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(54) Benævnelse: **Indretning til findeling af stykgods og fremgangsmåde til nødstandsning af indretningen**

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Device for comminuting bulk goods and method for an emergency stop of the device

The invention relates to a device for comminuting bulk goods with a drive motor that is coupled with at least one hydraulic pump of a hydrostatic drive such that it enables force transmission, wherein the hydrostatic drive comprises at least one hydraulic motor that is connected to the at least one hydraulic pump via a first supply line and a first return line for hydraulic oil, and the at least one hydraulic motor is coupled with a transmission such that it enables force transmission, said transmission being coupled with a comminution rotor such that it enables force transmission, tools being arranged on said rotor for the comminution of the bulk goods, wherein a bypass valve unit is arranged in a first bypass line, which is arranged between the first supply line and the first return line, and a discharge valve unit is arranged in a further bypass line, which is arranged between the first supply line and a second return line, said discharge valve unit being connected via the second return line to the at least one hydraulic motor.

This type of device is described, for instance, in WO 2002/000349 A1. The hydrostatic drive is intended to avoid the hard starting behaviour of a mechanical drive, which places heavy loads on the power transmission elements and results in uncontrolled overrunning.

In WO 2012/167912 A1 the drive motor arrangement is connected to the rotor arrangement via a rotational direction variable speed transmission for reversing the direction of rotation of the rotors of a comminuting machine. The control of the rotational direction variable speed transmission is achieved, for example, by monitoring the supply current drawn by the drive motor arrangement.
A device for comminuting bulk goods is described in EP 2 789 391A1.

When operating a device according to the preamble, the three different operating phases of starting, comminuting and shutdown are carried out. The starting operating phase covers a period of time from the start of the drive motor until the comminution rotor reaches a defined target speed. In the comminuting operating phase, which follows the starting operating phase, the comminution rotor is driven at the defined target speed or in a defined target speed range, so that bulk goods can be comminuted using the comminution rotor. In the shutdown operating phase, which typically follows the comminuting operating phase, the device is stopped in a controlled manner to bring the comminution rotor to a standstill.

Since the comminution rotor has a very high mass, the comminution rotor is very slow when started compared to a rotation about its own axis. When the comminution rotor is driven directly by the drive motor and without an intermediate hydrostatic drive, this high moment of inertia would have to be overcome by the drive motor alone. The drive motor would have to be dimensioned appropriately large for this relatively short starting operating phase. With the hydrostatic drive arranged between the drive motor and the comminution rotor, on the other hand, the high moment of inertia is overcome in an advantageous manner, in that a feed rate of hydraulic oil of the at least one hydraulic pump is continuously increased during starting, so that the speed of the at least one hydraulic motor also increases continuously. The drive motor coupled with at least one hydraulic pump therefore does not have to be dimensioned for this comparatively short starting operating phase, but rather can be adapted to the requirements of the comminuting operating phase and does not need to be overstressed during starting.

The hydrostatic drive also offers advantages in the shutdown operating phase, as the feed rate of hydraulic oil of at least one hydraulic pump can be continuously reduced in order to slow down the once accelerated mass of the comminution rotor during shutdown. The resulting pressure increase in the first supply line and the first return line of the hydrostatic drive can be reduced via optional pressure relief valves. The drive motor also slows down the comminution rotor.

However, the advantages obtained by arranging the hydrostatic drive in the bulk goods comminution device during the operating phases of starting and shutting down the comminution device are accompanied by a difficulty during a fourth operating phase, but this only occurs in the event of a malfunction during operation. This refers to the operating phase of the emergency mode, which is activated by an emergency safety function that triggers a cut-off of the supply of electricity to the device from a power source. The emergency safety function can, for example, be activated automatically by manual operation of an emergency stop switch arranged on the device or by a control device. The emergency safety function is important, for example, in cases in which components of the device have been damaged, unwanted or unsuitable bulk goods reach the comminution rotor or a danger to a person is imminent.

In emergency mode, electrical control parts of the device are no longer supplied with power. As a result, the drive motor switches off and stops. The at least one hydraulic pump is thus no longer driven and optional electromagnetic controls of the at least one hydraulic pump, in particular electric proportional valves for controlling the feed rate of hydraulic oil, are set to zero position. Unlike during shutdown, the comminution rotor continues to rotate and is not slowed down in a controlled manner. This leads to the problem that the power unit of the at least one hydraulic motor is driven by the rotating comminution rotor in emergency mode via the transmission. The at least one hydraulic motor is reversed in its function to become a pump, which builds up an overpressure, which is damaging to the system, against a blocking position of a stationary power of the at least one hydraulic pump. As a result, the hydraulic oil cannot circulate between the first supply line and the first return line, which can damage the hydrostatic drive.

The task of the invention is to provide a device for comminuting bulk goods of the type mentioned above and a method for the emergency shutdown of this device, which endures the operating phases of an emergency run without being destroyed. According to the invention, the task is solved with the features of claims 1 and 4. The sub-claims reflect advantageous configurations.

The short-circuit valve unit is especially designed to block a flow of hydraulic oil through the first bypass line when the short-circuit valve unit is supplied with power and to release it otherwise. The current supplying the short-circuit valve unit is obtained in particular from a power source supplying the device with electricity, for which purpose the device has at least one power connection. In emergency mode, when the short-circuit valve unit is not supplied with power, the first bypass line is released, allowing the hydraulic oil, now in a closed circuit, to circulate and thus supply and discharge the hydraulic oil to the at least one rotating hydraulic motor. This prevents damage to the hydrostatic drive as a result of excess pressure which would otherwise build up and damage the system.

The drive engine is preferably designed as a combustion engine, in particular a petrol or diesel engine. In these cases the direction of rotation of the drive motor is unidirectional. For starting and comminuting, the speed of the drive motor is preferably set at a defined target speed. In the case of a diesel engine, the combination of diesel engine and hydrostatic drive is also called a diesel-hydraulic drive.

Preferably, the hydrostatic drive has at least two hydraulic pumps and at least two hydraulic motors, especially preferably exactly two hydraulic pumps and exactly two hydraulic motors. The at least one hydraulic pump works especially with a variable feed volume, while the at least one hydraulic motor works especially with a fixed displacement volume. The speed of the at least one hydraulic motor is preferably detected by a speed sensor. To control the feed rate of the at least one hydraulic pump, at least one electromagnetic control, in particular an electric proportional valve, can be arranged on the hydraulic pump, wherein the feed rate of hydraulic oil can be regulated by an electric control of the at least one hydraulic pump, which can be connected to the hydraulic pump. Preferably, at least one feed pump is integrated in the at least one hydraulic pump, which compensates for leakage oil losses in the first supply line and the first return line.

Preferably, the comminution rotor is infinitely variable up to a maximum speed, wherein the infinitely variable control of the comminution rotor speed is achieved in particular by an electric control of the hydrostatic drive. The transmission can be designed as a belt drive or chain drive.

