprising a rear frame part 14 and a U-shaped frame part 30. A rear door 36 is mounted at the frame par 30. Hydraulic arms 40 can open the door 36. A beam 46 carries a shaft 55
 5 which carries a horizontal arm 48. Two vertical arms 58 are mounted at the horizontal arm 48 and carry two holders 60 for two plastic films 61. A hydraulic motor 50 rotates the shaft 55 with the arms 48 and 58. Thereby the bale 12 is wrapped. A wire mesh guard 34 protects the operator.

10 SUMMARY OF THE INVENTION

A problem solved by the invention is to provide a wrapping apparatus with the features of the preamble of claim 1 and a wrapping method with the features of the preamble of claim 17 wherein the operation of the blocking mechanism does not depend on the action of a control unit.

15 This problem is solved by a wrapping apparatus with the features of claim 1 and by a wrapping method with the features of claim 17. Preferred embodiments are specified in the depending claims.

The wrapping apparatus according to the invention comprises

- an object support for supporting from below an object to be wrapped,
- 20 – a wrapping unit with a rotatable part comprising at least one holder for a wrapping material reservoir,
- a wrapping unit drive for rotating the wrapping unit,
- at least one mechanical barrier, and
- a mechanical blocking mechanism.

25 The or at least one barrier is movable with respect to the wrapping unit between

- a protecting position and
- at least one further position.

The or every movable barrier being in the protecting position provides a
 30 mechanical safety mechanism.

The blocking mechanism comprises

- at least one mechanical interrupter and
- at least one interrupter connector.

The or every mechanical interrupter is movable between

- an interrupting position and
- at least one further position.

The or one interrupter being in the interrupting position interrupts a supply connection for the wrapping unit drive, thereby deactivating the wrapping unit drive. The
 5 or every interrupter being in the or one further position does not engage the supply connection, thereby enabling the wrapping unit drive to rotate the wrapping unit part.

The or one interrupter connector mechanically connects the or one movable barrier with the or one movable mechanical interrupter. In the case of several movable barriers every movable barrier is connected with the or at least one interrupter
 10 by means of the or one interrupter connector.

The or every interrupter connector couples

- a movement of the or one barrier into the or one further position with
- a movement of the or one interrupter into the interrupting position.

The wrapping apparatus according to the invention operates as follows
 15 and the wrapping method according to the invention comprises the following steps:

- The object to be wrapped is placed on the object support such that the object is supported from below by the object support.
- The wrapping unit drive rotates the rotatable part of the wrapping unit around the object support and thereby around the object on the object support. Thereby the
 20 object on the object support is wrapped into at least one web of wrapping material. This web is taken from the or one wrapping material reservoir. This reservoir is kept by the or at least one holder of the rotated wrapping unit. This holder with a wrapping material reservoir is moved around the object.
- While the wrapping unit is rotated and in particular while the object is wrapped,
 25 every movable mechanical interrupter is in the or one further position and does not engage the supply connection. The or every moveable barrier is in the protecting position while the wrapping unit is rotated such that the or every barrier provides a mechanical security mechanism.

The wrapping apparatus is further arranged to operate as follows and the
 30 method comprises a sequence which is performed at least once wherein the sequence comprises the following further steps:

- At least one barrier is moved into the or one further position.

- The or one interrupter connector transfers the movement of the barrier into the further position onto the or one interrupter connected with the moved barrier. Thereby the connected interrupter is moved into the interrupting position.
- The interrupter being in the interrupting position automatically interrupts the supply connection for the wrapping unit drive, thereby deactivating the wrapping unit drive. The wrapping unit drive does no longer rotate the rotatable wrapping unit part.

ADVANTAGES

As long as the or every movable barrier is in the protecting position, a mechanical safety mechanism is provided. This safety mechanism protects a human operator or a further living being outside of the wrapping apparatus from engaging into the working area of the rotated wrapping unit part. Thereby the safety mechanism helps to fulfill a safety requirement according to ISO 4254-14. As the safety mechanism is a mechanical device, it also protects the operator when the operator does not pay attention to the environment and does not notice the wrapping unit or an alert. This is an advantage of a mechanical barrier over a device for generating visual or acoustic signals. The invention can be combined with such an alert generator but does not require it.

If the wrapping apparatus belongs to a vehicle which is moved over ground, the or every barrier being in the protecting position reduces the risk that the rotated wrapping unit part on board of the moved vehicle hits an obstacle. If at all, the or one barrier in the protecting position hits the obstacle.

From time to time it is necessary that an operator obtains access to the wrapping unit, e.g. for placing a new wrapping material reservoir into the or one holder of the wrapping unit or to perform maintenance or a repair action. For doing so it is necessary to move the or one barrier out of the protecting position. According to the invention the or at least one barrier is movable with respect to the wrapping unit. Therefore it is not necessary to remove the or every barrier from the wrapping apparatus for obtaining access to the wrapping unit. It suffices that the or one barrier is moved into the or one further position. The barrier remains connected with the wrapping apparatus. This feature saves time compared with removing the barrier and later mounting it again. Thanks to the invention the rotation of the wrapping unit part with the holder is automatically stopped when at least one barrier is moved out of the protecting

position – more precisely: The wrapping unit drive is automatically deactivated by the interrupter.

The blocking mechanism according to the invention automatically deactivates the wrapping unit drive when the or one barrier is moved into the or one further position. It is not necessary that an operator switches off the wrapping unit drive. Therefore the security mechanism does not depend on the attention of the operator. The wrapping unit drive is also deactivated when the or one barrier is unintentionally or by an obstacle moved into the or one further position.

According to the invention the or one mechanical interrupter interrupts the supply connection for the wrapping unit drive when being moved into the interrupting position. The interrupter is moved in the interrupting position by the movement of the or one barrier into the or one further position. The barrier movement is transferred onto the interrupter by the interrupter connector. The invention ensures an immediate reaction on the step that the or one barrier is moved into the or one further position. This reaction does not depend on the operation of an actuator for the interrupter or for the wrapping unit drive which may fail. In the case of several barriers the wrapping unit drive is deactivated if only one barrier is moved into the or one further position.

Thanks to the invention no position sensor which monitors the position of the or one barrier is required. Such a sensor can malfunction and can in particular not generate an alert or generate a false alarm. In addition an operator may not pay attention to an alert generated on the basis of sensor signals. The invention can also be implemented without or with such a position sensor. It is further possible but not necessary to provide a sensor which monitors whether or not the wrapping unit drive rotates the wrapping unit. Thanks to the invention it is also not necessary to provide an optical sensor which monitors the working area of the rotated wrapping unit part.

The wrapping unit drive is automatically deactivated by the or one interrupter. No action of a control unit is required. Therefore no data connection between the control unit and the wrapping unit drive needs to be established when the barrier is moved into the or one further position. The protecting function is also achieved when no control unit is provided or the control unit malfunctions or a data connection is interrupted.

The invention can be implemented by using purely passive mechanical parts. In particular no actuator for deactivating the wrapping unit drive and no sensor for monitoring the blocking mechanism, the barrier, or the wrapping unit drive are required.

The invention can quite easily be implemented on board of an existing wrapping apparatus, in particular in the case that the barriers are already mounted. It suffices to add the interrupter and the interrupter connector. Thanks to the invention it is not necessary to adapt the wrapping unit drive, a control unit, or an actuator.

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PREFERED EMBODIMENTS

In one embodiment the wrapping unit comprises a wrapping unit carrier. This carrier rotatably carries the rotatable part with the wrapping material holder. The wrapping unit drive can rotate the wrapping unit part with the holder with respect to the carrier and with respect to the object support. Preferably the or every barrier is movably connected with the wrapping unit carrier and is not rotated while the wrapping unit drive rotates the part with the holder.

In one embodiment the or every barrier in the protecting position has a distance to the ground such that it prevents a standing human from approaching or even contacting the rotating wrapping unit part. Preferably the or every barrier can be pivoted downwards, i.e. towards the ground, into a further position wherein the barrier is angularly below the wrapping unit when the barrier is in this further position. Thereby the barrier in the further position does not contact the wrapping unit and is not an obstacle to an operator accessing the wrapping unit. The barrier in the further position does not increase the height over ground of the wrapping apparatus. It is also possible that the or one barrier can be pivoted upwards into the or one further position. The pivoting axis of the barrier can be horizontal or vertical or angularly sloping. It is further possible that the or one barrier can linearly be moved between at least two different positions, e.g. in a vertical direction.

In one embodiment the wrapping apparatus comprises at least two mechanical barriers. Every barrier is movable between the protecting position and the or at least one further position independently from the or every other barrier. Thereby the barriers selectively prevent or enable access from at least different sides to the wrapping unit. Preferably the object support and the wrapping unit are positioned between at least two movable barriers.

The embodiment with several barriers increases the flexibility without reducing the provided safety as only one selected barrier needs to be moved out of the protecting position for obtaining access whereas all further barriers remain in the protecting position and provide a mechanical safety mechanism. The wrapping unit drive is preferably stopped if only one barrier is moved out of the protecting position.

Preferably every movable barrier is connected with the or one interrupter. Thereby the wrapping unit drive is deactivated if one barrier is not in the protecting position – regardless of the respective position of the or every further barrier. This embodiment with several movable barriers provides even increased safety and more flexibility, e.g. for performing maintenance.

In one embodiment the wrapping apparatus comprises a frame. The wrapping unit can be moved with respect to the frame between

- a wrapping position and
- at least one parking position.

When being in the wrapping position, the wrapping unit drive can rotate the wrapping unit part such that the object on the object support is wrapped into at least one web. Moving the wrapping unit into the or one parking position adapts the wrapping apparatus to a further constraint, e.g. enables the wrapping apparatus to be moved over a public street or to be transported in a container or on a truck. Preferably the overall length of the wrapping apparatus is decreased when the wrapping unit is moved into the or one parking position. Preferably the or every barrier is moved together with the wrapping unit.

When the wrapping unit is in the or one parking position, it must be inhibited that the no wrapping unit part is rotated, i.e. the wrapping unit drive should be deactivated. It is possible that a movement of the wrapping unit into the parking position directly causes the wrapping unit drive to be deactivated and/or the rotatable wrapping unit part to be locked. One alternative implementation how to prevent the wrapping unit from rotating is to provide at least one barrier connector - that is a mechanical coupling element which couples

- a movement of the wrapping unit into the or one parking position with
- a movement of the or at least one barrier into the or one further position.

Moving the wrapping unit into the parking position has the following effect: The enforced movement of the barrier into the further position causes the or one interrupter to be moved into the interrupting position. This embodiment ensures that the wrapping unit drive is automatically and immediately deactivated when the wrapping unit is moved into the or one parking position.

Preferably the or every barrier connector is pivotally connected with the or one movable barrier and with the frame of the wrapping apparatus. Preferably the or every barrier is pivotally connected with the wrapping unit. Thanks to this connection the or every barrier is moved together with the wrapping unit when the wrapping unit is

moved with respect to the frame into the or one parking position. The barrier connector forces the or every barrier to be moved with respect to the wrapping unit into the or one further position. The or every interrupter is moved into the interrupting position. This embodiment ensures that the wrapping unit drive is automatically deactivated by using only passive mechanical parts. In particular the wrapping unit drive is deactivated without a control input from a control device and without the need for a human input from an operator.

In one embodiment the or every barrier can pivot with respect to the wrapping unit about a barrier pivoting axis. The or one interrupter connector can pivot with respect to this barrier about a connector pivoting axis. A lever arm emerges between these two pivoting axes. When the barrier is pivoted into the or one further position, the connected interrupter connector is moved by this lever arm and moves the interrupter into the interrupting position.

The wrapping unit drive can comprise a mechanical motor. In one implementation the wrapping apparatus further comprises a drive connection which connects the wrapping unit drive with a main input shaft of the wrapping apparatus. A further shaft, e.g. the PTO shaft of a tractor, rotates the main input shaft and thereby moves the wrapping unit drive. For stopping the wrapping unit part or the wrapping unit drive it is not necessary to interrupt the drive connection or even the main input shaft.

The wrapping unit drive can also be implemented as a hydraulic, pneumatic, or electric motor. A source for hydraulic or pneumatic fluid or electric energy can be mounted on board of the wrapping apparatus itself or outside of the wrapping apparatus.

The rotatable part can comprise a ring or further rotatable part which encircles the object on the object support and carries the or every holder for a wrapping material reservoir. The rotatable part can also comprise a shaft and at least one arm, preferably one arm per holder, which is mounted at the shaft. The shaft is positioned above the object on the object support. The or every holder is preferably mounted at the lower end of the or one arm.

In one embodiment the object on the object support remains in its position with respect to the object support. In a further embodiment the object support rotates the object around an object rotating axis. This object rotating axis is preferably perpendicular to the wrapping unit rotating axis, i.e. that axis around which the wrapping unit drive rotates the wrapping unit part with the holder. The further embodiment ensures that the entire surface of the object on the object support is wrapped.

The wrapping apparatus can belong to a vehicle, e.g. to an agricultural vehicle which is moved over a field. The wrapping apparatus can be a stand-alone wrapper or can belong to an object forming and wrapping combination, e.g. to a baler-wrapper combination. The wrapping apparatus can also belong to a stationary plant.

5 These and other aspects of the invention and of the preferred embodiment will be even more apparent from the detailed embodiment as described below and will be elucidated in detail there.

BRIEF DESCRIPTION OF THE DRAWINGS

10 Fig. 1 shows from the left-hand side the wrapping apparatus of the embodiment with the wrapping unit in a slightly inclined wrapping position and both barriers in the protecting position;

Fig. 2 shows in a perspective view the wrapping apparatus with both barriers and the wrapping unit in the positions of Fig. 1;

15 Fig. 3 shows in a rear view the wrapping apparatus with both barriers and the wrapping unit in the positions of Fig. 1;

Fig. 4 shows in a top view the wrapping apparatus with both barriers and the wrapping unit in the positions of Fig. 1;

20 Fig. 5 shows from the left-hand side the wrapping apparatus with the left barrier in the access-enabling position and the right barrier still in the protecting position and the wrapping unit still in the wrapping position;

Fig. 6 shows a perspective view the wrapping apparatus with both barriers and the wrapping unit in the positions of Fig. 5;

25 Fig. 7 shows from the rear the wrapping apparatus with both barriers and the wrapping unit in the positions of Fig. 5;

Fig. 8 shows in a detailed view the left interrupter and the left interrupter connector together with segments of the wrapping ring and the wrapping ring carrier;

30 Fig. 9 shows in a more detailed view the left interrupter and the left interrupter connector of Fig. 8;

Fig. 10 shows from the left-hand side the wrapping apparatus with the wrapping unit in a further inclined wrapping position and with both barriers in the protecting position;

35 Fig. 11 shows from the left-hand side the wrapping unit in a tilted transport position and both barriers in the transport position;

Fig. 12 shows in a detailed view how the left barrier is forced into the transport position;

Fig. 13 shows in a top view the wrapping apparatus with the left barrier in the access-enabling position and the right barrier in the protecting position;

5 Fig. 14 shows the left transport position rod in a detailed view;

Fig. 15 shows both barriers with their mounting assemblies and both transport position rods.

DETAILED DESCRIPTION OF EMBODIMENT

10 In the embodiment the invention is used on board of a baler-wrapper combination for agricultural purposes. A propelled vehicle moves the combination in a travelling direction TD over a field. The baler-wrapper combination comprises

- a combination frame with two ground-engaging wheels,
- a round baler,
- 15 – a bale transfer unit, and
- a wrapping apparatus according to the invention and comprising a pivotal wrapping table serving as the object support.

