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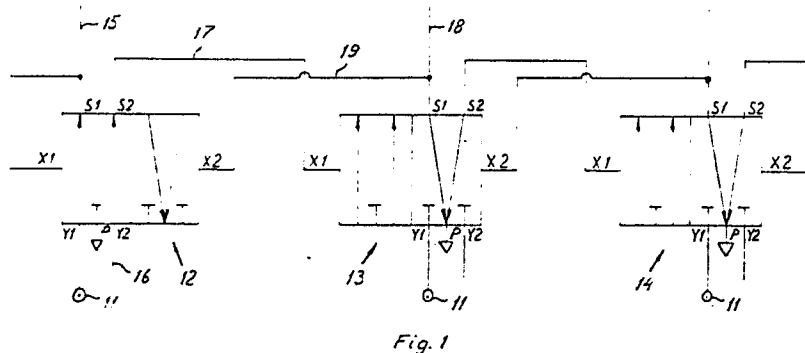
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(54) **Sequential register for pressure fluid system.**

(57) A sequential register for a pressure fluid system for controlling a number of successive working procedures. Each stage comprises a single valve (13) which in activated position delivers order signal (S1) to the working procedure and when the working procedure has been finished passes a feed-back signal (Y2) for activation (X1) of the next valve (14). The order signal (S1) from that valve (14) is conducted back to the next preceding valve (13) which is reswitched.



Sequential register for pressure fluid system

The present invention relates to a sequential register for a pressure fluid system for supplying order signals for starting a number of working procedures, whereby one working procedure is started only when the next preceding working procedure has been finished.

In systems of the above mentioned kind each working procedure is started by an order signal. When the working procedure has been finished a feed-back signal is obtained for initiating the next working procedure. In a prior art solution each stage utilizes a valve and an and-element for activation of the valve when the next preceding stage delivers order signal and a feed-back signal is obtained. The valve is reset when the next proceeding stage delivers order signal.

The present invention achieves the above mentioned function by using only one valve per stage. This is obtained by a sequential register according to the appended claim.

One important characteristic of the present invention is that each stage of the register is connected to the pressure fluid source. This means safe operation since the order signal for starting the working procedure does not have to pass through a number of register stages but is obtained directly from the pressure source.

An embodiment of the invention is described below with reference to the accompanying drawings in which fig. 1 shows a circuit diagram according to the invention. Fig. 2 shows a longitudinal section through a valve with the slide in a first position. Fig. 3 shows the valve with the slide in a second position.

The shown sequential register comprises a number of stages of which three stages provided with valves 12, 13 and 14 are shown in fig. 1. The valves can be switched between a first position, shown for valve 12 and in fig. 2, and a second position, shown for valves 13 and 14 and in fig. 3. Each valve comprises a valve housing 1 provided with

an end piece 2. A slide 5 is movable in the valve housing between a first position, fig. 2, and a second position fig. 3. Valve housing 1 is provided with a first inlet opening Y1 for connection to a pressure fluid source 11, normally the same pressure fluid source for all stages, a second inlet opening Y2 for receiving feed-back signal via conduit 16 when the working procedure relates to the valve has been finished, a first order signal opening S1 for delivering order signal via conduit 15 for starting the working procedure related to the valve, a second order signal opening S2 for delivering order signal via conduit 17 to a first control opening X1 in the next proceeding stage for activation of that stage, an outlet opening P for connection to a low pressure, atmospheric pressure if the fluid is air, a first control opening X1 for supply of control fluid from the second order signal opening S2 in the next preceding stage for switching slide 5 from the second position, fig. 3, to the first position, fig. 2, and a second control opening X2 for supplying of control fluid from the first order signal opening S1 in the next proceeding stage via conduit 19 for switching the slide 5 from the first position, fig. 2, to the second position, fig. 3. Slide 5 is provided with five seals 6, 7, 8, 9 and 10. The first seal 6 separates the first control opening X1 from the other openings. The fifth seal 10 separates the second control opening X2 from the other openings. The second seal 7 separates in the first valve position openings Y1 and S1 from outlet opening P and in the second valve position opening Y1 from opening S1. The third seal 8 separates in the first valve position openings Y2 and S2 from outlet opening P and allows in the second valve position fluid to flow from openings S1 and S2 to outlet opening P. The fourth seal 9 has in the first valve position no function. In the second valve position seal 9 separates opening Y2 from opening S2. Seals 9 and 10 can be replaced by one considerably wider seal. However, this would be more expensive. The valves are furthermore provided with axial openings 3 and 4. Opening 4 can be used to put the slide in the position according to fig. 3 before starting the first working procedure. The first working procedure can then be started by supply of pressure fluid to opening 3 in the first valve of the sequential register. The same function can also be obtained through suitable pressurization of control