In one embodiment of the invention, the short-circuit valve unit has a two-way built-in valve and/or a pilot valve. The pilot valve is preferably designed as a second 4/-2-way valve with a first electrical actuation device. The short-circuit valve unit also preferably has two pressure relief valves. The 2-way built-in valve is located especially in the first bypass line. In particular, the pilot valve is connected to the first pressure relief valve, the second pressure relief valve and the 2-way built-in valve via pilot pressure lines to control the pilot pressure of the 2-way built-in valve. During comminuting, the first electrical actuation device of the 4-2-way valve is supplied with power and the pilot pressure is limited by the second pressure relief valve so that the 2-way built-in valve is in the blocking position and the first bypass line remains closed. In emergency mode, the first electrical actuation device is activated and switches the pilot pressure to the first pressure relief valve, which now releases the pilot pressure for the 2-way built-in valve and thus the flow through the first bypass line.

A third bypass line is arranged between the first supply line and the second return line, a discharge valve unit being arranged in the third bypass line and the discharge valve unit being connected to the at least one hydraulic motor via a second return line.

A second aspect of the invention relates to a device for comminuting bulk goods with a drive motor that is coupled with at least one hydraulic pump of a hydrostatic drive such that it enables force transmission, wherein the hydrostatic drive comprises at least one hydraulic motor that is connected to the at least one hydraulic pump via a first supply line and a first return line for hydraulic oil, and the at least one hydraulic motor is coupled with a transmission such that it enables force transmission, said transmission being coupled with a comminution rotor such that it enables force transmission, tools being arranged on said rotor for the comminution of the bulk goods, wherein a third bypass line is arranged between the first supply line and the first return line, wherein a discharge valve unit is arranged in the third bypass line and the discharge valve unit is connected via the second return line to the at least one hydraulic motor.

During comminution, the discharge valve takes a defined quantity of hydraulic oil from the third bypass line and directs it onwards to the at least one hydraulic motor, in particular to a motor housing of the at least one hydraulic motor. This prevents an oil deficit in and a damaging temperature increase at the at least one hydraulic motor during the comminuting operating phase.

Furthermore, it is ensured that a minimum system pressure, preferably a minimum system pressure of 30 bar, is maintained in the lines of the hydrostatic drive, in particular the first supply line and the first return line, during emergency operation. Any leakage of hydraulic oil in the lines of the hydrostatic drive can be compensated for during comminuting by the at least one feed pump, preferably integrated in the at least one hydraulic pump.

The discharge valve unit preferably has a 3/3-way valve and/or a pressure retention valve. The flushing piston of the 3/3-way valve (62) scans the respective low pressure side of the closed third bypass line and flushes out of this bypass line from a pressure difference of approximately 5 bar.

A pressure retention valve is installed in the tank channel of the discharge valve unit. As soon as the pressure level falls below the set holding pressure, e.g. due to an excessive flushing volume, the pressure retention valve reduces the flushing volume and thus prevents an impermissible drop in pressure.

According to one embodiment of the invention, a second 4/2-way valve with a second electrical actuation device and/or a throttle valve is arranged downstream of the discharge valve unit. As long as the second electrical actuation device is supplied with power, i.e. during the operating phases of starting, comminuting and shutdown, the 4/2-way valve is in a switching position in which the hydraulic oil fed from the discharge valve is directed onwards via a second return line to the at least one hydraulic motor, in particular the motor housing of the at least one hydraulic motor.

The first return line is connected via a second bypass line, the first 2/4-way valve and a throttle valve to the emergency hydraulic motor which is coupled to the emergency hydraulic pump, the emergency hydraulic motor being arranged to drive the emergency hydraulic pump by means of the hydraulic oil supplied from the first return line via the second bypass line, and the emergency hydraulic pump being connected to an emergency hydraulic oil tank and the at least one hydraulic motor via a third return line. During emergency operation the discharge valve has no function because the much higher pressure in the bypass line blocks a non-return valve.

In the operating phase of emergency operation, the second electrical actuation device is no longer supplied with power and switches the 4/2-way valve into a switching position in which the discharged hydraulic oil flows via the second bypass line to the emergency hydraulic motor. The throttle valve is preferably arranged in the second bypass line. Preferably, the discharged hydraulic oil supplied to the emergency hydraulic motor is fed to the motor housing of the at least one hydraulic motor. The emergency hydraulic pump draws hydraulic oil from the emergency hydraulic oil tank, which is preferably designed to be separate from other hydraulic oil tanks of the device, and feeds it to at least one motor housing. In particular, the hydraulic oil from the emergency hydraulic oil tank is supplied via at least one shut-off valve with suction function via at least one low-pressure working connection of the at least one hydraulic motor.

The invention also includes a method for an emergency stop of a device for comminuting bulk goods according to claim 1, in which the drive motor, the hydrostatic drive, the transmission and the comminution rotor are driven, wherein the short-circuit valve unit is short-circuited in the event of failure of a power supply to the device, so that the flow of hydraulic oil through the first bypass line is released.

Hydraulic oil is preferably discharged from the third bypass line from the discharge valve unit, which is arranged in the third bypass line between the first supply line and the second return line, and is fed through the second return line to the at least one hydraulic motor.

It is even more preferable if hydraulic oil is directed from the working line via the second bypass line to the emergency hydraulic motor, which drives an emergency hydraulic pump, wherein the emergency hydraulic pump conducts hydraulic oil from the emergency hydraulic oil tank to the at least one hydraulic motor.

In a further preferred embodiment of the method according to the invention, a hydraulic oil volume flow Q_P conducted from the emergency hydraulic pump to the at least one hydraulic motor is greater than a hydraulic oil volume flow Q_M conducted from the working line to the emergency hydraulic motor. The hydraulic oil volume flow Q_P conducted from the emergency hydraulic pump to the at least one hydraulic motor is especially preferably at least 1.1 times, in particular 1.5 times, the hydraulic oil volume flow Q_M conducted from the discharge valve unit to the emergency hydraulic motor.

An example of an embodiment of the device for comminuting bulk goods according to the invention and an example of an embodiment of the method according to the invention are explained in the following with the aid of figures. They show:

Figure 1 - a hydraulic diagram of a device for comminuting bulk goods according to an example of an embodiment of the invention in the comminuting operating phase,

Figure 2 - a section of the hydraulic diagram according to figure 1,

Figure 3 - the hydraulic diagram of the device from figure 1 in the emergency operation phase,

Figure 4 - a section of the hydraulic diagram according to figure 3,

Figure 5 - a top view of the device from figure 1,

Figure 6 - a transverse side view of the device according to figure 5,

Figure 7 - a section from figure 6.