The round baler operates as follows:

- A baler pick-up unit picks up loose crop material from the ground.
- 20 – A conveying rotor conveys the picked-up crop material through a feeding channel in a direction opposite to the travelling direction TD towards a drum-shaped pressing chamber with fixed or variable size.
- Optionally a cutting assembly engages into the feeding channel, cooperates with the conveying rotor, and cuts the conveyed crop material.
- 25 – A bale forming device forms under pressure from injected crop material a round-cylindrical bale in the pressing chamber. This bale forming device comprises several pressing rollers and in one embodiment at least one endless flexible pressing belt surrounding the pressing chamber.
- The circumferential surface of the bale in the pressing chamber is wrapped into a
- 30 web of net or plastic film or into several strands of twine.
- A discharge gate (tailgate) is opened and the partially wrapped bale is ejected out of the pressing chamber.

The bale transfer unit comprises a pivotal bale carrier and a bale carrier actuator. The partially wrapped and ejected bale drops onto the bale carrier. The bale

carrier with the ejected bale is pivoted away from the baler and moves the bale onto the wrapping table while the wrapping table is in a bale receiving position. The bale rolls onto and is kept on the wrapping table such that the bale center axis is perpendicular to the travelling direction TD.

5 The bale serves as the object to be wrapped. The wrapping apparatus of the embodiment wraps the entire surface of the bale into two webs of plastic film and operates as follows:

- The wrapping table carrying the bale is pivoted around a horizontal axis perpendicular to the travelling direction TD from the bale receiving position into a
10 substantially horizontal and slightly inclining bale wrapping position.
- Driven belts of the wrapping table rotate the bale on the wrapping table around the bale center axis while the wrapping table remains in the bale wrapping position.
- Two holders for holding two plastic film rolls are moved around the bale on the
15 wrapping table. The common rotating axis around which the holders are rotated is substantially vertical and is perpendicular to the bale center axis around which the bale on the wrapping table is rotated.
- As soon as the required numbers of film layers are placed around the bale on the wrapping table, two clamping and cutting devices clamp the two film webs and
20 sever them.
- The wrapping table carrying the entirely wrapped bale is pivoted again away from the baler, this time into a descending bale depositing position. The entirely wrapped bale rolls from the wrapping table and is deposited on the ground.
- Optionally a tilting unit (quarter turn) tilts the wrapped bale onto a front face.

25 In the embodiment several hydraulic and electrical connections are established between the combination and the pulling vehicle. In one implementation a hydraulic source for every hydraulic motor of the combination is mounted on board of the pulling vehicle. It is also possible that a hydraulic source is mounted on board of the combination. The main input shaft of the combination is mechanically connected with
30 the PTO shaft of the pulling vehicle. The towing unit of the combination is mechanically connected with a corresponding hitch of the propelled vehicle.

The figures only show the wrapping apparatus of the embodiment but neither the round baler nor the bale transfer unit. The wrapping table and the bale to be wrapped as well as the plastic films kept by the holders are omitted in the figures.

In the embodiment shown in the figures the two film holders are mounted on a wrapping ring. While the bale on the wrapping table is wrapped, the wrapping ring is positioned in a horizontal or slightly inclined wrapping position such that the bale is in the interior of the rotated wrapping ring. In one implementation the pivoting angle of the wrapping ring with respect to the wrapping table depends on the diameter of the bale on the wrapping table. Preferably the holders are positioned approximately at the height of the bale center axis.

In an alternative embodiment (not shown) the film holders are mounted at the lower ends of two rotated wrapping arms. The wrapping arms are mounted at a vertical shaft and are positioned above the bale on the wrapping table. In one implementation the height of the wrapping arms over ground or the vertical position of the wrapping arms with respect to the wrapping table is adapted to the bale diameter.

The combination comprises a combination frame at which a chassis with at least two ground-engaging wheels and a towing unit are mounted. This combination frame carries the bale forming device providing the pressing chamber as well as the bale transfer unit and the wrapping apparatus.

The wrapping apparatus of the embodiment comprises

- the pivotal wrapping table,
- a power train for moving the rollers and/or belts of the wrapping table wherein the power train is connected with the main input shaft of the combination,
- the rotatable wrapping ring with the film holders which together serve as the rotatable wrapping unit part,
- a hydraulic wrapping ring motor serving as the wrapping unit drive, and
- a wrapping ring carrier carrying the wrapping ring.

The wrapping table is pivotally mounted at the combination frame and can be pivoted with respect to the combination frame between

- the bale receiving position,
- the bale wrapping position, and
- the bale depositing position.

The wrapping ring carrier is pivotally mounted at the combination frame such that the wrapping ring carrier together with the wrapping ring can be pivoted with respect to the combination frame and with respect to the wrapping table between

- the wrapping position and
- a transport position.

In the wrapping position the wrapping ring extends in a horizontal or slightly inclined plane. This position can depend on the bale diameter. In the transport position the wrapping ring extends in a substantially vertical or significantly inclining plane. The combination has a shorter length when the wrapping ring is in the transfer position compared with the wrapping position. The reduced length makes it easier to move the combination over a public street or to place it in a container. The wrapping ring extends always in the same plane than the wrapping ring carrier and can rotate with respect to the wrapping ring carrier but cannot perform a further relative movement. The wrapping ring must not rotate with respect to the wrapping ring carrier when the wrapping ring carrier is in the transport position.

A hydraulic wrapping table actuator can pivot the wrapping table with respect to the combination frame between the three positions. A hydraulic carrier actuator can pivot the wrapping ring carrier together with the wrapping ring with respect to the combination frame between the wrapping position and the transport position. The hydraulic wrapping ring motor can rotate the wrapping ring with respect to the wrapping ring frame when the wrapping ring carrier is in the wrapping position.

Fig. 1 to Fig. 4 show from different viewing directions the wrapping device of the embodiment with the wrapping ring in the wrapping position and a mechanical safety mechanism comprising two barriers being in the protecting position. The following parts are shown:

- the frame 28 of the combination with a left wheel rim 4.l and a right wheel rim 4.r for the two ground-engaging wheels (not shown),
- a left guiding sheet 31.l of the bale transfer unit 33 whereas the right guiding sheet 31.r is not shown and the ejected bale can be carried between the two guiding sheets 31.l, 31.r,
- the wrapping ring 3 carrying the two reservoir holders (film roll holders) 30.1, 30.2,
- the curved wrapping ring carrier 20 which is pivotally mounted at the combination frame 28 and which surrounds and rotatably carries the wrapping ring 3,
- a guiding roller 29 for the wrapping ring 3 mounted at the wrapping ring carrier 20,
- a hydraulic motor 8 which can rotate the wrapping ring 3 with respect to the wrapping ring carrier 20 and which serves as the wrapping unit drive,
- two hydraulic lines 6.1, 6.2 which belong to the hydraulic circuit which supplies the hydraulic motor 8 with hydraulic fluid,

- a left and a right sequences 24.l.1, 24.l.2, ... and 24.r.1, 24.r.2 ... of preferably pivotal holders for carrying reserve reservoirs (reserve film rolls) in a vertical orientation,
- a left barrier 1.l and a right barrier 1.r providing the mechanical safety mechanism,
- two mounting assemblies for mounting the two carriers 1.l and 1.r at the wrapping ring carrier 20, and
- a left front gas strut 15.l.1, a left rear gas strut 15.l.2, a right front gas strut 15.r.1, and a right rear gas strut 15.r.2.

The wrapping ring 3, the holders 30.1, 30.2, and the wrapping ring carrier 20 together form the wrapping unit of the embodiment. The wrapping ring 3 and the holders 30.1, 30.2 together form the rotatable wrapping unit part.

The hydraulic wrapping ring motor 8 is surrounded by a protective housing which is rigidly mounted at the wrapping ring carrier 20. The hydraulic motor 8 comprises a vertical shaft which is rotated by hydraulic fluid pressed through the lines 6.1 and 6.2. This vertical shaft rotates a sprocket wheel which is made of plastic and which touches the outer vertical surface of the wrapping ring 3. The vertical shaft further rotates via two chain wheels and a chain a further vertical shaft which in turn rotates a further sprocket wheel also made of plastic and touching the inner vertical surface of the wrapping ring 3. The wrapping ring 3 is clamped between the plastic sprocket wheels and is rotated when the plastic sprocket wheels rotate with the same circumferential velocity. The rotating axis of the wrapping ring 3 is substantially vertical to the ground while the wrapping ring carrier 20 is in the wrapping position and a bale is wrapped. The rotating axis of the wrapping ring 3 extends perpendicular to the drawing plane of Fig. 4.

In addition a spring (not shown) biases two jaws (not shown) against the wrapping ring 3. The biased clamping jaws prevent the wrapping ring 3 from rotating. When the hydraulic motor 8 is activated, it opens the jaws against the biasing force of the spring such that the wrapping ring 3 can rotate. As long as the hydraulic motor 8 is deactivated, the jaws are no longer opened and prevent the wrapping 3 from rotating.

Every reservoir holder 30.1, 30.2 is mounted on the wrapping ring 3 and comprises

- a holder frame 2.1, 2.2,
- a deflecting roller 21.1, 21.2,
- an upper reservoir support 36.1, 36.2, and
- a lower reservoir support 16.1, 16.2.

A reservoir (film roll) is rotatably kept in a vertical orientation in the holder frame 2.1, 2.2 and rests on the lower support 16.1, 16.2 and is further kept by the upper reservoir support 36.1, 36.2. A web pulled from the film roll is guided around the deflecting roller 16.1, 16.2 which has a vertical rotating axis. A spring tends to rotate the reservoir holder 30.1, 30.2 around a vertical axis such that the plastic film is tensioned.

For wrapping a bale supported and rotated on the wrapping table, two plastic films are pulled from the two film rolls held in the holders 30.1, 30.2. The remaining amount of plastic film decreases. Therefore it is necessary from time to time to replace an empty film roll with a new one. In the embodiment this replacement is done by a human operator. In addition repair work on the wrapping unit 3, 20, 30.1, 30.2 might be necessary. For replacing a film roll or for performing maintenance work the operator needs access to the wrapping unit 3, 20, 30.1, 30.2.

On the other hand no human should come too close to the working area of the wrapping unit as long as the wrapping ring 3 rotates. Therefore a mechanical protecting mechanism comprising the barriers 1.l, 1.r is provided. This mechanism fulfills the requirements of ISO 4254-14 and provides safety independently from the operations of a control unit on board of the combination or of the pulling vehicle.

In the embodiment the protecting mechanism comprises two mechanical barriers, namely the left barrier 1.l and the right barrier 1.r wherein the terms “left” and “right” refer to the travelling direction TD of the combination. The wrapping table, the wrapping ring 3, the holders 30.1, 30.2, the wrapping ring carrier 20, and the bale to be wrapped are positioned between these two barriers 1.l and 1.r. Every barrier 1.l, 1.r has the form of a curved bar which is pivotally mounted at the wrapping ring carrier 20. Every barrier 1.l, 1.r can be pivoted independently from the other barrier 1.r, 1.l between

- a protecting position (Fig. 1 to Fig. 4),
- a transport position (Fig. 11, Fig. 12), and
- an access-enabling position (Fig. 5 to Fig. 7).

When both barriers 1.l, 1.r are in the protecting position, they extend in an approximately horizontal plane such that the combination has the maximal width. Preferably this plane has a height over ground between 1m and 1.3m. The barriers 1.l, 1.r provide a mechanical obstacle which prevents a human or other living being from entering into the circular working area of the wrapping ring 3. A blocking mechanism (described below) ensures that the wrapping ring 3 only rotates when both barriers 1.l, 1.r are in the respective protecting position.

Every mounting assembly for a barrier 1.l, 1.r comprises (cf. Fig. 12 and Fig. 15)

- a stationary triangular carrying element 23.l, 23.r which is rigidly mounted at the wrapping ring carrier 20,
- 5 – a horizontal connecting element 19.l, 19.r which is rigidly mounted at the respective barrier 1.l, 1.r and hingedly connected with the stationary carrying element 23.l, 23.r, and
- a holding element 18.l, 18.r (to be described below).

The barriers 1.l, 1.r and the mounting assemblies can best be seen in the perspective view of Fig. 12 and in the detailed view of Fig. 15. The carrying element 23.l, 23.r and the connecting element 19.l, 19.r keep the barrier 1.l, 1.r such that the barrier 1.l, 1.r can pivot with respect to the wrapping ring carrier 20 about a rear pivoting axis PA.l.2, PA.r.2. The holding element 18.l, 18.r keeps the barrier 1.l, 1.r such that the barrier 1.l, 1.r can pivot with respect to the wrapping ring carrier 20 about a front pivoting axis PA.l.1, PA.r.1. These pivoting axes PA.l.1 and PA.l.2 as well as PA.r.1 and PA.r.2 are parallel to each other and keep their positions relative to the wrapping ring carrier 20 when the barrier 1.l, 1.r is pivoted.

In the embodiment every barrier 1.l, 1.r is kept in the protecting position by means of a front gas strut 15.l.1, 15.r.1 and a rear gas strut 15.l.2, 15.r.2. The lower end of a gas strut 15.l.1, 15.r.1, 15.l.2, 15.r.2 is pivotally mounted at the wrapping ring carrier 20. The upper end of the front gas strut 15.l.1, 15.r.1 is pivotally mounted at the holding element 18.l, 18.r of the barrier 1.l or 1.r. The upper end of the rear gas strut 15.l.2, 15.r.2 is pivotally mounted at the connecting element 19.l, 19.r.

An operator can pivot a barrier 1.l, 1.r independently from the other barrier 1.r, 1.l downwards against the biasing force of the connected gas struts 15.l.1 and 15.l.2 or 15.r.1 and 15.r.2. In the embodiment the barrier 1.l, 1.r does not comprise an actuator for pivoting the barriers 1.l, 1.r.

Every barrier 1.l, 1.r can be pivoted downwards from the protecting position into the transport position and further into the access-enabling position. The transport position is between the protecting position and the access-enabling position which provide the two possible end positions of the barrier 1.l, 1.r. When both barriers 1.l and 1.r are in the transport position, the width of the combination is reduced – compared with at least one barrier 1.l, 1.r being in the protecting position. Thanks to the reduced width the combination may be moved over a public street. In the embodiment a movement of the wrapping table into the vertical transport position is mechanically

coupled with a movement of both barriers 1.l and 1.r into the transport position, see below.

When the left barrier 1.l is in the access-enabling position, a human operator has access from the left-hand side of the combination to the wrapping ring 3 and to the wrapping table. When the right barrier 1.r is in the access-enabling position, a human operator has access from right-hand side.

Fig. 5 to Fig. 7 show the wrapping apparatus of the embodiment with the left barrier 1.l in the access-enabling position and the right barrier 1.r still in the protecting position. A mechanical blocking mechanism deactivates the hydraulic motor 8. When the hydraulic motor 8 is deactivated, the spring keeps the two jaws in the clamping position in which they keep the wrapping ring 3 in its current rotational position with respect to the wrapping ring carrier 20 and prevents an undesired wrapping ring movement.

Fig. 8 and Fig. 9 show in a detailed view the left blocking mechanism of the embodiment which is connected with the left barrier 1.l. The viewing direction is angularly rearwards. Fig. 8 shows

- the front part of the left barrier 1.l,
- the holding element 18.l of the mounting assembly for the left barrier 1.l,
- a front part of the wrapping ring 3,
- a front part of the wrapping ring carrier 20,
- a part of one reservoir holder 30.1, and
- the blocking mechanism for the left barrier 1.l.