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openings X2 and X1, whereby openings 3 and 4 are sealed against the surrounding atmosphere. Openings 3 and 4 can also be used for putting in pins to indicate the position of slide 5 and/or to manually move the slide.

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The sequential register shown works in the following way. Valve 12 is in the first position as shown in fig. 1. The corresponding working procedure has been started by order signal from opening S1 via conduit 15. When this working procedure has been finished feed-back signal is obtained via conduit 16 to opening Y2. This signal is further conducted through valve 12 to its opening S2 and further via conduit 17 to opening X1 in valve 13. Valve 13 is switched to the first position. As a result pressure fluid is conducted from the pressure fluid source 11 to opening Y1 in valve 13 and through this to opening S1, whereby the next working procedure is started via conduit 18. This signal is also conducted via conduit 19 to opening X2 in valve 12 which as a result is switched to the second position. As a result openings S1 and S2 in valve 12, and consequently conduits 15 and 17, are connected to a low pressure via outlet opening P. As a result opening X1 in valve 13 is unloaded whereby valve 13 is ready for reswitching when valve 14 is activated.

Claim:

A sequential register for a pressure fluid system comprising a number of stages for successive supply of order signals for starting a number of successive working procedures, whereby one working procedure is started only when the next preceding working procedure has been finished, characterized thereby that each stage comprises a valve being switchable between a first position and a second position, that said valve comprises a first inlet opening (Y1) for connection to a pressure fluid source, a second inlet opening (Y2) for receiving a feed-back signal when the working procedure corresponding to the valve has been finished, a first order signal opening (S1) for delivering an order signal for starting the working procedure corresponding to the valve, a second order signal opening (S2) for delivering an order signal for activation of the next proceeding stage, an outlet opening (P) for connection to a low pressure, a first control opening (X1) for switching the valve from said second position to said first position and a second control opening (X2) for switching the valve from said first position to said second position, that said first order signal opening (S1) is connected with the second control opening (X2) in the next preceding stage and said second order signal opening (S2) is connected with the first control opening (X1) in the next proceeding stage, whereby the valve in said first position connects the first inlet opening (Y1) with the first order signal opening (S1) and the second inlet opening (Y2) with the second order signal opening (S2) and in said second position both order signal openings (S1 and S2) are connected with the outlet opening (P).