Figure 1 shows a hydraulic diagram of a device for comminuting bulk goods according to an example of an embodiment of the invention in the comminuting operating phase. A drive motor 10, which in the present case is designed as a diesel motor, is coupled in a manner that enables force transmission to a first hydraulic pump 22 and a second hydraulic pump 23 via a distribution transmission 21. The hydrostatic drive 20 comprising the first hydraulic pump 22 and second hydraulic pump 23 further comprises a first hydraulic motor 24 and a second hydraulic motor 25. The hydraulic pumps 22, 23 and hydraulic motors 24, 25 are connected to each other via a first supply line 26 and a first return line 27 for hydraulic oil. The hydraulic motors 24, 25 are coupled in a manner that enables force transmission to a comminution rotor 41 via a transmission 30 to drive said rotor.

Partially, the representations of the lines with hydraulic oil show different dashes. According to the legend at the bottom left of figures 1 and 3, there is high pressure in the lines H depicted with dashed lines. Low pressure prevails in the lines N depicted with dashed lines. Accordingly, in figure 1, during the comminuting operating phase, high pressure prevails in the first supply line 26 and low pressure in the first return line 27. The dash-dot lines S are feed pressure lines which ensure a minimum system pressure of 30 bar in the present case at the hydraulic pumps 22, 23 and the hydraulic motors 24, 25 so that they are not damaged. The second return line 65 for returning hydraulic oil discharged from a discharge valve unit 50 to motor housings of the hydraulic motors 24, 25 is also depicted by a dashed line.

A first bypass line 51 and a third bypass line 61 are each arranged between the first supply line 26 and the first return line 27. The first bypass line 51 leads to a short-circuit valve unit 50 and the third bypass line 61 leads to a discharge valve unit 60. To facilitate understanding, a section of figure 1 showing the first bypass line 51 and the third bypass line 61 with the components therein is framed in bold dashed lines and shown enlarged as figure 2.

In figure 2, it can be seen that the short circuit valve unit 50 has a 2-way built-in valve 54 arranged in the first bypass line 51 to block or release the flow through the first bypass line 51. The 2-way built-in valve 54 is controlled by a pilot valve. The pilot valve has a second 4/2-way valve 52, a first pressure relief valve 55 and a second pressure relief valve 56 connected via pilot pressure lines to each other, a pilot pressure hydraulic oil tank 57, the first bypass line 51 and the 2-way built-in valve 54 to control the pilot pressure of the 2-way built-in valve 54. In the comminuting operating phase present in figures 1 and 2, a first electrical actuation unit 53 of the 4/2-way valve 52 is supplied with power and the pilot pressure is limited by the second pressure relief valve 56 in such a way that the 2-way built-in valve 54 is in the blocking position and the first bypass line 51 remains closed. The first bypass line 51 is also closed during start-up and shutdown because of the power supply to the first electrical electrical actuation 53. Hydraulic oil can thus not circulate in the first bypass line 51 during starting, comminuting and shutdown.

The discharge valve unit 60 in the third bypass line 61 has a 3/3-way valve 62 and a pressure retention valve (63). The operation of the 3/3-way valve and pressure retention valve 63 is as follows: The flushing piston of the 3/3-way valve 62 scans the respective low pressure side of the closed lines 61 and flushes out of this line from a pressure difference of approximately 5 bar.

A pressure retention valve 63 is installed in the tank channel of the discharge valve unit 60. As soon as the pressure level falls below the set holding pressure, e.g. due to an excessive flushing volume, the pressure retention valve reduces the flushing volume and thus prevents an impermissible drop in pressure.

The discharge valve unit 60 is connected via a second return line 65, in which a first non-return valve 64 is arranged, designed in this case to be spring-loaded, to a first 4/2-way valve 67, on which a second electrical actuation device 68 is arranged. Hydraulic oil discharged from the discharge valve unit 60 during the starting, comminuting and shutdown phases of operation is supplied to the motor housings of the first hydraulic motor 24 and the second hydraulic motor 25 via the second return line 65 to prevent an oil deficit in and an excess temperature at the hydraulic motors 24, 25.

Figure 3 depicts the hydraulic diagram of the device from figure 1 in the emergency operation phase. The drive motor 10 and the hydraulic pumps 22, 23 are at a standstill while the comminution rotor 41 continues to rotate and drive the hydraulic motors 24, 25, which now operate like pumps. In the first supply line 26 there is correspondingly low pressure and in the second supply line 27 there is correspondingly high pressure. To facilitate understanding of the flows of hydraulic oil through the first bypass line 51 and the third bypass line 61, a section of figure 3 showing the first bypass line 51 and the third bypass line 61 with the components therein is framed in bold dashed lines and shown enlarged in figure 4.

As figure 4 shows, the first electrical actuation device 53 of the short-circuit valve unit 50 is no longer supplied with power during emergency operation, so that the second

4/2-way valve 52 changes the switching position and the pilot pressure of the 2-way built-in valve 54 is no longer controlled by the second pressure relief valve 56, but now by the first pressure relief valve 55, which is configured to open the 2-way built-in valve 54 to release the flow of hydraulic oil for the first bypass line 51. This allows the hydraulic oil in the first supply line 26 and the first return line 27 to circulate through the first bypass line 51. A build-up of an overpressure against the blocking position of stationary power units of the hydraulic pumps 22, 23 and thus damage to the hydrostatic drive 20 is thus avoided.

The second electrical actuation device 68 of the first 4/2-way valve 67 is also not supplied with power during emergency operation and changes the switching position of the first 4/2-way valve 67 as a result. Hydraulic oil now flows through a second by-pass line 66, in which high pressure prevails during emergency operation and which is connected to the first supply line 26 and the first 4/2-way valve 67, through the first 4/2-way valve 67, through the throttle valve 69 and a third pressure relief valve 70 to an emergency hydraulic motor 71, which is coupled to an emergency hydraulic pump 72. The hydraulic oil drives the emergency hydraulic motor 71, which in turn drives the emergency hydraulic pump 72, which delivers hydraulic oil from a separate emergency hydraulic oil tank 73 via a third return line 74, in which a second non-return valve 75, which in this case is spring-loaded, is arranged downstream of the emergency hydraulic pump 72, to the hydraulic motors 24, 25, in particular to the first supply line 26 upstream of the hydraulic motors 24, 25, in which low pressure prevails during emergency operation. In the present case, the hydraulic oil volume flow Q_P directed from the emergency hydraulic pump 72 to the hydraulic motors 24, 25 is twice the hydraulic oil volume flow Q_M directed from the discharge valve unit 60 to the emergency hydraulic motor 71. This prevents the hydraulic motors 24, 25 from running dry and causing damage. The hydraulic oil leaving the emergency hydraulic motor 71 is fed to the second return line 65, which feeds the hydraulic oil to the motor housings of the hydraulic motors 24, 25.

It is ensured that a minimum system pressure, preferably of 30 bar, is maintained in the lines of the hydraulic drive, in particular the first supply line 26 and the first return line 27, during emergency operation.

