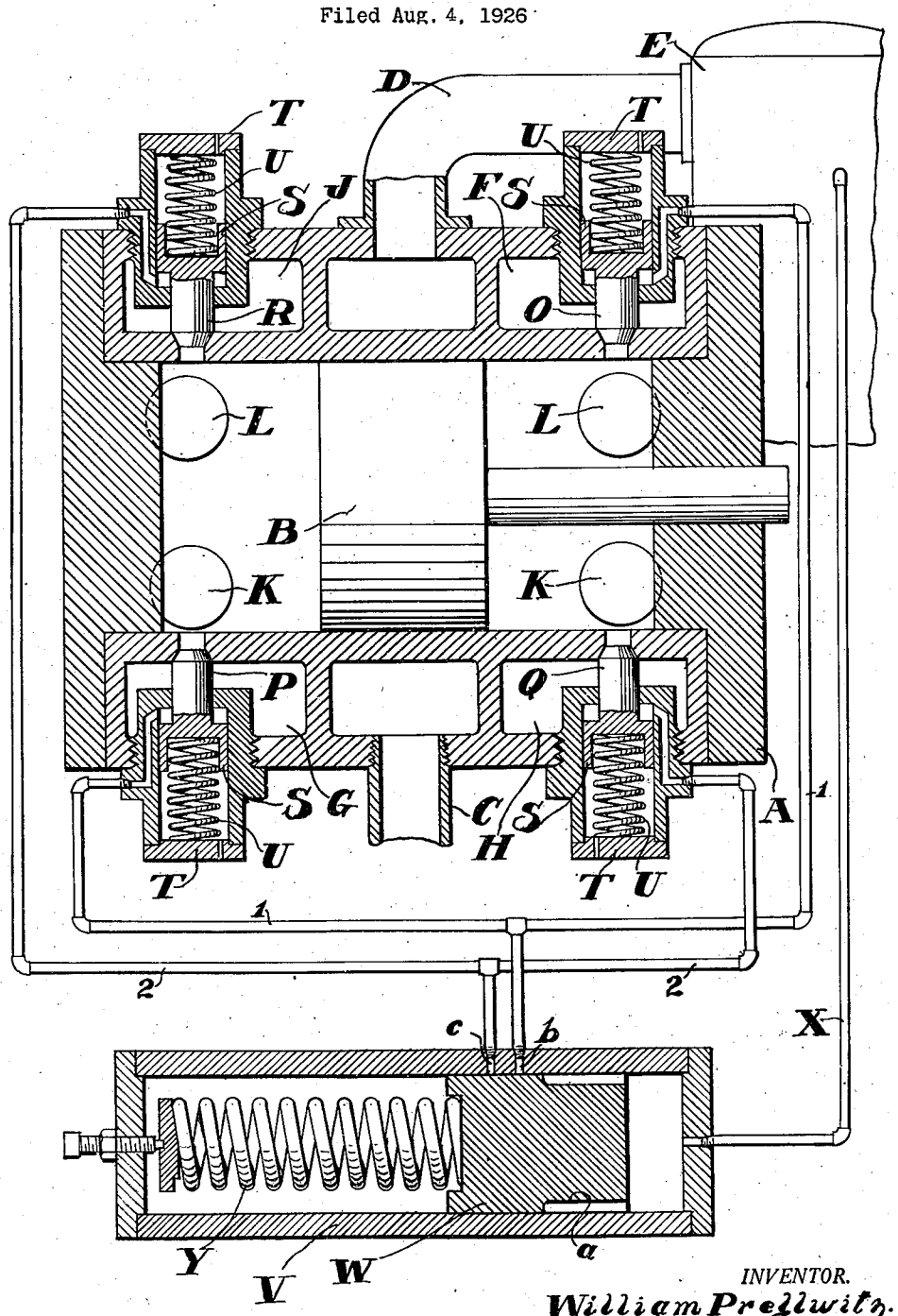
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THREE-STEP CLEARANCE CONTROL

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THREE-STEP CLEARANCE CONTROL.

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This invention relates to compressor unloaders, but more particularly to a clearance unloader which unloads and loads in three steps, that is, full load, half load and no load, considering the full load condition as one of the three steps.

The object of the invention is to enable a compressor to be unloaded entirely by clearance chambers, but in few steps and throughout each step pressure at each end of the cylinder is substantially the same and the compressor is maintained in balanced condition.

The invention is illustrated in one of its preferred forms in the accompanying drawing which is a diagrammatic representation partly in longitudinal section of a simple unloading system.

Referring to the drawings, the cylinder A having the piston B receives air through the intake C and discharges it through the discharge outlet D to the receiver E. The cylinder is provided with four clearance chambers F, G, H and J, so that by opening the chambers F and G simultaneously at opposite ends of the cylinder, the compressor is half unloaded in one step and by opening the chambers H and J simultaneously at opposite ends of the cylinder, the compressor runs under no load as the final step.

The compressor has the usual inlet and discharge valves K and L which may be of the plate type. The clearance chambers are provided with the clearance valves O, P, Q and R and valve opening mechanism comprising the pistons S operating in the cylinders T and having the retracting springs U.

The regulation is effected by a suitable regulator and a simple type of regulator is shown comprising a cylinder V having the piston W which is subjected to receiver pressure at one end through the pipe X and is provided with an adjustable retracting spring Y at the other end. The piston is cut away at *a* to cooperate with the ports *b* and *c* in the cylinder V. Pipes 1 joining together and leading from the port *b*, supply pressure to the cylinders T of the clearance valves O and P, while pipes 2 joining together and leading from the port *c*, supply pressure to the cylinders T of the clearance valves Q and R.

In the operation of the device, when the piston W of the regulator is moved the first step to the left as the figure is viewed, then the port *b* is uncovered and subjected to receiver pressure so that the clearance valves O and P are opened and the compressor is half unloaded, but maintained in balance. During the next step of unloading, when the port *c* is uncovered, pressure is supplied to open the clearance valves Q and R while maintaining the clearance valves O and P open which completely unloads the compressor.

I claim:

1. In a compressor unloader, the combination of a cylinder and piston, inlet and discharge valves, a receiver, two clearance chambers and clearance valves for each end of the cylinder, and means for operating the clearance chambers in successive pairs, to effect steps of unloading, thereby keeping the pressures at each end of the cylinder substantially the same.

2. In a compressor unloader, the combination of a cylinder and piston, inlet and discharge valves, a receiver, two clearance chambers and clearance valves for each end of the cylinder, and means for operating the clearance chambers in successive pairs, to first partially unload the compressor and then wholly unload the compressor.

3. In a compressor unloader, the combination of a cylinder and piston, inlet and discharge valves, a receiver, two clearance chambers and clearance valves for each end of the cylinder, and automatic means responsive to receiver pressure for operating the clearance valves in successive pairs, to first partially unload the compressor and then wholly unload the compressor, thereby keeping the compressor balanced.

4. In a compressor unloader, the combination of a cylinder and piston, inlet and discharge valves, a receiver, two clearance chambers and clearance valves for each end of the cylinder, and automatic means responsive to receiver pressure for operating the clearance valves in successive pairs, the valves of each pair being located at opposite ends of the cylinder, for effecting steps of unloading, thereby keeping the pressures at each end of the cylinder substantially the same and maintaining a balanced condition in the compressor.

In testimony whereof I have signed this specification.

WILLIAM PRELLWITZ.