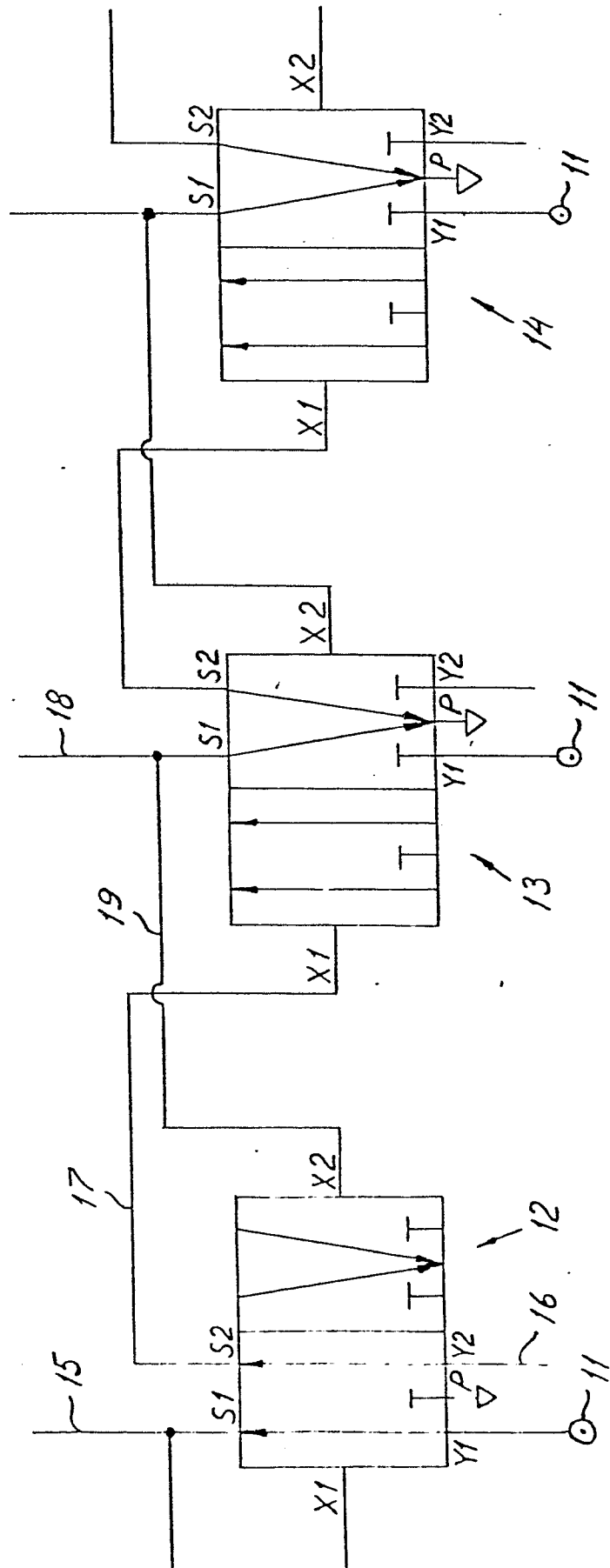


Fig. 1

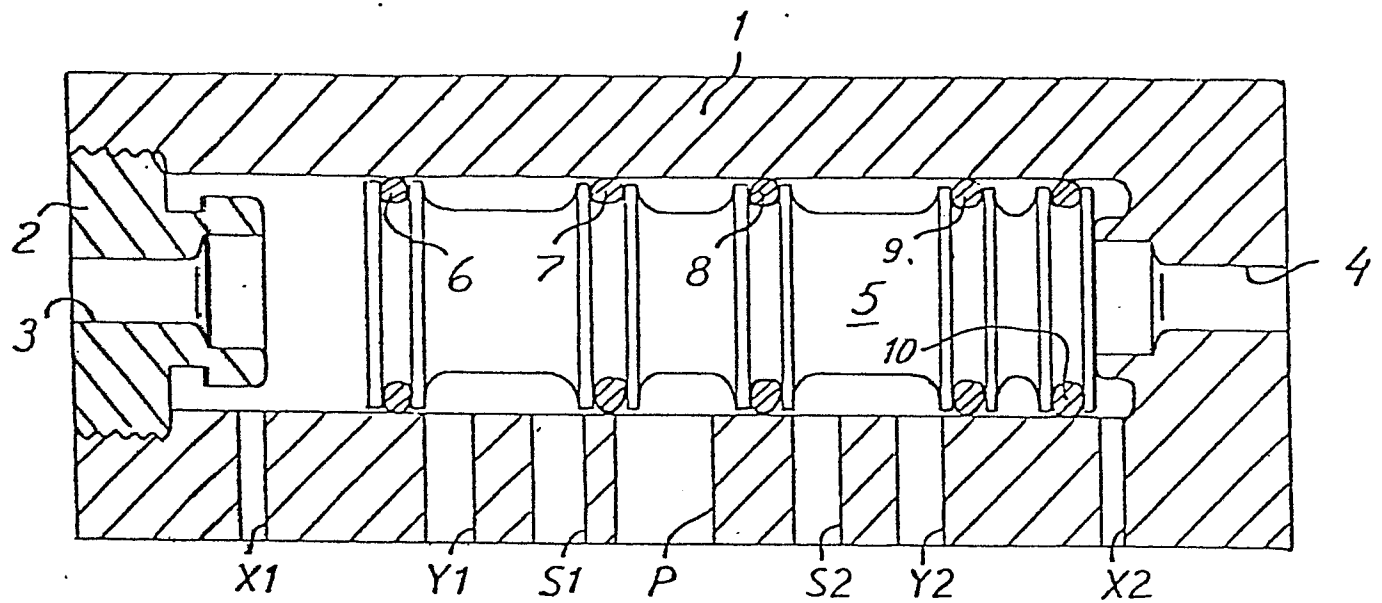