The emergency hydraulic oil tank 73 does not necessarily have to be physically designed as a separate component. The emergency hydraulic pump 72 can also pump oil from the hydraulic oil tank 57 in emergency mode. The emergency hydraulic motor 71 is fed by the return line 27 via the second bypass line 66, which has free passage to the emergency hydraulic motor 73 in the event of a power failure in the magnetic valve 68. During emergency operation, the pressure from the return line 27 closes the non-return valve 64. Consequently, the discharge valve 60 cannot discharge oil in emergency operation.

The flushing piston of the 3/3-way valve 62 scans the respective low pressure side of the closed third bypass line 61 and flushes out of this bypass line 61 from a pressure difference of approximately 5 bar. A pressure retention valve 63 is installed in the tank channel of the discharge valve unit 60. As soon as the pressure level falls below the set holding pressure, e.g. due to an excessive flushing volume, the pressure retention valve 63 reduces the flushing volume and thus prevents an impermissible drop in pressure.

Figure 5 depicts a top view of the device from figure 1. The drive motor 10 is coupled to the first hydraulic pump 22 and the second hydraulic pump 23 of the hydrostatic drive 20 by means of the distribution transmission 21. The hydraulic pumps 22, 23 are coupled to the first hydraulic motor 24 and the second hydraulic motor 25 by means of the first supply line 26 and the first return line 27. A first speed sensor 28 is arranged on the first hydraulic motor 24 and a second speed sensor 29 is arranged on the second hydraulic motor 25. The hydraulic motors 24, 25 are coupled to the transmission 30, which is designed as a belt drive. The transmission 30 is coupled to the comminution rotor 41 of a comminution unit 40. Comminution beaters 42 are arranged on the comminution rotor 41 for comminuting a bulk good fed via a feed chute 44 of the comminution unit 40. A screen basket 43 of the comminution unit 40 screens through sufficiently comminuted bulk goods and catches bulk goods that has not yet been sufficiently comminuted so that it is further comminuted before it can leave the screen basket 43 and exit the comminution unit 40.

Figure 6 shows a transverse side view of the device according to figure 5. The comminution unit 40 with the comminution rotor 41 and the comminution beaters 42 arranged on it can be seen particularly well here.

Figure 7 depicts a detailed view of the circular section A from figure 6. The short-circuit valve unit 50, the first 4/2-way valve 67, the throttle valve 69, the emergency hydraulic motor 71 and the emergency hydraulic pump 72 can be seen.

Reference list

10	drive motor
20	hydrostatic drive
21	distribution transmission
22	first hydraulic pump
23	second hydraulic pump
24	first hydraulic motor
25	second hydraulic motor
26	first supply line
27	first return line
28	first speed sensor
29	second speed sensor
30	transmission
40	comminution unit
41	comminution rotor
42	comminution beaters
43	screen basket
44	feed chute
50	short-circuit valve
51	first bypass line
52	second 4/2-way valve
53	first electrical actuation device
54	2-way built-in valve
55	first pressure relief valve
56	second pressure relief valve

57 pilot pressure hydraulic oil tank
60 discharge valve unit
61 third bypass line
62 3/3-way valve
63 pressure retention valve

64 first non-return valve
65 second return line
66 second bypass line
67 first 4/2-way valve
68 second electrical actuation device

69 throttle valve
70 third pressure relief valve
71 emergency hydraulic motor
72 emergency hydraulic pump
73 emergency hydraulic oil tank

74 third return line
75 second non-return valve

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PATENTKRAV

1. Indretning til findeling af stykgods med en drivmotor (10), som kraftoverførende er koblet med mindst en hydraulisk pumpe (22, 23) i en hydrostatisk drivmekanisme (20), hvor den hydrostatiske drivmekanisme (20) omfatter mindst en hydraulisk motor (24, 25), som via en første tilførselsledning (26) og en første returledning (27) til hydraulikolie er forbundet med den mindst ene hydrauliske pumpe (22, 23), og den mindst ene hydrauliske motor (24, 25) kraftoverførende er koblet med en findelingsrotor (41), hvorpå der er anbragt værktøjer (42) til findeling af stykgodset, hvor der i en første bypassledning (51), som er anbragt mellem den første tilførselsledning (26) og den første returledning (27), er anbragt en kortslutningsventilenhed (50), og der i en yderligere bypassledning (61), som er anbragt mellem den første tilførselsledning (26) og en anden returledning (65), er anbragt en udledningsventilenhed (60), som via den anden returledning (65) er forbundet med den mindst ene hydrauliske motor (24, 25), **kendetegnet ved, at** den hydrauliske motor (24, 25) kraftoverførende er koblet med et gear (30), som er koblet med findelingsrotoren (41), og der nedstrøms fra udledningsventilenheden (60) er anbragt en første 4/2-vejsventil (67) med en anden elektrisk aktiveringsindretning (68) og/eller en drosselventil (69), og den anden returledning (65) via en anden bypassledning (66), den første 4/2-vejsventil (67) og drosselventilen (69) er forbundet med en hydraulisk nødmotor (71), som er koblet med en hydraulisk nødpumpe (72), hvor den hydrauliske nødmotor (71) er indrettet til at drive den hydrauliske nødpumpe (72) ved hjælp af den fra den første returledning (27) via den yderligere (tredje) bypassledning (61) udledte hydraulikolie, og den hydrauliske nødpumpe (72) er forbundet med en nødtank (73) til hydraulikolie og den mindst ene hydrauliske motor (24, 25) via en tredje returledning (74).

2. Indretning ifølge krav 1, **kendetegnet ved, at** kortslutningsventilenheden (50) omfatter en 2-vejs-indbygningsventil (54) og/eller en pilotventil, især en anden 4/2-vejsventil (52) med en første elektrisk aktiveringsindretning (53).

3. Indretning ifølge krav 2, **kendetegnet ved, at** udledningsventilenheden (60) omfatter en 3/3-vejsventil (62) og/eller en trykholderventil (63).

4. Fremgangsmåde til nødstandsning af en indretning til findeling af stykgods ifølge et af de foregående krav, hvor drivmotoren (10), den hydrostatiske drivmekanisme (20), gearet (30) og findelingsrotoren (41) drives, **kendetegnet ved, at** kortslutningsventilenheden (50) ved svigt af en strømforsyning af indretningen kortsluttes, således at gennemstrømningen af hydraulikolie gennem den første bypassledning (51) frigives, idet hydraulikolie ledes fra den første returledning (27) via den anden bypassledning (66) og en ved strømsvigt gennemgående magnetventil (67) til den hydrauliske nødmotor (71), som driver den hydrauliske nødpumpe (72), hvor den hydrauliske nødpumpe (72) transporterer hydraulikolie fra nødtanken (73) til hydraulikolie til den mindst ene hydrauliske motor (24, 25).

5. Fremgangsmåde ifølge krav 4, **kendetegnet ved, at** hydraulikolie udledes fra udledningsventilenheden (60), som er anbragt i den tredje bypassledning (61) mellem den første tilførselsledning (26) og den anden returledning (27), ud af den tredje bypassledning (61) og via den anden returledning (65) ledes til den mindst ene hydrauliske motor (24, 25).