The holding element 18.l is mounted at a barrier carrier 11.l which is upwardly curved and is rigidly mounted at the wrapping ring carrier 20. A vertical sequence with several holes or threads 13.l is cut into this carrier 11.l and can receive fasteners for fixing the holding element 18.l. The holding element 18.l can thereby be mounted at a position selected out of different possible positions. The left barrier 1.l is pivotally mounted at this holding element 18.l such that the left barrier 1.l can pivot around the left front pivoting axis PA.l.1. The holding element 18.l defines this pivoting axis PA.l.1 and prevents a lateral movement of the left barrier 1.l. The right barrier 1.r is mounted in a corresponding manner.

Every blocking mechanism comprises

- a tap 7.l, 7.r,
- a tap activating element 17.l, 17.r,

- a vertically oriented interrupting rod 5.l, 5.r, and
- a tap connecting element 10.l, 10.r, cf. Fig. 9.

The tap 7.l, 7.r together with the tap activating element 17.l, 17.r serves as the mechanical interrupter of the embodiment and can be moved linearly in a vertical direction between

- a releasing position and
- an interrupting position.

When in the interrupting position, the tap 7.l, 7.r interrupts one hydraulic line 6.1, 6.2 and thereby interrupts the hydraulic circuit for supplying the hydraulic motor 8. The taps 7.l, 7.r are mounted at different positions at the lines 6.1, 6.2 and in line such that every tap 7.l, 7.r can interrupt the hydraulic line 6.1, 6.2 independently from the position of the other tap 7.r, 7.l. One tap 7.l, 7.r in the interrupting position suffices to deactivate the hydraulic motor 8. When in the releasing position, the tap 7.l, 7.r does not engage the hydraulic circuit. The tap activating element 17.l, 17.r can shift the tap 7.l, 7.r vertically between these two positions.

The tap connecting element 10.l, 10.r connects

- the tap activating element 17.l, 17.r for the tap 7.l, 7.r with
- the interrupting rod 5.l, 5.r.

The interrupting rod 5.l, 5.r and the tap activating element 17.l, 17.r together serve as the interrupter connector of the embodiment. The upper end of the interrupting rod 5.l, 5.r is pivotally connected with the barrier 1.l, 1.r in a pivot 12.l, 12.r. Its lower end is pivotally connected with the tap connecting element 10.l, 10.r, cf. Fig. 8 and Fig. 9. The pivot 12.l, 12.r is guided through a hole near the upper end of the interrupting rod 5.l, 5.r and through a hole in a pivot holder 22.l, 22.r. This pivot holder 22.l, 22.r is movably mounted at the barrier carrier 11.l, 11.r wherein the holding element 18.l, 18.r is rigidly mounted. Fig. 9 further shows a left mounting element 34.l for the tap 7.l which is rigidly mounted at the combination frame 28. The lower end of the gas strut 15.l.1 is pivotally mounted at this mounting element 34.l.

When the barrier 1.l, 1.r is pivoted downwards and thereby moved out of the protecting position, the barrier 1.l, 1.r is pivoted around the front pivoting axis PA.l.1, PA.r.1 as well as around the rear pivoting axis PA.l.2, PA.r.2 which is parallel to the front axis PA.l.1, PA.r.1. The pivot axes PA.l.1, PA.r.1, PA.l.2, and PA.r.2 do not move with respect to the wrapping ring carrier 20. Thereby and as the barrier 1.l, 1.r is connected with the interrupting rod 5.l, 5.r in the pivot 12.l, 12.r, a lever arm emerges between the pivot 12.l, 12.r and the pivoting axis PA.l.1, PA.r.1 defined by the holding

element 18.l, 18.r. Thanks to this lever arm the interrupting rod 5.l, 5.r is pulled upwards. The tap connecting element 10.l, 10.r and the tap activating element 17.l, 17.r transfer this movement of the interrupting rod 5.l, 5.r onto the tap 7.l, 7.r. The tap 7.l, 7.r is moved upwards out of the releasing position into the interrupting position and interrupts
 5 the hydraulic line 6.1, 6.2.

The gas struts 15.l.1, 15.l.2 and 15.r.1, 15.r.2 of the embodiment operate in a so-called flip-flop mode. On the one hand they keep the connected barrier 1.l, 1.r in the protecting position. On the other hand they also keep the barrier 1.l, 1.r in the access-enabling position after the barrier 1.l, 1.r is pivoted downwards. Thereby the gas
 10 struts 15.l.1, 15.l.2 and 15.r.1, 15.r.2 prevent the barrier 1.l, 1.r from moving back by itself into the protecting position. In particular they prevent a tap 7.l, 7.r from being unintentionally moved into the releasing position.

As mentioned above a barrier 1.l or 1.r is pivoted manually by the operator into the access-enabling position. In general the other barrier 1.r or 1.l remains in the
 15 protecting position. This movement of one barrier 1.l or 1.r causes the hydraulic motor 8 to be deactivated regardless of the position of the other barrier 1.r or 1.l. The two jaws keep the wrapping ring 3 in a fixed position with respect to the wrapping ring carrier 20.

In addition the operator can trigger a hydraulic actuator which pivots the wrapping ring carrier 20 together with the wrapping ring 3 into the transport position.
 20 The wrapping ring 3 should also be locked and must not be rotated when the wrapping unit with the wrapping ring 3 is in the vertical or angled transport position. The following embodiment achieves this goal.

As mentioned above a hydraulic actuator (not shown) can move the wrapping ring carrier 20 together with the wrapping ring 3 with respect to the
 25 combination frame 28 from the wrapping position into the transport position and back. Fig. 1 to Fig. 4 show the wrapping ring 3 in the wrapping position and Fig. 11 shows the wrapping ring 3 in the transport position. A mechanical barrier connector transfers this movement of the wrapping ring 3 onto both barriers 1.l and 1.r and forces the barrier 1.l, 1.r to be moved into the transport position. This mechanical barrier connector comprises
 30 a transport position rod 9.l, 9.r per barrier 1.l, 1.r which is vertically oriented and which is rigidly mounted at the combination frame 28 by means of a mounting bracket 14.l, 14.r, cf. Fig. 8 and Fig. 15. The mounting bracket 14.l, 14.r is rigidly mounted at the mounting element 35.l, 35.r which in turn is mounted at the combination frame 28. The transport position rod 9.l, 9.r is pivotally connected with the assigned barrier 1.l, 1.r by means of a
 35 pivot 32.l, 32.r. This pivot 32.l, 32.r is positioned near the upper end of the transport

position rod 9.l, 9.r such that the pivoting axis PA.l.1, PA.r.1 of the barrier 1.l, 1.r is positioned between the pivot 32.l, 32.r (connection with the rod 9.l, 9.r) and the pivot 12.l, 12.r (connection with the interrupting rod 5.l, 5.r), cf. Fig. 9. Two lever arms emerge.

5 When the wrapping ring 3 is pivoted upwards into the transport position, the mounting assemblies for the barriers 1.l and 1.r are also pivoted and all barrier pivoting axes PA.l.1, PA.r.1, PA.l.2, PA.r.2 are moved upwards. Thereby the respective lever arm emerging between the pivot 32.l, 32.r and the pivot axis PA.l.1, PA.l.2 forces both barriers 1.l, 1.r to be pivoted downwards with respect to the wrapping unit 3, 20, 10 30.1, 30.2 around the pivots 32.l, 32.r into the transport position. The moved barriers 1.l, 1.r pull the interrupting rods 5.l, 5.r upwards. Thereby both taps 7.l and 7.r are moved into the interrupting position and block the line 6.1, 6.2. The wrapping ring motor 8 is deactivated. The wrapping ring 3 is no longer rotated and is locked by the jaws.

 Reference signs used in the claims will not limit the scope of the claimed 15 invention. The term “comprises” does not exclude other elements or steps. The articles “a”, “an”, and “one” do not exclude a plurality of elements. Features specified in several depending claims may be combined in an advantageous manner.

LIST OF REFERENCE SIGNS

1.l	left wrapper barrier, pivotally mounted at the left holding element 18.l and rigidly mounted at the left rear horizontal connecting element 19.l, can pivot around the axes PA.l.1, PA.l.2
1.r	right wrapper barrier, pivotally mounted at the right holding element 18.r and rigidly mounted at the right rear horizontal connecting element 19.r, can pivot around the axes PA.r.1, PA.r.2
2.1	frame of the first reservoir holder 30.1
2.2	frame of the second reservoir holder 30.2
3	wrapping ring, rotated with respect to the wrapping ring carrier 20 by the motor 8, carries and rotates both reservoir holders 30.1 and 30.2 around the bale to be wrapped on the wrapping table
4.l	wheel rim of the left ground-engaging wheel
4.r	wheel rim of the right ground-engaging wheel
5.l	left interrupting rod, connected with the left wrapper barrier 1.l in the left pivot 12.l and with the left tap connecting element 10.l
5.r	right interrupting rod, connected with the right wrapper barrier 1.r in the right pivot 12.r and with the right tap connecting element 10.r
6.1, 6.2	hydraulic lines of the hydraulic circuit for the hydraulic motor 8, can be interrupted by the taps 7.l and 7.r
7.l	left tap for disconnecting the hydraulic circuit for the hydraulic motor 8, is connected with the left interrupting rod 5.l by the left connecting element 10.l
7.r	right tap for disconnecting the hydraulic circuit for the right hydraulic motor 8, is connected with the right interrupting rod 5.r by the right connecting element 10.r
8	hydraulic motor for rotating the wrapping ring 3 with respect to the wrapping ring carrier 20, supplied by the lines 6.1 and 6.2, serves as the wrapping unit drive
9.l	left transport position rod for enforced pivoting the left wrapper barrier 1.l into the transport position, connected with the left wrapper barrier 1.l in the pivot 32.l, rigidly mounted at the left mounting element 35.l
9.r	right transport position rod for enforced pivoting the right wrapper barrier

	1.r into the transport position, connected with the right wrapper barrier 1.r in the pivot 32.r, rigidly mounted at the right mounting element 35.r
10.l	left tap connecting element, connects the left tap activating element 17.l with the left interrupting rod 5.l
10.r	right tap connecting element, connects the right tap activating element 17.r with the right interrupting rod 5.r
11.l	left barrier carrier for keeping the left wrapper barrier 1.l, provides the hole sequence 13.l, carries the left holding element 18.l
11.r	right barrier carrier for keeping the right wrapper barrier 1.r, provides the hole sequence 13.r, carries the right holding element 18.r
12.l	left pivot between the left wrapper barrier 1.l and the left interrupting rod 5.l, mounted at the left pivot holder 22.l
12.r	right pivot between the right wrapper barrier 1.r and the right interrupting rod 5.r
13.l	sequence of holes or threads in the left carrier 11.l
13.r	sequence of holes or threads in the right carrier 11.r
14.l	mounting bracket at the bottom end of the left bracket 9.l, connected with the left mounting element 35.l
14.r	mounting bracket at the bottom end of the right bracket 9.r, connected with the right mounting element 35.r
15.l.1, 15.l.2	left front and rear gas struts which tends to pivot and keep the left wrapper barrier 1.l
15.r.1, 15.r.2	right front and rear gas struts which tends to pivot and keep the right wrapper barrier 1.r
16.1	lower reservoir support of the first reservoir holder 30.1
16.2	lower reservoir support of the second reservoir holder 30.2
17.l	left tap activating element, moves the left tap 7.l into the interrupting position, moved by the left tap connecting element 10.l
17.r	right tap activating element, moves the right tap 7.r into the interrupting position, moved by the right tap connecting element 10.r
18.l	left holding element for the left wrapper barrier 1.l, mounted at the left carrier 11.l, defines the left front pivoting axis PA.l.1
18.r	right holding element for the right wrapper barrier 1.l, mounted at the right carrier 11.r

19.l	left rear horizontal connecting element, rigidly connected with the left wrapper barrier 1.l, hingedly connected with the left stationary carrying element 23.l and with the left rear gas strut 15.l.2
19.r	right rear horizontal connecting element, rigidly connected with the right wrapper barrier 1.r, hingedly connected with the right stationary carrying element 23.r and with the right rear gas strut 15.r.2
20	wrapping ring carrier, is pivotal with respect to the combination frame 28, carries the wrapping ring 3, the motor 8, the holding elements 18.l, 18.r, and the carrying elements 23.l, 23.r
21.1	deflecting roller of the first reservoir holder 30.1
21.2	deflecting roller of the second reservoir holder 30.2
22.l	left pivot holder for holding the left pivot 12.l
22.r	right pivot holder for holding the right pivot 12.r
23.l	stationary left carrying element mounted at the wrapping ring carrier 20, holds the left rear holding element 19.l for the left wrapper barrier 1.l, defines the left rear pivoting axis PA.l.2, connected with the left rear gas strut 15.l.2
23.r	stationary right carrying element mounted at the wrapping ring carrier 20, holds the right rear holding element 19.r for the right wrapper barrier 1.r, defines the right rear pivoting axis PA.r.2, connected with the right rear gas strut 15.r.2
24.l.1, 24.l.2, ...	left pivotal holders for reserve film rolls
24.r.1, 24.r.2, ...	right pivotal holders for reserve film rolls
28	combination frame, carries the wrapping ring carrier 20 and the wrapping table
29	guiding roller for the wrapping ring 3
30.1	first reservoir holder, mounted on the wrapping ring 3, comprises the frame 2.1, the lower reservoir support 16.1, the upper reservoir support 36.1, and the deflecting roller 21.1
30.2	second reservoir holder, mounted on the wrapping ring 3, comprises the

	frame 2.2, the lower reservoir support 16.2, the upper reservoir support 36.2, and the deflecting roller 21.2
31.l	left guiding sheet of the bale transfer unit 32
32.l	left pivot between the left wrapper barrier 1.l and the left transport position rod 9.l
32.r	right pivot between the right wrapper barrier 1.r and the right transport position rod 9.r
33	bale transfer unit, moves a bale onto the wrapping table
34.l	mounting element for the left tap 7.l and the left front gas strut 15.l.1
35.l	mounting element for the left transport position rod 9.l, rigidly mounted at the combination frame 28
35.r	mounting element for the right transport position rod 9.r, rigidly mounted at the combination frame 28
36.1	upper reservoir support of the first reservoir holder 30.1
36.2	upper reservoir support of the second reservoir holder 30.2
PA.l.1	front pivoting axis of the left wrapper barrier 1.l, defined by the left holding element 18.l
PA.l.2	rear pivoting axis of the left wrapper barrier 1.l, defined by the left carrying element 23.l
PA.r.1	front pivoting axis of the right wrapper barrier 1.r, defined by the right holding element 18.r
PA.r.2	rear pivoting axis of the right wrapper barrier 1.r, defined by the right carrying element 23.r
TD	traveling direction of the baler-wrapper combination

CONCLUSIES

1. Wikkelinrichting voor het wikkelen van een object,

waarbij de wikkelinrichting omvat

- 5 – een objectdrager voor het ondersteunen van een te wikkelen object,
- een wikkeleenheid (3, 20, 30.1, 30.2) met ten minste een houder (30.1, 30.2) voor een wikkelmateriaalvoorraad,
- een wikkeleenheidaandrijving (8),
- ten minste een beschermbeugel (1.l, 1.r), en
- 10 – een blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r),

waarbij een wikkeleenheiddeel (3, 30.1, 30.2) omvattende de of ten minste een houder (30.1, 30.2) van de wikkeleenheid (3, 20, 30.1, 30.2) roteerbaar is ten opzichte van de objectdrager,