Fig. 2

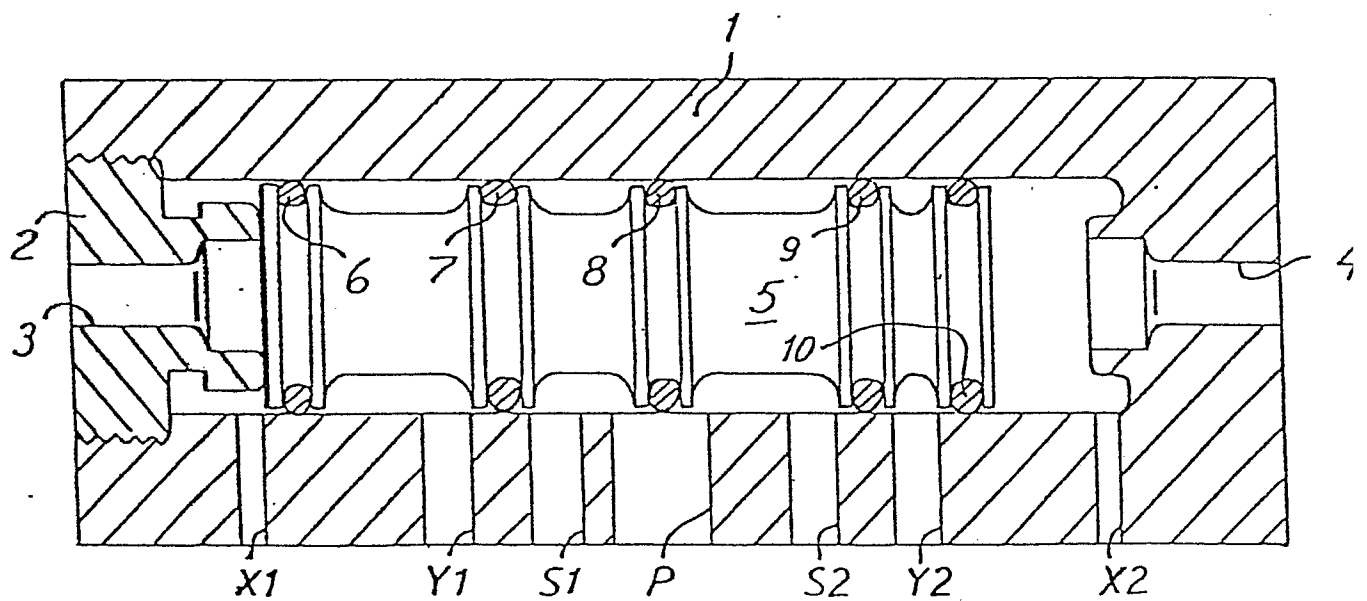


Fig. 3