6. Fremgangsmåde ifølge krav 4, **kendetegnet ved, at** en hydraulikolievolumenstrøm Q_P, som ledes fra den hydrauliske nødpumpe (72) til den mindst ene hydrauliske motor (24, 25), er større end en hydraulikolievolumenstrøm Q_M, som ledes fra returledningen (27) via den anden bypassledning (66) og magnetventilen (67) til den hydrauliske nødmotor (71).

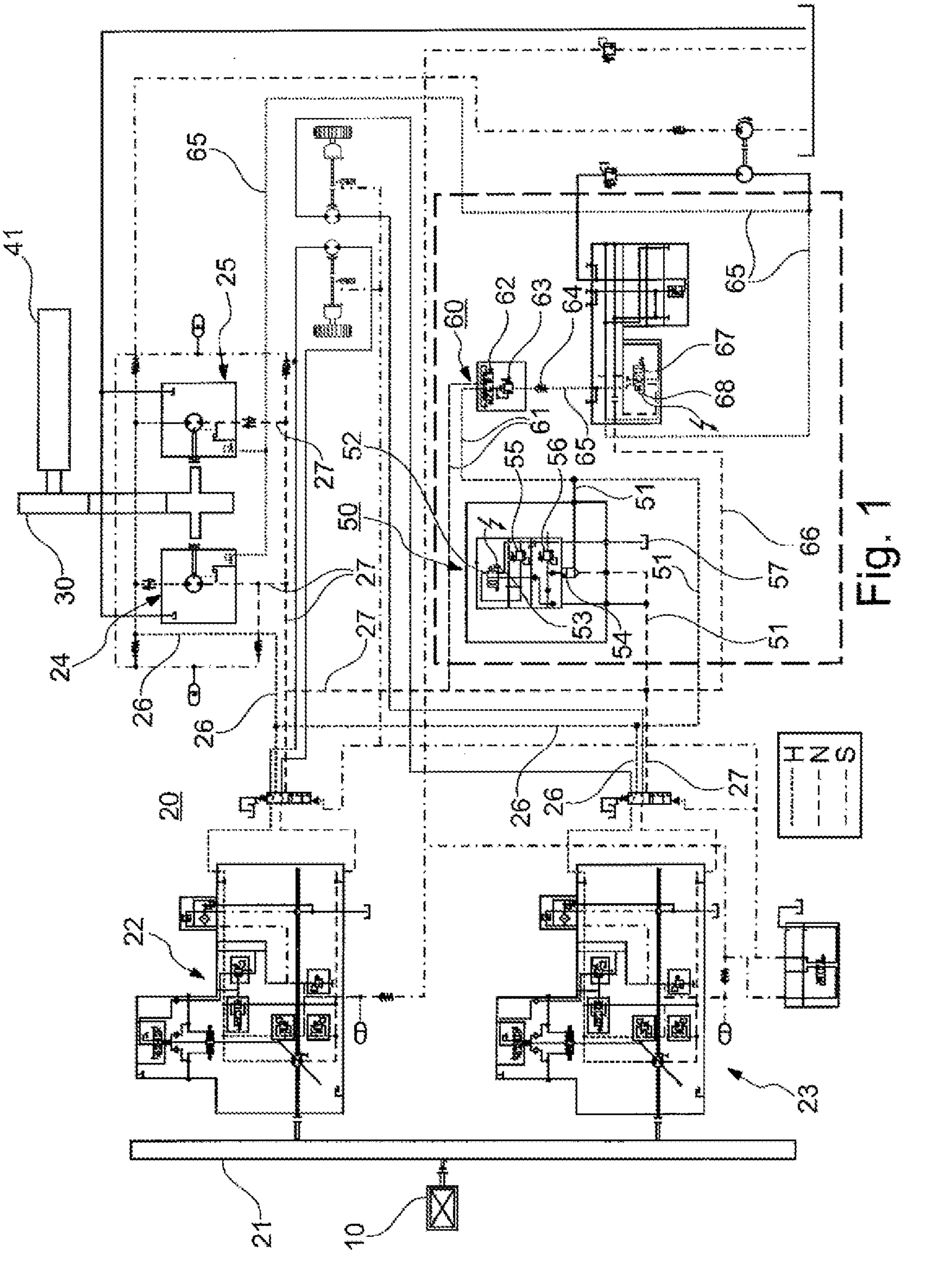
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Fig. 1