- waarbij de wikkeleenheidaandrijving (8) is uitgevoerd om het roteerbare
- 15 wikkeleenheiddeel (3, 30.1, 30.2) ten opzichte van de objectdrager te roteren, waardoor een object op de objectdrager gewikkeld wordt in ten minste een web van wikkelmateriaal dat van de of een door de of een roterende houder (30.1, 30.2) gehouden wikkelmateriaalvoorraad wordt genomen,
- waarbij de of ten minste een beschermbeugel (1.l, 1.r) beweegbaar is ten opzichte van
- 20 de wikkeleenheid (3, 20, 30.1, 30.2) tussen

- een beschermingspositie en
- ten minste een verdere positie,

 waarbij de of een beschermbeugel (1.l, 1.r) die zich in de beschermingspositie bevindt een mechanisch veiligheidsmechanisme verschaft, en

- 25 waarbij het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) is uitgevoerd om te verhinderen dat de wikkeleenheidaandrijving (8) het wikkeleenheiddeel (3, 30.1, 30.2) roteert als de of ten minste een beweegbare beschermbeugel (1.l, 1.r) zich in de of een verdere positie bevindt,

met het kenmerk, dat

- 30 het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) is voorzien van
- ten minste een mechanische onderbreker (7.l, 7.r, 17.l, 17.r) en
 - ten minste een onderbreker-connector (5.l, 5.r, 10.l, 10.r),

 waarbij de of elke onderbreker (7.l, 7.r, 17.l, 17.r) beweegbaar is tussen

- een onderbrekingspositie en
- 35 – ten minste een verdere positie,

waarbij de of een zich in de onderbrekingspositie bevindende onderbreker (7.l, 7.r, 17.l, 17.r) een aanvoerverbinding (6.1, 6.2) van de wikkeleenheidsaandrijving (8) onderbreekt, waardoor de wikkeleenheidsaandrijving (8) wordt gedeactiveerd,

waarbij de of elke onderbreker-connector (5.l, 5.r, 10.l, 10.r) de of een beweegbare beschermbeugel (1.l, 1.r) mechanisch verbindt met de of een onderbreker (7.l, 7.r, 17.l, 17.r) zodanig dat elke beweegbare beschermbeugel (1.l, 1.r) verbonden is met de of ten minste een onderbreker (7.l, 7.r, 17.l, 17.r), en

waarbij de of elke onderbreker-connector (5.l, 5.r, 10.l, 10.r) koppelt

- een beweging van de of een beschermbeugel (1.l, 1.r) naar de of een verdere positie met
- een beweging van de of een verbonden onderbreker (7.l, 7.r, 17.l, 17.r) naar de onderbrekingspositie.

2. Wikkelinrichting volgens conclusie 1,

met het kenmerk, dat

de wikkelinrichting twee beweegbare beschermbeugels (1.l, 1.r) omvat,

waarbij elke beweegbare beschermbeugel (1.l, 1.r) onafhankelijk beweegbaar is van de of elke andere beweegbare beschermbeugel (1.l, 1.r) tussen

- de beschermingspositie en
- de of ten minste een verdere positie,

waarbij elke beweegbare beschermbeugel (1.l, 1.r) verbonden is met de of ten minste een onderbreker-connector (5.l, 5.r, 10.l, 10.r), en

waarbij elke onderbreker-connector (5.l, 5.r, 10.l, 10.r) koppelt

- een beweging van de verbonden beweegbare beschermbeugel (1.l, 1.r) naar de of een verdere positie met
- een beweging van de of een verbonden onderbreker (7.l, 7.r, 17.l, 17.r) naar de onderbrekingspositie.

3. Wikkelinrichting volgens conclusie 2,

met het kenmerk, dat

het roteerbare deel (3, 30.1, 30.2) van de wikkeleenheid (3, 20, 30.1, 30.2) is geplaatst

tussen de of ten minste twee beschermbeugels (1.l, 1.r)

ten minste als elke beschermbeugel (1.l, 1.r) zich in de beschermingspositie bevindt.

4. Wikkelinrichting volgens een van de voorgaande conclusies,

met het kenmerk, dat

de of ten minste een beschermbeugel (1.l, 1.r) een kleinere afstand tot de grond heeft

wanneer deze zich in de of een verdere positie bevindt vergeleken met de

beschermingspositie.

5. Wikkelinrichting volgens een van de voorgaande conclusies,

met het kenmerk, dat

de of elke beweegbare beschermbeugel (1.l, 1.r) scharnierbaar is ten opzichte van de
5 wikkeleenheid (3, 20, 30.1, 30.2) tussen

- de beschermingspositie en
- de of elke verdere positie.

6. Wikkelinrichting volgens conclusie 5,

met het kenmerk, dat

10 de of elke beweegbare beschermbeugel (1.l, 1.r) scharnierbaar is ten opzichte van de
wikkeleenheid (3, 20, 30.1, 30.2) om een beschermbeugelscharnierhartlijn (PA.l.1,
PA.r.1) en

de of ten minste een onderbreker-connector (5.l, 5.r, 10.l, 10.r) scharnierbaar is ten
opzichte van de of een beschermbeugel (1.l, 1.r) om een connectorscharnierhartlijn (12.l,

15 12.r),

waarbij een afstand tussen

- de beschermbeugelscharnierhartlijn (PA.l.1, PA.r.1) en
- de connectorscharnierhartlijn (12.l, 12.r)

zodanig is dat een hefboomarm ontstaat voor het scharnieren van de onderbreker-
20 connector (5.l, 5.r, 10.l, 10.r).

7. Wikkelinrichting volgens een van de voorgaande conclusies,

met het kenmerk, dat

de wikkelinrichting omvat

- een frame (28) en
- 25 – ten minste een beschermbeugelconnector (9.l, 9.r) die is verbonden met de of een
beweegbare beschermbeugel (1.l, 1.r),

waarbij de wikkeleenheid (3, 20, 30.1, 30.2) beweegbaar is ten opzichte van het frame
(28) tussen

- ten minste een wikkelpositie en
- 30 – ten minste een parkeerpositie,

waarbij de wikkelinrichting is uitgevoerd om een object te wikkelen op de objectdrager als
de wikkeleenheid (3, 20, 30.1, 30.2) zich in de of een wikkelpositie bevindt, en

waarbij de of elke beschermbeugelconnector (9.l, 9.r) koppelt

- een beweging van de wikkeleenheid (3, 20, 30.1, 30.2) ten opzichte van het frame
35 (28) naar de parkeerpositie met

- een beweging van de of een verbonden beschermbeugel (1.l, 1.r) naar de of een verdere positie.

8. Wikkelinrichting volgens conclusie 7,

met het kenmerk, dat

- 5 de of ten minste een beschermbeugelconnector (9.l, 9.r) verbonden is met het frame (28), waarbij een beweging van de wikkeleenheid (3, 20, 30.1, 30.2) naar de of een parkeerpositie ertoe leidt dat de of een beschermbeugel (1.l, 1.r) die is verbonden met de beschermbeugelconnector (9.l, 9.r) naar de of een verdere positie bewogen wordt, waardoor de wikkeleenheidaandrijving (8) gedeactiveerd wordt.

10 9. Wikkelinrichting volgens een van de voorgaande conclusies,

met het kenmerk, dat

de wikkelinrichting ten minste een voorspanelement (15.l.1, 15.l.2, 15.r.1, 15.r.2) omvat dat de of een beweegbare beschermbeugel (1.l, 1.r) in de beschermingspositie neigt te houden.

15 10. Wikkelinrichting volgens conclusie 9,

met het kenmerk, dat

de of een voorspanelement (15.l.1, 15.l.2, 15.r.1, 15.r.2) verder de beschermbeugel (1.l, 1.r) die zich in de of een verdere positie bevindt in deze verdere positie neigt te houden.

11. Wikkelinrichting volgens een van de voorgaande conclusies,

20 **met het kenmerk**,

het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) twee onderbrekers (7.l, 7.r, 17.l, 17.r) omvat,

waarbij elke onderbreker (7.l, 7.r, 17.l, 17.r) beweegbaar is tussen

- de onderbrekingspositie en
- 25 – ten minste een verdere positie

onafhankelijk van de of elke andere onderbreker (7.l, 7.r, 17.l, 17.r),

waarbij elke onderbreker (7.l, 7.r, 17.l, 17.r) verbonden is met de of een onderbrekerconnector (5.l, 5.r, 10.l, 10.r), en

- 30 waarbij de twee onderbrekers (7.l, 7.r, 17.l, 17.r) zijn uitgevoerd om de aanvoerverbinding (6.1, 6.2) op verschillende plaatsen te onderbreken als deze zich in de onderbrekingspositie bevinden.

12. Wikkelinrichting volgens conclusie 11,

met het kenmerk, dat

het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) twee onderbreker-

35 connectors (5.l, 5.r, 10.l, 10.r) omvat,

waarbij elke onderbreker-connector (5.l, 5.r, 10.l, 10.r)

- verbonden is met ten minste een van de onderbrekers (7.l, 7.r, 17.l, 17.r) en
- beweegbaar is onafhankelijk van de of elke andere onderbreker-connector (5.r, 5.l, 10.r, 10.l).

5 13. Wikkelinrichting volgens een van de voorgaande conclusies,

met het kenmerk, dat

de wikkelinrichting een vergrendelinrichting omvat die beweegbaar is tussen

- een vergrendelpositie en
- een vrijgeefpositie,

10 waarbij de vergrendelinrichting die zich in de vergrendelpositie bevindt het roteren van het roteerbare wikkeleenheiddeel (3, 30.1, 30.2) verhindert en waarbij de wikkeleenheid aandrijving (8) is uitgevoerd om de vergrendelinrichting in de vrijgeefpositie te bewegen en/of te houden.

14. Wikkelinrichting volgens conclusie 13,

15 **met het kenmerk**, dat

de wikkelinrichting verder een vergrendelvoorspaninrichting omvat,

waarbij de vergrendelvoorspaninrichting de vergrendelinrichting in de vergrendelpositie neigt te bewegen of te houden.

15. Objectvormende-en-wikkelinrichting omvattende

- 20
- een objectvormende inrichting,
 - een objectoverdrachtinrichting, en
 - een wikkelinrichting volgens een van de conclusies 1-14,

waarbij de objectvormende inrichting is uitgevoerd om een object te vormen en

waarbij de objectoverdrachtinrichting is uitgevoerd om een object over te dragen

- 25
- van de objectvormende inrichting
 - op de objectdrager van de wikkelinrichting.

16. Voertuig omvattende

- een hefinrichting en
- een wikkelinrichting volgens een van de conclusies 1-14,

30 waarbij de hefinrichting is uitgevoerd om

- een object van de grond op te heffen en
- het opheffen object op de objectdrager van de wikkelinrichting te plaatsen.

17. Werkwijze voor het wikkelen van een object

door gebruik van een wikkelinrichting omvattende

- een objectdrager voor het ondersteunen van een te wikkelen object, een wikkeleenheid (3, 20, 30.1, 30.2) met ten minste een houder (30.1, 30.2) voor een wikkelmateriaalvoorraad,

- een wikkeleenheidaandrijving (8),

5 – ten minste een beschermbeugel (1.l, 1.r), en

- een blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r),

waarbij een wikkeleenheiddeel (3, 30.1, 30.2) omvattende de of ten minste een houder (30.1, 30.2) van de wikkeleenheid (3, 20, 30.1, 30.2) roteerbaar is ten opzichte van de objectdrager,

10 waarbij de of ten minste een beschermbeugel (1.l, 1.r) beweegbaar is ten opzichte van de wikkeleenheid (3, 20, 30.1, 30.2) tussen

- een beschermingspositie en

- ten minste een verdere positie,

waarbij de werkwijze de stappen omvat dat

15 – het te wikkelen object geplaatst is op de objectdrager zodanig dat het object ondersteund wordt door de objectdrager,

- de wikkeleenheidaandrijving (8) ten minste tijdelijk het roteerbare deel (3, 30.1, 30.2) van de wikkeleenheid (3, 20, 30.1, 30.2) roteert om de objectdrager zodanig dat het object op de objectdrager gewikkeld wordt in ten minste een web

20 van wikkelmateriaal dat van de of een door de of een roterende houder (30.1, 30.2) gehouden wikkelmateriaalvoorraad wordt genomen, en

- de of elke beweegbare beschermbeugel (1.l, 1.r) zich in de beschermingspositie bevindt terwijl het wikkeleenheiddeel (3, 30.1, 30.2) geroteerd wordt zodanig dat de of elke beschermbeugel (1.l, 1.r) een mechanisch veiligheidsmechanisme

25 verschafft,

waarbij de werkwijze een volgorde omvat die ten minste eenmalig uitgevoerd wordt en die de stappen omvat dat

- de of ten minste een beschermbeugel (1.l, 1.r) bewogen wordt naar de of een verdere positie en

30 – het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) verhindert dat de wikkeleenheidaandrijving (8) de wikkeleenheid (3, 20, 30.1, 30.2) roteert als de of ten minste een beweegbare beschermbeugel (1.l, 1.r) zich in de of een verdere positie bevindt,

met het kenmerk, dat

35 het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) is voorzien van

- ten minste een mechanische onderbreker (7.l, 7.r, 17.l, 17.r) en
- ten minste een onderbreker-connector (5.l, 5.r, 10.l, 10.r),

waarbij de of elke onderbreker (7.l, 7.r, 17.l, 17.r) beweegbaar is tussen

- een onderbrekingspositie en

5 – ten minste een verdere positie, en

- waarbij de of elke onderbreker-connector (5.l, 5.r, 10.l, 10.r) de of een beweegbare beschermbeugel (1.l, 1.r) mechanisch verbindt met de of een onderbreker (7.l, 7.r, 17.l, 17.r) zodanig dat elke beweegbare beschermbeugel (1.l, 1.r) verbonden is met de of ten minste een onderbreker (7.l, 7.r, 17.l, 17.r), en

10 waarbij de stap dat het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) verhindert dat de wikkeleenheidsaandrijving (8) het roteerbare wikkeleenheidsdeel (3, 30.1, 30.2) roteert de stappen omvat dat

- de of een onderbreker-connector (5.l, 5.r, 10.l, 10.r) de beweging van de beschermbeugel (1.l, 1.r) naar de verdere positie overbrengt op de of een

15 verbonden onderbreker (7.l, 7.r, 17.l, 17.r)

zodanig dat deze onderbreker (7.l, 7.r, 17.l, 17.r) bewogen wordt naar de onderbrekingspositie en

- de onderbreker (7.l, 7.r, 17.l, 17.r) die zich in de onderbrekingspositie bevindt een aanvoerverbinding (6.1, 6.2) voor de wikkeleenheidsaandrijving (8) onderbreekt,

20 waardoor de wikkeleenheidsaandrijving (8) wordt gedeactiveerd.

