CLAIMS

What is claimed is:

1. A working device energy recovery system, comprising two energy converters ~~that at least comprise~~ providing a first unit and a second unit (1.1, 1.2) ~~each~~, a main valve (6), a first control signal (Signal-a) corresponding to a lifting operation and a second control signal (Signal-b) corresponding to a dropping operation, wherein an inlet of a pressure energy retaining valve (2) is connected with the main valve (6) through a switchover valve (3), an outlet of the pressure energy retaining valve (2) is connected with rodless cavities of the first and second units (1.1, 1.2) of the energy converters, the switchover valve (3) is connected with an energy collector (4), an input end of a logical control member (5) is in communication connections with the main valve (6), the first and second units (1.1, 1.2) of the energy converters, the first control signal (Signal-a) and the second control signal (Signal-b), and an output end of the logical control member (5) is connected with a control end of the switchover valve (3) ~~.~~

wherein the switchover valve (3) comprises a three position valve providing:

a first operating position by which the rodless cavity of the first unit (1.1) is coupled to the energy collector (4) while the rodless cavity of the second unit (1.2) is coupled to the main valve (6);

a second operating position by which the rodless cavity of each of the first unit (1.1) and the second unit (1.2) is coupled to the main valve (6), and

a third operating position by which the rodless cavity of the first unit (1.1) is coupled to the energy collector (4) while the rodless cavity of the second unit (1.2) is coupled to the main valve (6), and

wherein the logical control member (5) is configured to sense a first pressure corresponding to a first main oil port (A) and a second pressure corresponding to a second main oil port (B) of the main valve (6), and

wherein during a lifting operation the logical control member (5) selects one of the first operating position and the second operating position of the switchover valve (3) to

respectively enable or disable assistive functions of the energy collector (4) in response to the sensed first pressure, and

wherein during a dropping operation the logical control member (5) selects one of the second operating position and the third operating position of the switchover valve (3) to respectively disable or enable energy storage by the energy collector (4) in response to the sensed second pressure.

2. ~~The working device energy recovery system according to claim 1,~~ A working device energy recovery system, comprising two energy converters that at least comprise a unit (1.1, 1.2) each, a main valve (6), a first control signal (Signal-a) and a second control signal (Signal-b), wherein an inlet of a pressure energy retaining valve (2) is connected with the main valve (6) through a switchover valve (3), an outlet of the pressure energy retaining valve (2) is connected with rodless cavities of the units (1.1, 1.2) of the energy converters, the switchover valve (3) is connected with an energy collector (4), an input end of a logical control member (5) is in communication connections with the main valve (6), the units (1.1, 1.2) of the energy converters, the first control signal (Signal-a) and the second control signal (Signal-b), and an output end of the logical control member (5) is connected with a control end of the switchover valve (3), wherein: ~~each of the two energy converters at least comprises one or more converter units (1.1, 1.2),~~ each unit (1.1, 1.2) is separated into corresponding working cavities (1.1b, 1.1c, 1.2b, 1.2c) by a rod piston (1.1a, 1.2a), the working cavities (1.1b, 1.2b) are each provided with an oil port (B1, B2) and are directly connected with an oil port (B) of the main valve, and the working cavities (1.1c, 1.2c) are each provided with an oil port (A1, A2); the pressure energy retaining valve (2) comprises: unit valves (2a, 2b), a signal OR valve (2c), a pressure overload protection valve (2d), a direction valve (2e) and a one-way throttle control valve (2f); the unit valve (2a) is provided with a first oil port (Ia), a second oil port (IIa), a third oil port (IIIa) and a fourth oil port (IVa), and the second oil port (IIa) communicates with the fourth oil port (IVa); the unit valve (2b) is provided with a fifth oil port (Ib), a sixth oil port (IIb), a seventh oil port (IIIb) and an eighth oil port (IVb), the sixth oil port (IIb) communicates with the eighth oil port (IVb), and the second oil port (IIa) and the sixth oil port (IIb) are respectively