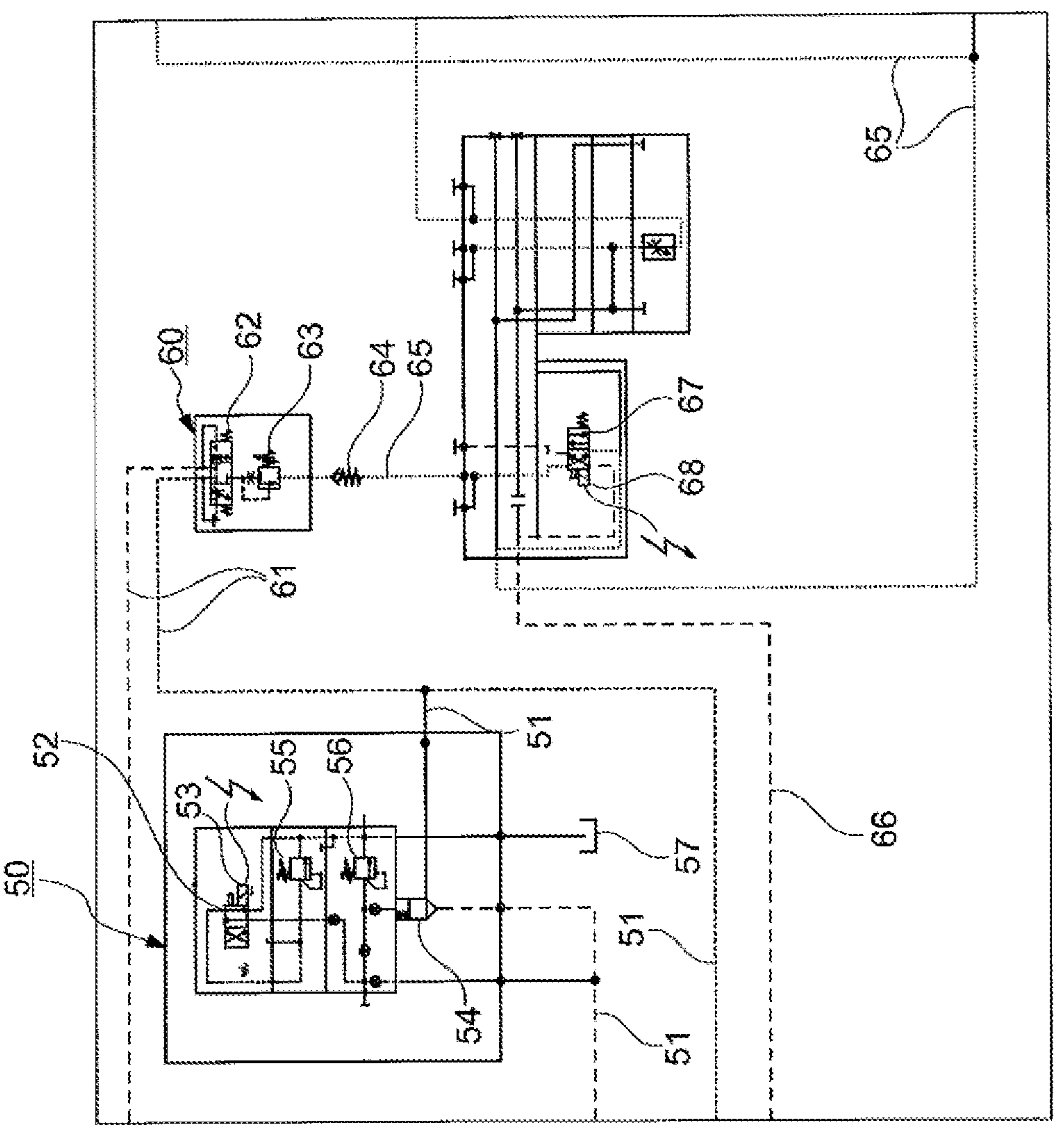

Fig. 2

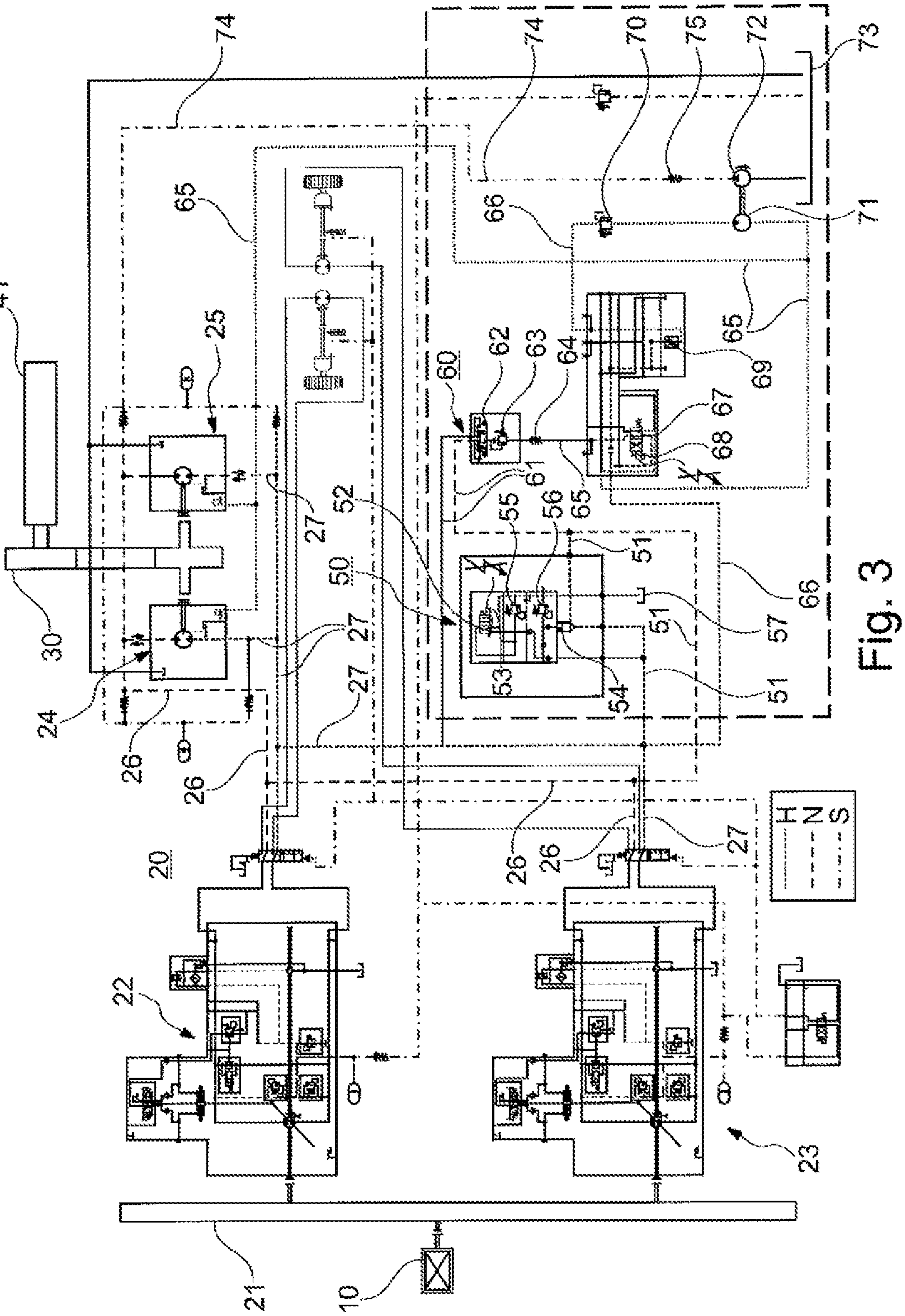
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Fig. 3

