CLAIMS

1. A launching cylinder for a catapult, wherein the launching cylinder comprises:

a frame comprising a cylindrical inner space;

a piston assembly arranged movably inside the inner space;

a first pressure space and a second pressure space inside the cylindrical inner space of the frame and being separated from each other by means of the piston assembly;

and wherein the first pressure space is connectable to a pneumatic circuit for generating launching movement towards a stroke direction of the launching cylinder, and the second pressure space is connectable to a hydraulic circuit characterised in that the launching cylinder is provided with combined pneumatic launching means and hydraulic returning means, the returning movement being generated by the hydraulic circuit and opposite to the stroke direction, wherein the piston assembly of the launching cylinder is connected to a piston rod on the hydraulic side of said piston assembly.

2. The launching cylinder as claimed in claim 1, wherein

the piston assembly comprises radial first sealing means on the side of the first pressure space and radial second sealing means on the side of the second pressure space;

the piston assembly is further provided with at least one radial first leakage channel, which is located between the first sealing means and second sealing means;

and the piston rod comprises at least one longitudinal second leakage channel a first end portion of which is in connection to the first leakage channel allowing thereby leakage fluids to be conveyed through the second leakage channel away from an area between the sealing means of the piston assembly.

3. The launching cylinder as claimed in claim 2, wherein

a free end of the piston rod is provided with a first connecting element by

means of which the launching movement is transmittable to a launching system of the catapult;

the first connecting element comprises an inner space which is in fluid connection with the longitudinal second leakage channel of the piston rod;

and the first connecting element is further provided with at least one pneumatic discharge port and at least one hydraulic discharge port for enabling discharge of pneumatic and hydraulic fluids from the inner space of the first connecting element.

4. The launching cylinder as claimed in any one of the preceding claims 1 to 3, wherein

the piston assembly is lubricated inside the pneumatic first pressure space by means of hydraulic fluid remaining on the inner surfaces of the first pressure space due to the return direction movement of the launching cylinder.

5. The launching cylinder as claimed in any one of the preceding claims 1 to 4, wherein

the launching cylinder comprises at least one release valve controlling at least discharge of hydraulic fluid flow from the second pressure space.

6. A catapult for launching an unmanned aircraft, which catapult comprises at least:

an elongated ramp;

a carriage supported to the ramp and being movable in the longitudinal direction of the ramp from a launch position to a release position and back, and which carriage comprises coupling members for supporting the aircraft;

a tackle mechanism that is also supported to the ramp and is movable in the longitudinal direction of the ramp;

at least one pressure-medium-operated launching cylinder configured to move the tackle mechanism for generating launching movement in launching direction;

at least one pulley mechanism that comprises at least one pulley and is

arranged in connection with the tackle mechanism;

at least one pulling element that is engaged with the carriage and the ramp and is further configured to run via at least one launch-side pulley mechanism and to transmit the motion of the tackle mechanism to the carriage for moving the carriage from the launch position to the release position;

locking means for keeping the carriage at the launching position and for releasing it at a launching moment;

dampening means for affecting accelerating and decelerating movements of the carriage in the launching direction;

and wherein the at least one launching cylinder is in accordance with any one of the preceding claims 1 to 5 and is further configured to return the carriage from the release position to the launch position.

7. The catapult as claimed in claim 6, wherein

the at least one launching cylinder comprises a pneumatic first pressure space connected to a pneumatic circuit and configured to generate the launching movement, and further comprises a hydraulic second pressure space connected to a hydraulic circuit and configured to generate the returning movement;

wherein connection from the hydraulic second pressure space is openable and closable to the hydraulic circuit by means of at least one release valve;

and the hydraulic circuit comprises at least one hydraulic fluid storage for receiving volume flow of the pressurized hydraulic fluid discharged from the second pressure space during the launching movement.