connected with the first working cavity oil port (A1) and the second working cavity oil port (A2) of the energy converters (1.1c, 1.2c); the direction valve (2e) is provided with a first pressure input port (k1), a second pressure input port (k2), an oil return port (kt) and a reverse control port (Kb5), the input port (k1) communicates with the third oil port (IIIa) and the seventh oil port (IIIb), the oil return port (kt) is connected with an oil return path (T2) and gets oil back to an oil tank, and the reverse control port (Kb5) is connected to a second connecting point (S2) of the main valve at which the second control signal (Signal-b) is input; the signal OR valve (2c) comprises: a third pressure input port (a), a fourth pressure input port (b) and a pressure output port (c), the third pressure input port (a) is connected with the fourth oil port (IVa) of the unit valve (2a), the fourth pressure input port (b) is connected with the eighth oil port (IVb) of the unit valve (2b), and the pressure output port (c) is connected with the oil port (k2) of the direction valve and takes a high-pressure oil signal of the third pressure input port (a) or the fourth pressure input port (b) through logic OR; an inlet of the pressure overload protection valve (2d) is connected to an oil path (G) from the oil port (k2) to the pressure output port (c), and an output port is connected to a control oil path (H) of the reverse control port (Kb5); the one-way throttle control valve (2f) is resistively connected to an output oil path of the pressure overload protection valve (2d), and is used to press the reverse control port (Kb5), to reverse the direction valve (2e) for overload protection, which has no throttle control effects on the second control signal (Signal-b); the switchover valve (3) comprises: a first main oil port (P1), a second main oil port (P2), a third main oil port (A), a fourth main oil port (B), a first control port (Ka4) and a second control port (Kb4), the first main oil port (P1) and the second main oil port (P2) are respectively connected with an oil port (A) of the main valve and an oil port (X) of the energy collector, the third main oil port (A) and the fourth main oil port (B) are respectively connected with the first oil port (Ia) and the fifth oil port (Ib) of the pressure energy retaining valve (2), the first control port (Ka4) and the second control port (Kb4) are respectively connected with a third control port (Pp1) and a fourth control port (Pp2) of the logical control member (5); and input and output connections of the logical control member (5) comprise: input (Ka2) is connected to a first connecting point (S1) of the main valve at which the first control signal (Signal-a) is input, input (Ka3) is connected to a first main oil

path (E) from the oil port (A) of the main valve to the oil port (P1) of the switchover valve, input (Kb2) is connected to a third connecting point (S3) of the main valve at which the second control signal (Signal-b) is input, input (Kb3) is connected to a second main oil path (F) from the oil port (B) of the main valve to a first rod end oil port (B1) and a second rod end oil port (B2) of the energy converter, output (Pp1) is connected to the first control port (Ka4) of the switchover valve (3), and output (Pp2) is connected to the second control port (Kb4) of the switchover valve (3).

3. The working device energy recovery system according to claim 1 or 2, wherein the logical control member (5) is a hydraulic logical control member, an electric logical control member or an electro-hydraulic control logical member.

4. The working device energy recovery system according to claim 1 or 2, wherein the first control signal (Signal-a) and the second control signal (Signal-b) are hydraulic pressure signals and/or electrical signals, and are directly or indirectly taken from an operating handle.

5. The working device energy recovery system according to claim 1, wherein:

during a lifting operation, in response to the sensed first pressure not reaching a set value, the logical control member (5) establishes the switchover valve (3) in the first operating position, and in response to the sensed first pressure reaching or exceeding the set value, the logical control member (5) establishes the switchover valve (3) in the second operating position; and

during a dropping operation, in response to the sensed second pressure reaching or exceeding the set value, the logical control member (5) establishes the switchover valve (3) in the second operating position, and in response to the sensed second pressure not reaching the set value, the logical control member (5) establishes the switchover valve (3) in the third operating position.

6. The working device energy recovery system according to claim 1 or 5, wherein the logical control member (5) selectively establishes the switchover valve (3) in: the first position to enable a lifting operation with energy conversation, the third position to enable a

dropping operation with energy conservation, or the second position to enable a lifting or a dropping operation without energy conservation.