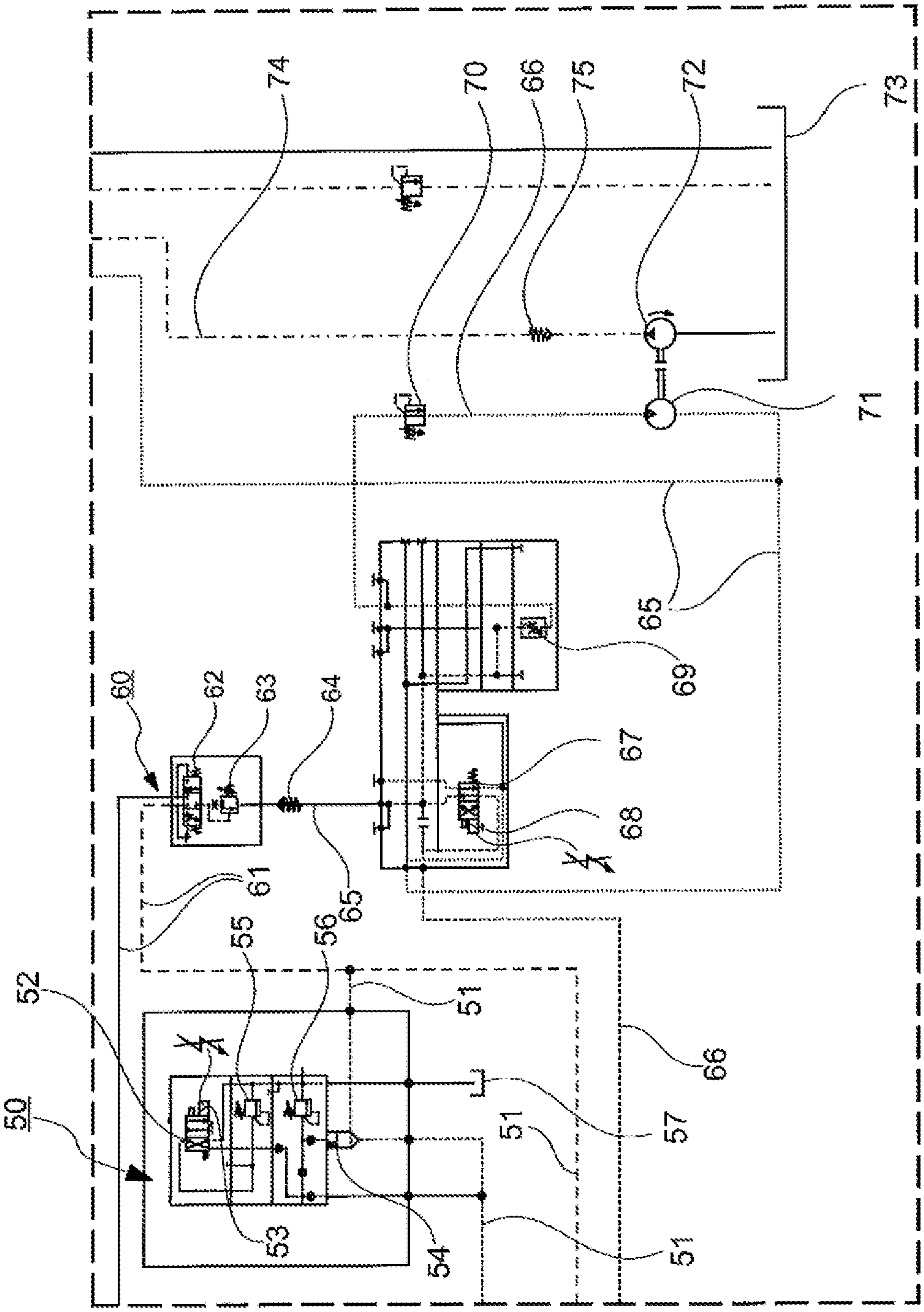
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Fig. 4