18. Wikkelinrichting volgens conclusie 17,

met het kenmerk, dat

de wikkelinrichting ten minste twee beweegbare beschermbeugels (1.l, 1.r) omvat en het blokkeermechanisme (7.l, 7.r, 17.l, 17.r, 5.l, 5.r, 10.l, 10.r) twee onderbreker-

25 connectors (5.l, 5.r, 10.l, 10.r) omvat,

waarbij elke beweegbare beschermbeugel (1.l, 1.r) verbonden is met een onderbreker-connector (5.l, 5.r, 10.l, 10.r),

waarbij de stap dat een beschermbeugel (1.l, 1.r) bewogen wordt naar de verdere positie wordt uitgevoerd terwijl de of elke andere beschermbeugel (1.r, 1.l) zich nog in de

30 beschermingspositie bevindt, en

waarbij elke stap dat een beschermbeugel (1.l, 1.r) bewogen wordt naar de verdere positie tot de stap leidt dat

de of een verbonden onderbreker-connector (5.l, 5.r, 10.l, 10.r) de beweging van deze beschermbeugel (1.l, 1.r) naar de verdere positie overdraagt op de verbonden

35 onderbreker (7.l, 7.r, 17.l, 17.r) zodanig dat deze onderbreker (7.l, 7.r, 17.l, 17.r) bewogen

wordt naar de onderbrekingspositie.

19. Wikkelerwijze volgens conclusie 17 of conclusie 18,

met het kenmerk, dat

de wikkelinrichting omvat

- 5 – een frame (28) en
- ten minste een beschermbeugel-connector (9.l, 9.r) die is verbonden met de of een beweegbare beschermbeugel (1.l, 1.r),

waarbij de wikkeleenheid (3, 20, 30.1, 30.2) beweegbaar is ten opzichte van het frame (28) tussen

- 10 – ten minste een wikkelpositie en
- ten minste een parkeerpositie,

waarbij de stap dat de wikkeleenheidaandrijving (8) het wikkeleenheiddeel (3, 30.1, 30.2) roteert

uitgevoerd wordt terwijl de wikkeleenheid (3, 20, 30.1, 30.2) zich in de of een wikkelpositie

- 15 bevindt en

ertoe leidt dat het wikkeleenheiddeel (3, 30.1, 30.2) om de objectdrager en ten opzichte van het frame (28) roteert en

waarbij de werkwijze een volgorde omvat die ten minste eenmalig uitgevoerd wordt en die de stappen omvat dat

- 20 de wikkelinrichting de wikkeleenheid (3, 20, 30.1, 30.2) beweegt

- van de wikkelpositie
- naar de of een parkeerpositie en

de beschermbeugelconnector (9.l, 9.r) de beweging van de wikkeleenheid (3, 20, 30.1, 30.2) naar de parkeerpositie overdraagt op de verbonden beschermbeugel (1.l, 1.r)

- 25 zodanig dat de verbonden beschermbeugel (1.l, 1.r) bewogen wordt naar de of een verdere positie.

20. Wikkelerwijze volgens een van de conclusies 17-19,

met het kenmerk, dat

de wikkelinrichting omvat

- 30 – een vergrendelinrichting en
- een vergrendelvoorspanelement dat de vergrendelinrichting naar de vergrendelpositie neigt te bewegen,

waarbij de stap dat de wikkeleenheidaandrijving (8) het wikkeleenheiddeel (3, 30.1, 30.2) roteert tot de stap leidt dat

- 35 de vergrendelinrichting bewogen wordt naar of gehouden wordt in de vrijgeefpositie tegen

de kracht van het vergrendelvoorspanelement in en
waarbij de stap dat de wikkeleenheidsaandrijving (8) wordt gedeactiveerd tot de stap leidt
dat

de vergrendelvoorspaninrichting

- 5 – bewogen wordt naar de vergrendelpositie en
 – verhindert dat het wikkeleenheidsdeel (3, 30.1, 30.2) roteert.