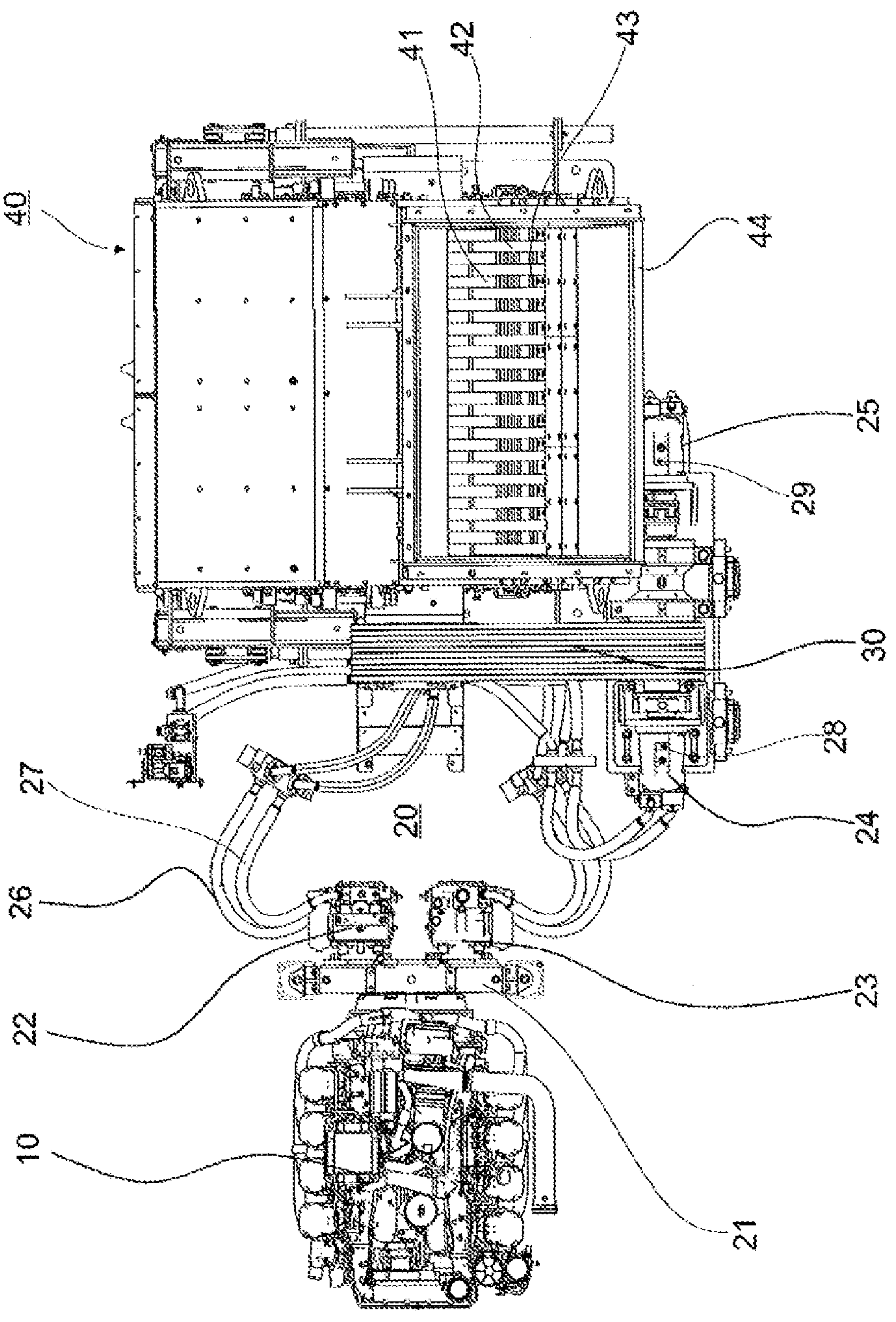

Fig. 5

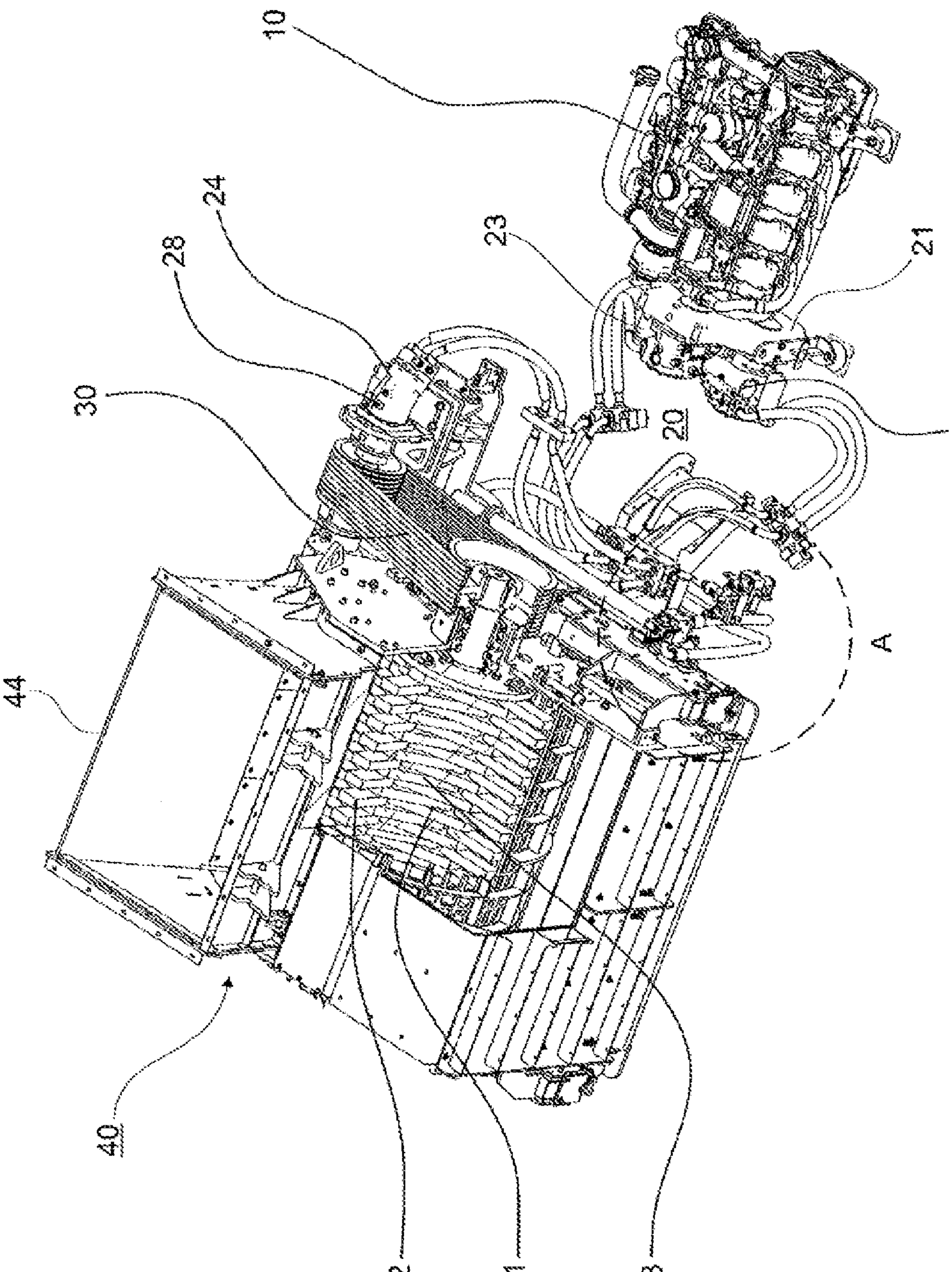

Fig. 6

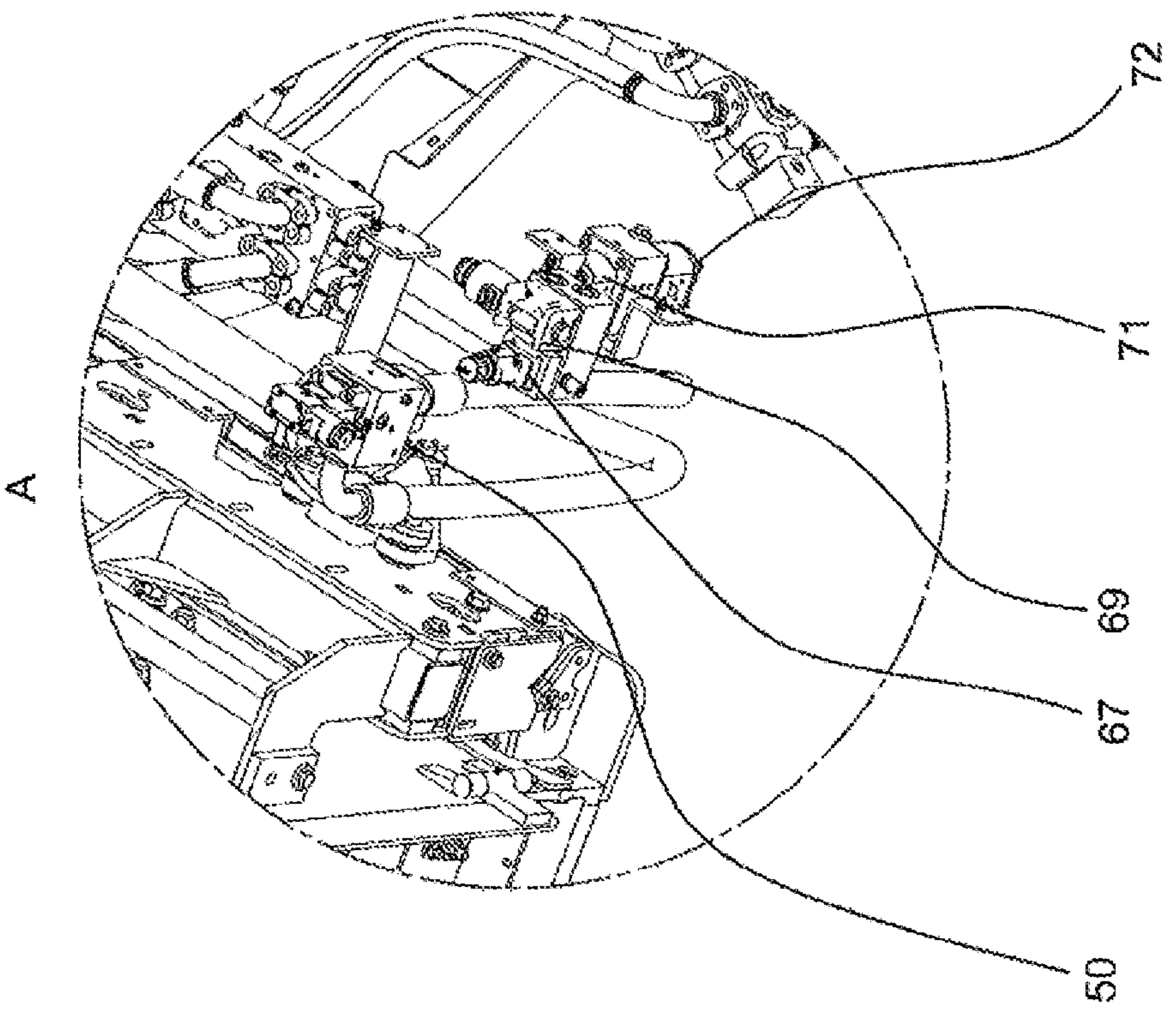

Fig. 7