FIG. 2

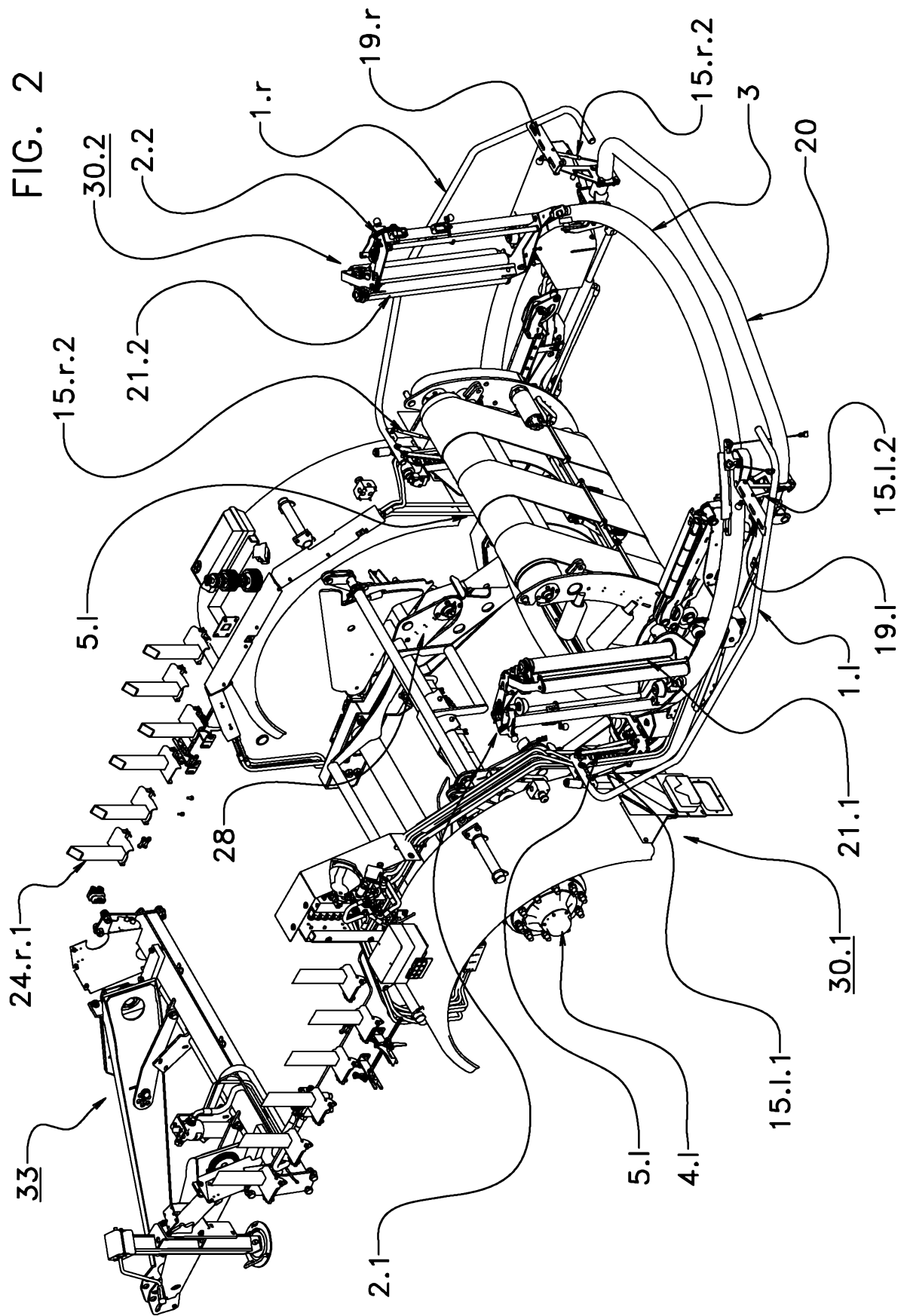


FIG. 3

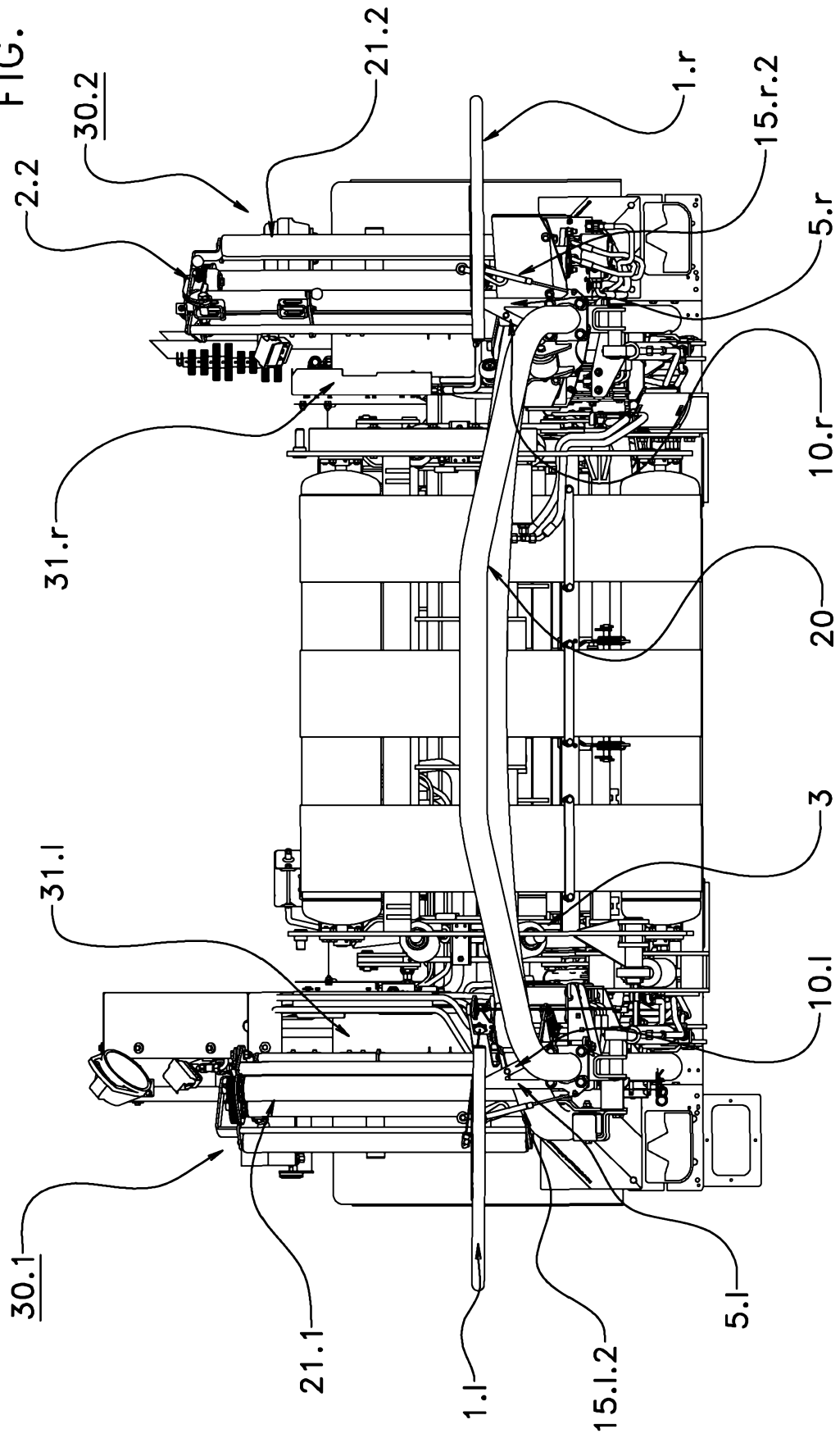


FIG. 4

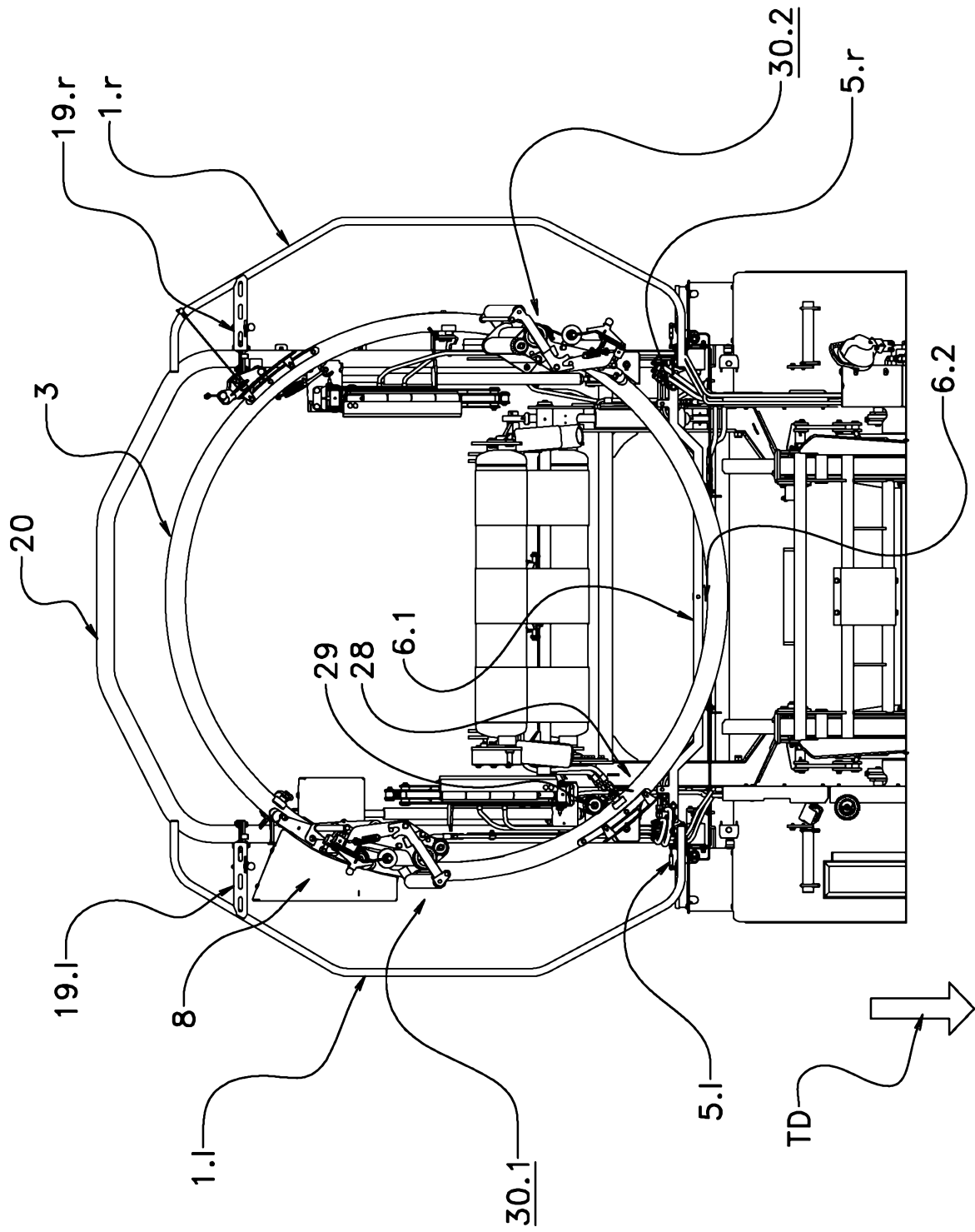


FIG. 5

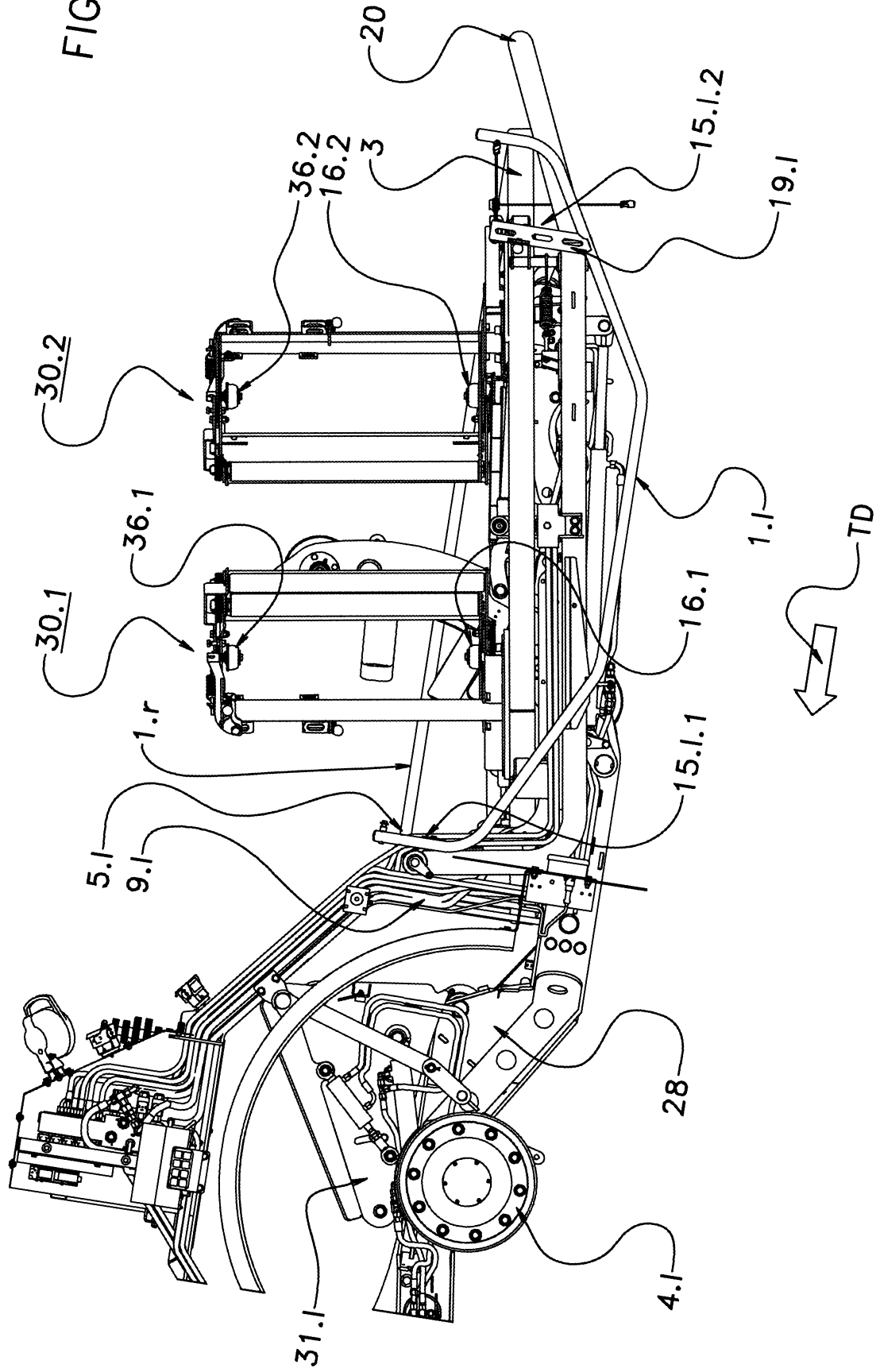


FIG. 6

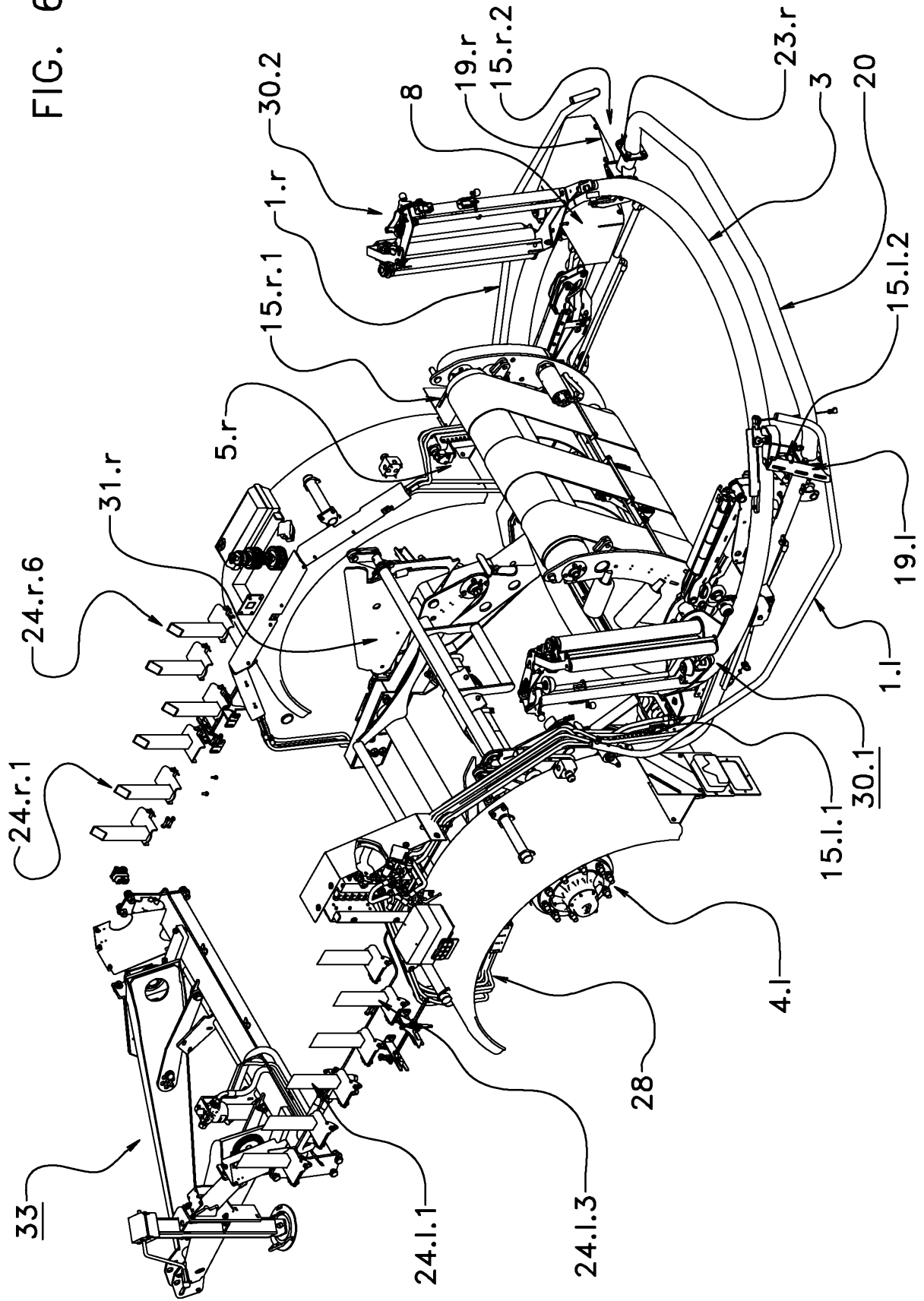


FIG. 7

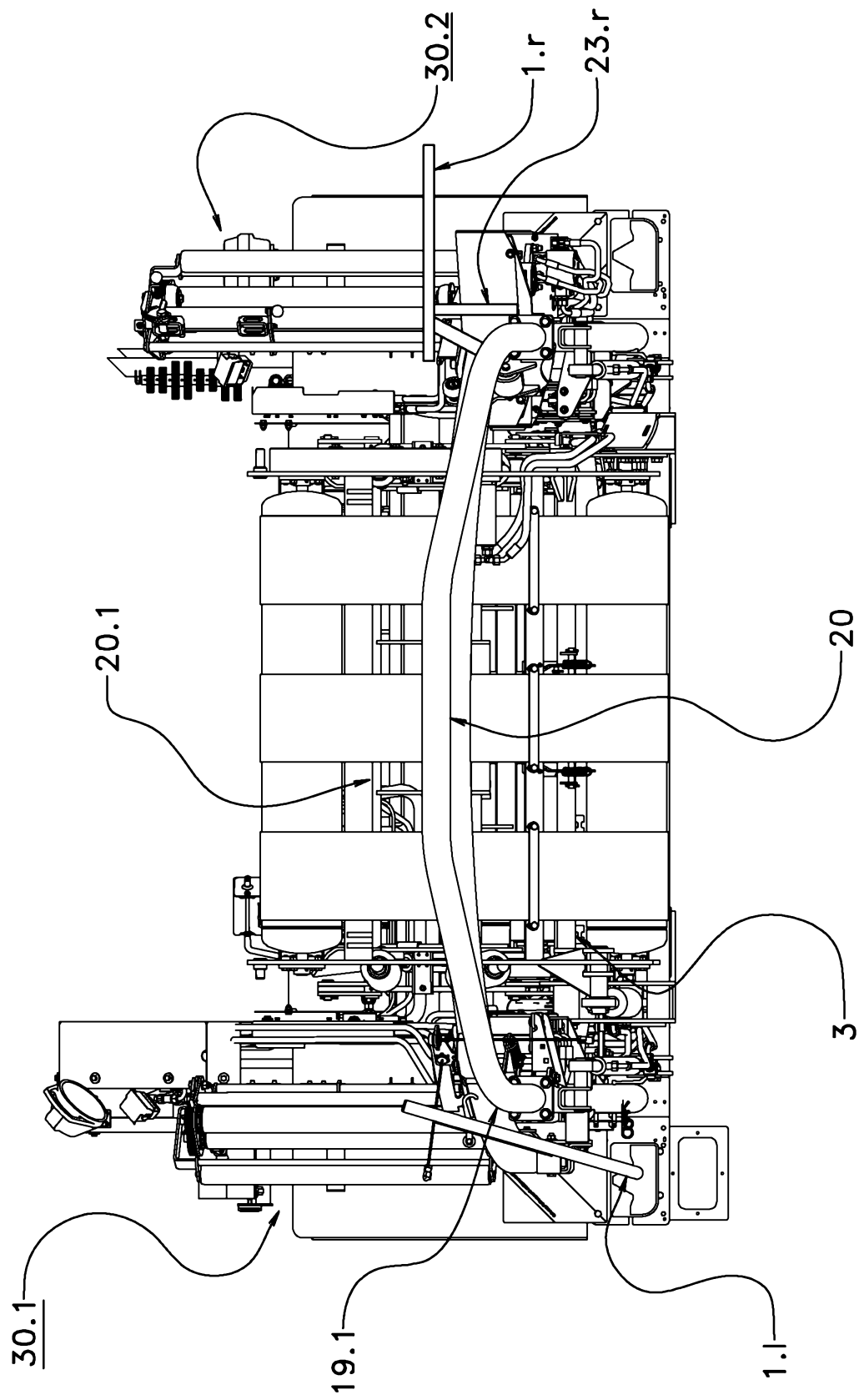
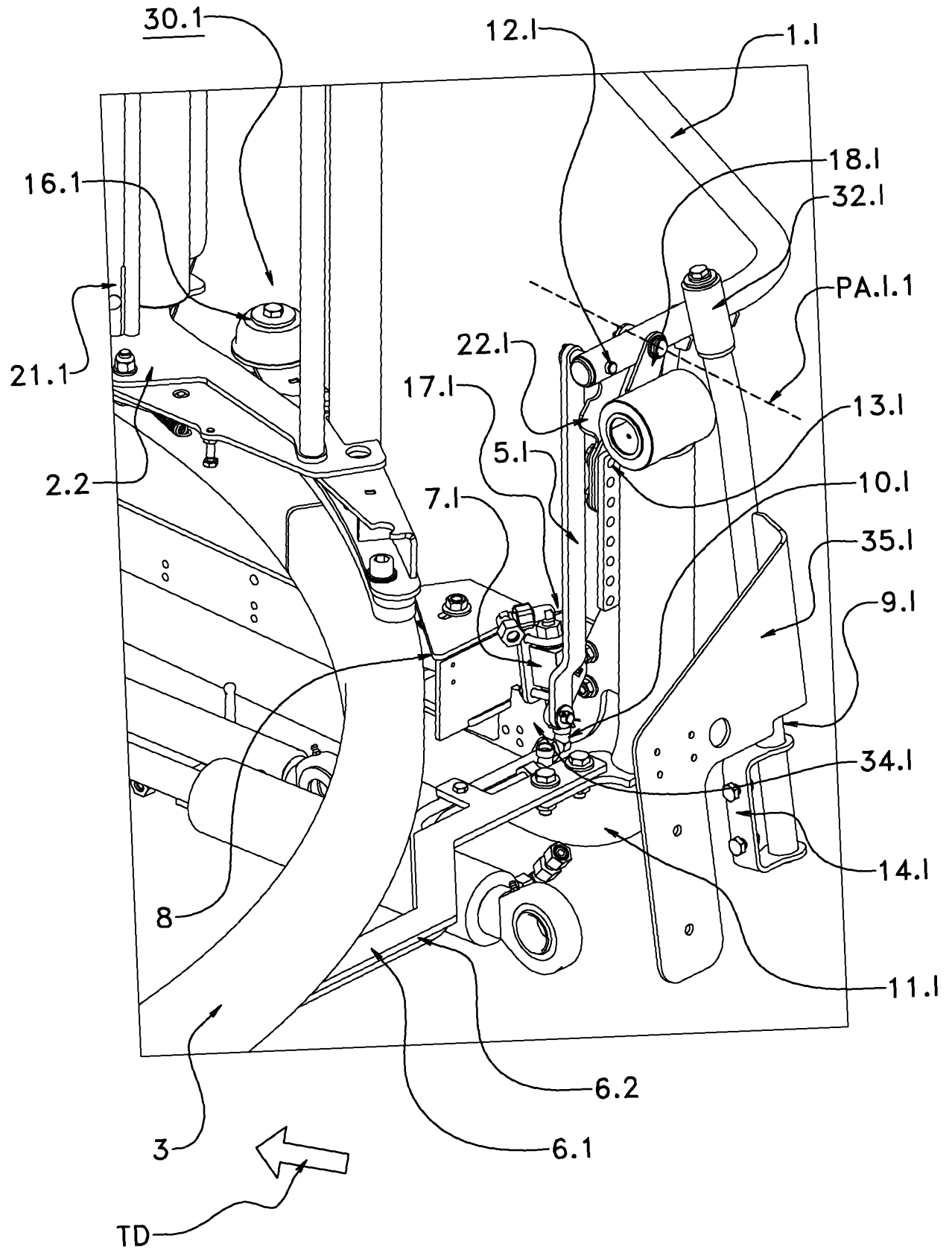
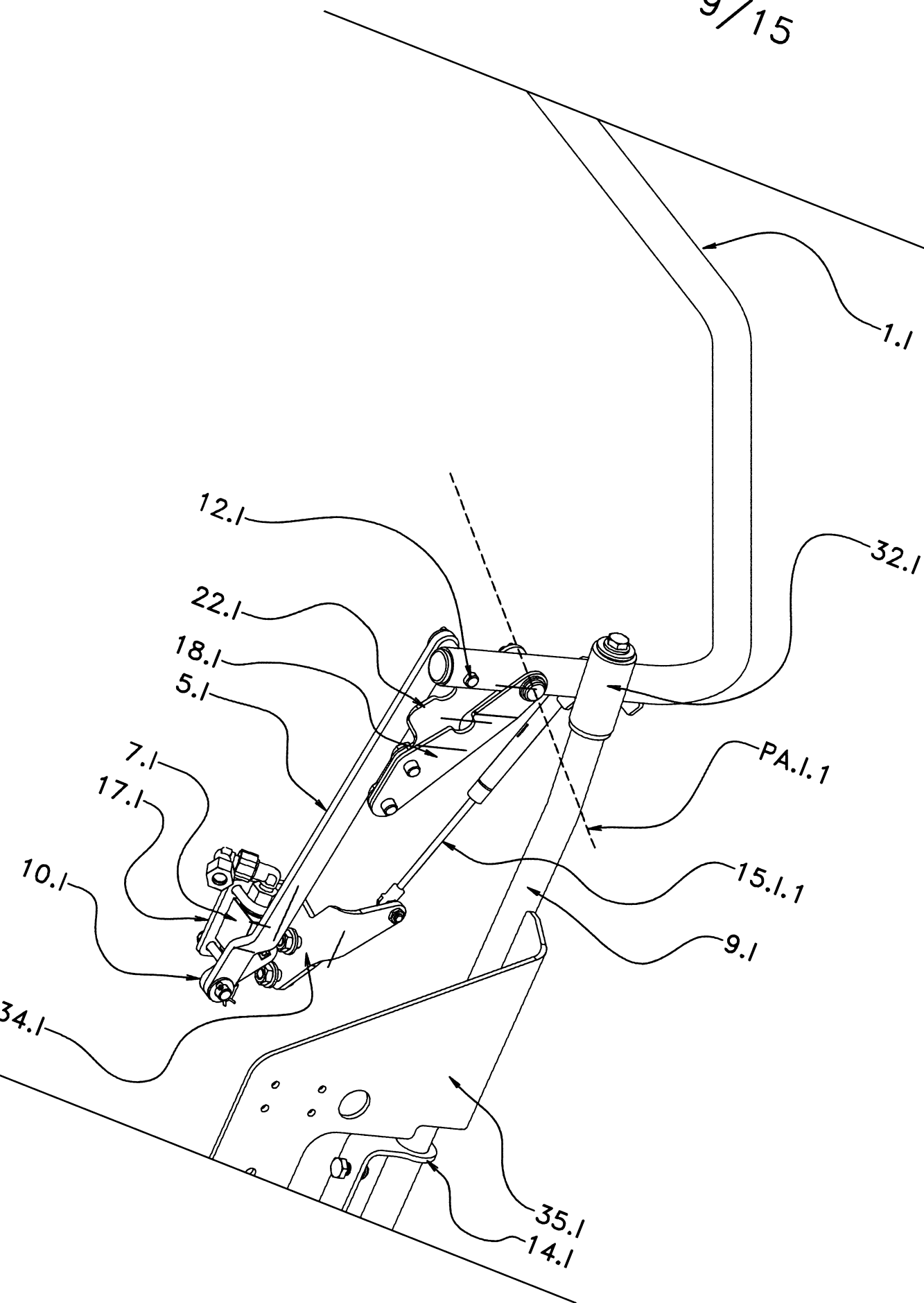


FIG. 8



9/15

FIG. 9



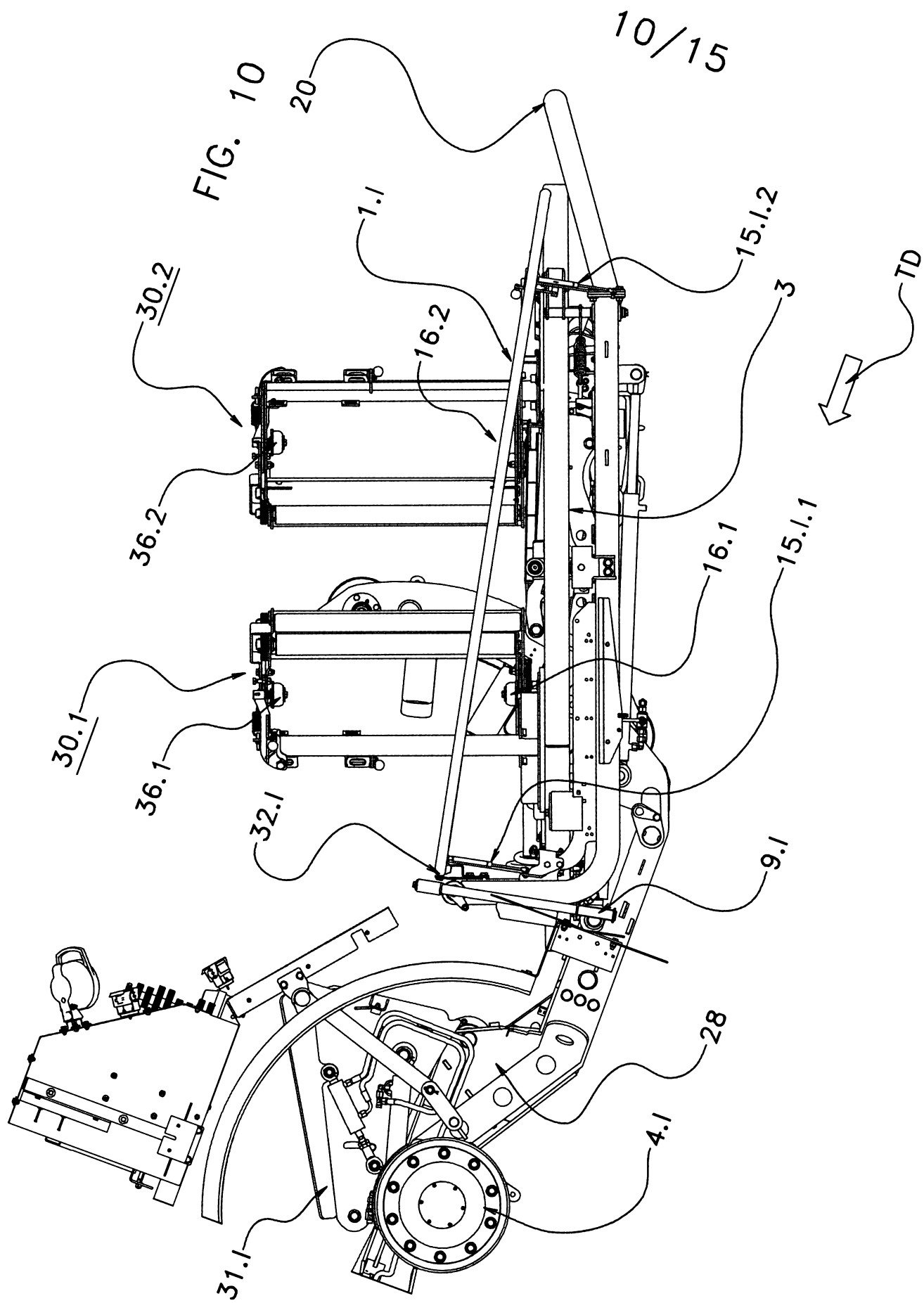


FIG. 11

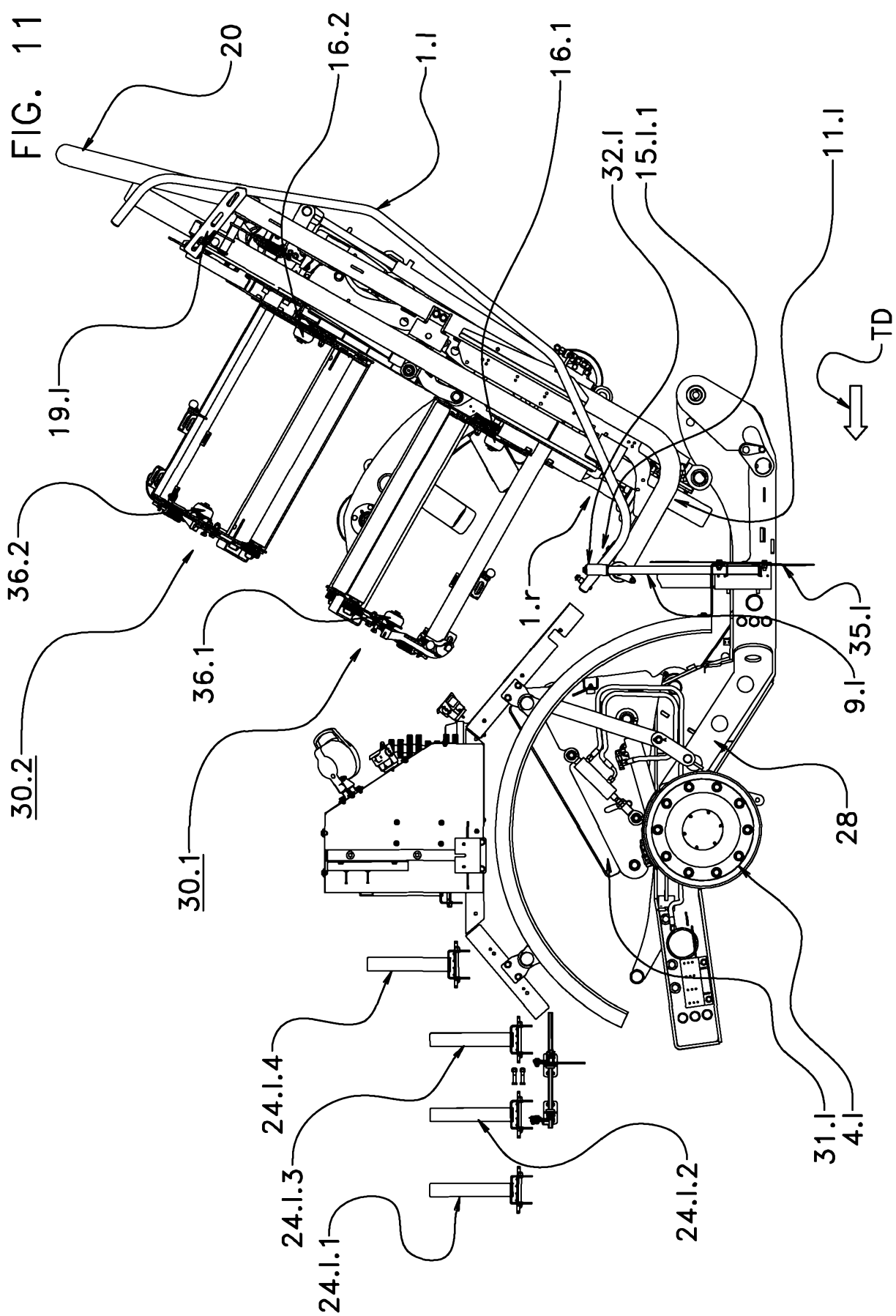


FIG. 12

12/15

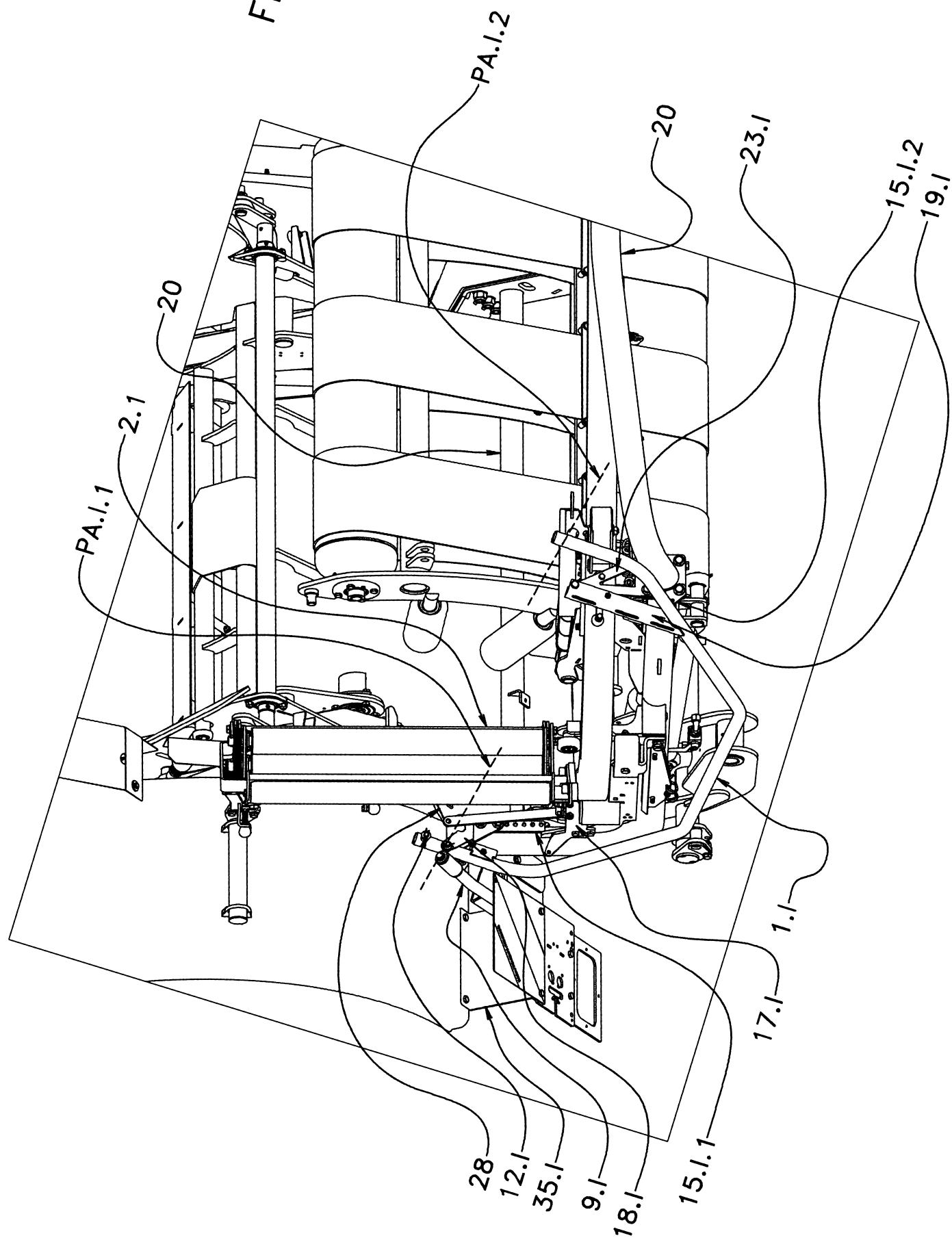


FIG. 13

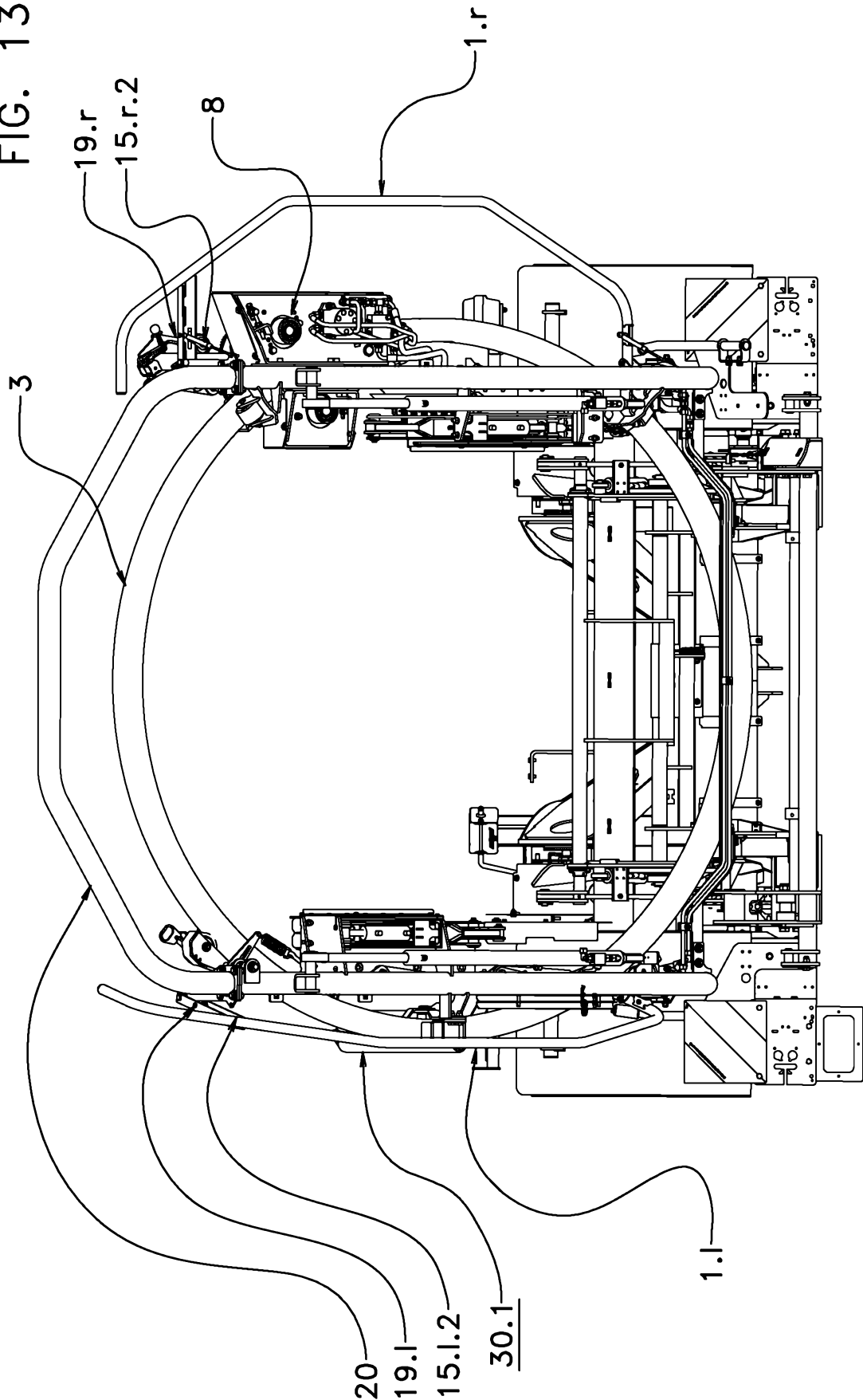
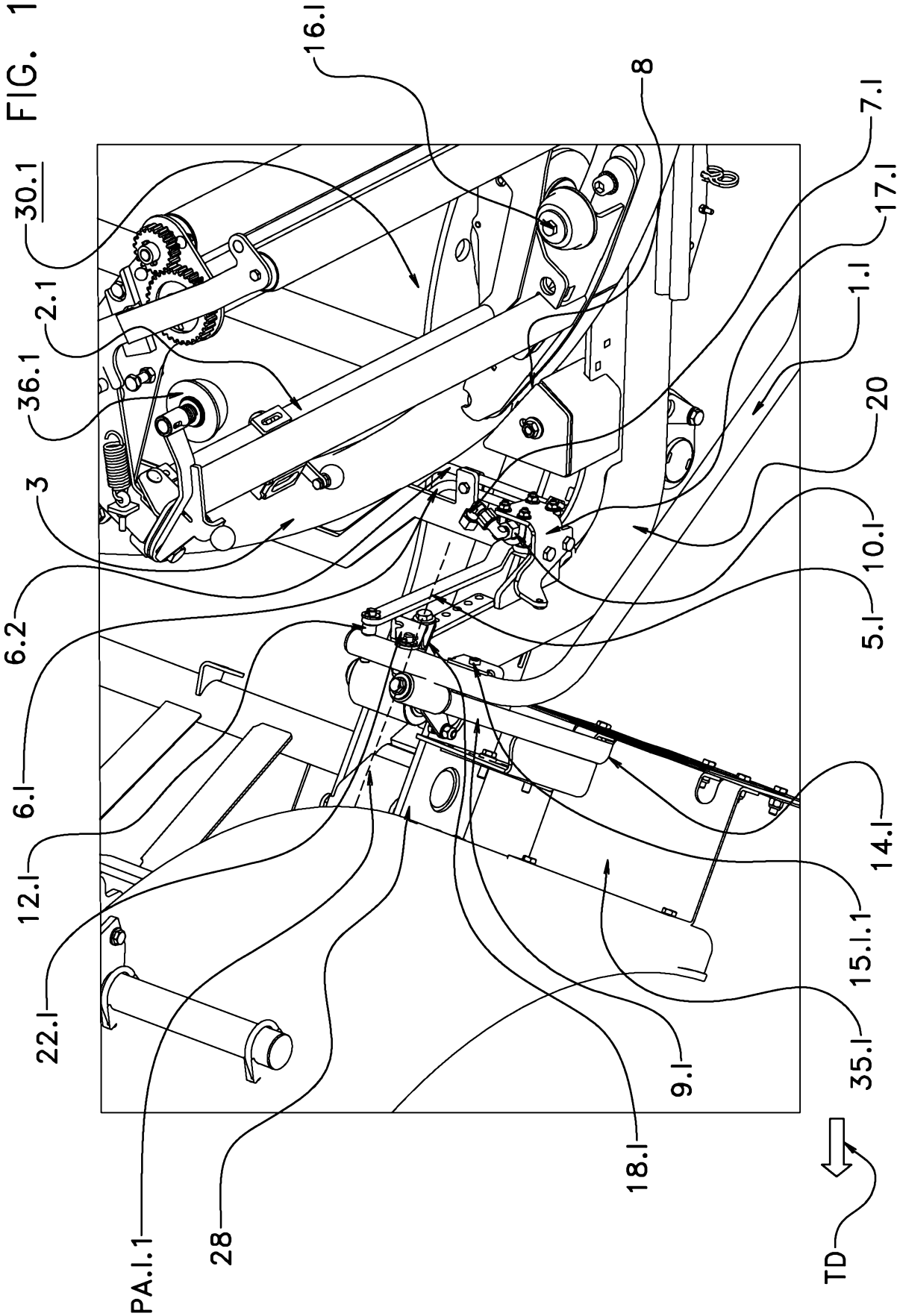


FIG. 14



ABSTRACT

The invention refers to an apparatus and to a method for wrapping an object. The object is on an object support. A wrapping unit drive (8) rotates a wrapping unit part (3, 30.1) with a holder (30.1) for wrapping material around the object. A barrier (1.I) in a protecting position provides a mechanical safety mechanism (5.I, 7.I, 10.I, 17.I). When the barrier (1.I) is moved into a further position, an interrupter (7.I, 17.I) is moved into an interrupting position and interrupts a supply connection (6.1, 6.2) for the wrapping unit drive (8). Thereby the wrapping unit part (3, 30.1) is no longer rotated.

(Fig. 8)

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE 	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE D4969/NLP
Nederlands aanvraag nr. 2018918	Indieningsdatum 15-05-2017
	Ingeroepen voorrangsdatum
Aanvrager (Naam) Forage Company B.V.	
Datum van het verzoek voor een onderzoek van internationaal type 26-08-2017	Door de instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. SN69539
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven) Volgens de internationale classificatie (IPC) A01F15/07;A01F21/00;B65B11/02	
II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
IPC	A01F;B65B
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen 	
III.	☐ GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)
IV.	☐ GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018918

A. CLASSIFICATIE VAN HET ONDERWERP INV. A01F15/07 A01F21/00 B65B11/02 ADD.		
Volgens de internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.		
B. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen) A01F B65B		
Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen		
Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden) EPO-Internal, WPI Data		
C. VAN BELANG GEACHTE DOCUMENTEN		
Categorie	Geopteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
E	EP 3 228 179 A1 (DEERE & CO [US]) 11 oktober 2017 (2017-10-11) * alinea [0020] - alinea [0022] * * figuren 1-3 *	1-3,6,9,13,15,17
A	EP 2 106 688 A1 (DEERE & CO [US]) 7 oktober 2009 (2009-10-07) * alinea's [0013], [0016], [0017] * * figuren 1, 2 *	1,15-17
A	DE 10 2014 016498 A1 (KRONE BERNARD MASCHF GMBH [DE]) 12 mei 2016 (2016-05-12) * alinea [0039] * * figuren 1, 2 *	1,15-17
-/-		
☒ Verdere documenten worden vermeld in het vervolg van vak C. ☒ Leden van dezelfde octrooifamilie zijn vermeld in een bijlage		
* Speciale categorieën van aangehaalde documenten		
"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft		
"D" in de octrooiaanvraag vermeld		
"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven		
"L" om andere redenen vermelde literatuur		
"O" niet-schriftelijke stand van de techniek		
"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur		
"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding		
"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur		
"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geopteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht		
"Z" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie		
Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid 18 januari 2018		Verzendsdatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type
Naam en adres van de instantie European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016		De bevoegde ambtenaar Baltanás y Jorge, R

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018918

C. (Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A,D	US 2016/120128 A1 (GUERIN SEBASTIEN [FR]) 5 mei 2016 (2016-05-05) in de aanvraag genoemd * alinea's [0019], [0021], [0021], [0024], [0025] * * figuren 1, 2 * -----	1,15-17
A	US 2012/060444 A1 (REIJERSEN VAN BUUREN WILLEM JACOBUS [NL]) 15 maart 2012 (2012-03-15) * alinea [0034] * * figuren 3-5 * -----	7,15,19
A	GB 2 495 903 A (KUHN GELDROF BV [NL]) 1 mei 2013 (2013-05-01) * figuren 1-4 * -----	16

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2018918

In het rapport genoemd octrooigescrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
EP 3228179	A1	11-10-2017	CA 2959894 A1 04-10-2017 DE 102016205527 A1 05-10-2017 EP 3228179 A1 11-10-2017
EP 2106688	A1	07-10-2009	AT 503377 T 15-04-2011 EP 2106688 A1 07-10-2009 US 2009249746 A1 08-10-2009
DE 102014016498	A1	12-05-2016	GEEN
US 2016120128	A1	05-05-2016	CA 2909236 A1 30-04-2016 DE 102014222213 A1 04-05-2016 EP 3014978 A1 04-05-2016 US 2016120128 A1 05-05-2016
US 2012060444	A1	15-03-2012	AU 2010253566 A1 27-10-2011 CN 102448284 A 09-05-2012 DK 2434862 T3 26-11-2012 EP 2434862 A1 04-04-2012 JP 5563070 B2 30-07-2014 JP 2012527891 A 12-11-2012 NL 1037000 C 30-11-2010 NZ 595547 A 25-10-2013 RU 2011153312 A 10-07-2013 US 2012060444 A1 15-03-2012 WO 2010137968 A1 02-12-2010
GB 2495903	A	01-05-2013	BR 112014005066 A2 28-03-2017 CA 2844568 A1 14-03-2013 EP 2753166 A1 16-07-2014 GB 2495903 A 01-05-2013 NZ 621032 A 30-01-2015 WO 2013034268 A1 14-03-2013

WRITTEN OPINION

File No. SN69539	Filing date (day/month/year) 15.05.2017	Priority date (day/month/year)	Application No. NL2018918
International Patent Classification (IPC) INV. A01F15/07 A01F21/00 B65B11/02			
Applicant Forage Company B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

Examiner Baltanás y Jorge, R

WRITTEN OPINION

Application number

NL2018918

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	1-20
	No: Claims	
Inventive step	Yes: Claims	1-20
	No: Claims	
Industrial applicability	Yes: Claims	1-20
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number

NL2018918

Box No. VI Certain documents cited

☒ Certain published documents

see the Search Report

☐ Non-written disclosures

Box No. VII Certain defects in the application

see separate sheet

Item V

Reference is made to the following documents:

- D1 EP 3 228 179 A1 (DEERE & CO [US]) 11 oktober 2017 (2017-10-11)
- D2 EP 2 106 688 A1 (DEERE & CO [US]) 7 oktober 2009 (2009-10-07)
- D3 DE 10 2014 016498 A1 (KRONE BERNARD MASCHF GMBH [DE]) 12 mei 2016 (2016-05-12)
- D4 US 2016/120128 A1 (GUERIN SEBASTIEN [FR]) 5 mei 2016 (2016-05-05) in de aanvraag genoemd
- D5 US 2012/060444 A1 (REIJERSEN VAN BUUREN WILLEM JACOBUS [NL]) 15 maart 2012 (2012-03-15)
- D6 GB 2 495 903 A (KUHN GELDROP BV [NL]) 1 mei 2013 (2013-05-01)

- 1 Document D2 discloses a wrapping device comprising all the features of the preamble of claim 1 (a.o.: wrapping unit 30, mechanical barrier 42 with an engaged position and the possibility of being displaced to a plurality of other positions, mechanical blocking mechanism disclosed as a valve in column 4, line 52).

Claim 1 differs from D2 in the characterizing features, more in particular in the mechanical connection of the interrupter connector and the mechanical interrupter.

Claim 1 is therefore novel with regard to the considered documents published before the filing date of the current application (however, see Item VI below).

The technical effect of the differentiating features is that drive is interrupted based on a purely mechanical arrangement.

The objective technical problem solved by the invention can therefore be defined as increasing reliability of the interrupter arrangement.

The subject-matter of claim 1 is considered to involve an inventive step on following grounds:

None of the considered prior art documents published before the filing date of the current application discloses said solution of even hints at the posed problem.

More in particular, for the skilled person it would not be immediate to think about replacing the flexible arrangement of D2, based on a sensor 44 detecting the displacement of barrier 42, by a mechanical arrangement which should begin on an arm rotating at a considerable speed and should end at a valve influencing a hydraulic circuit which is static with regard to said rotating arm.

- 2 Independent method claim 17 basically claims the use of the device of claim 1, and therefore the same reasoning applies as in point 1 above.
- 3 Claims 2-15 and 18-20 are respectively dependent on claim 1 and 17 and as such also meet the requirements with respect to novelty and inventive step

Item VI

Document D1, filed before the filing date of the current application but published later than this one, discloses the whole of the subject-matter of claims 1, 2, 3, 6, 9, 13, 15 and 17.

Document D1 discloses a wrapping device comprising:

- an object support 32,
- a wrapping unit 40,
- a wrapping unit drive (see a.o. paragraph 20),
- two mechanical barriers 42,
- a blocking mechanism (see paragraph 20) which stops the drive of the wrapping unit 40 whenever the mechanical barrier 42 is in a second position,

- the blocking mechanism comprising a mechanical interrupter (see column 4, lines 21 to 24) and an interrupter connector mechanically connecting the mechanical barrier and the mechanical interrupter (see column 4, lines 10 to 21, reference to "*geeigneten mechanischen Mitteln*"; as it is obvious, said mechanical means should be somehow pivotable with regard to the mechanical barrier),
- a tensioning means 56 for the mechanical barrier,
- and a blocking device (see column 4, lines 22 to 28, "*Bremseinrichtung*").

Item VII

Documents D1 and D2 should be identified in the description and the relevant background art disclosed therein should be briefly discussed.