

THE SEQUENCE MODULAR BLOCKS FOR THE AUTOMATISED PROCESSES COMMAND – PART 3

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Abstract: *In the paper there is presented an example in which the sequential modular block for the processes command can be use the offset register to perform simultaneously operation on the same gauge. As an example there is described a solution for the control, and filling with liquids of the canisters, their transport being made by a conveyor, entrained step by step by a pneumatic cylinder. There is presented the algorithm that allowed to establish the pneumatic command scheme, including some especial cases, like the emergency STOP, adjusting mode, or automatic mode.*

The register offset or the additional sequence modules as modular block command could serve for flexible automatic processes. As an example, in the paper there is about an automatic machine for the canister filling.

The machine is designated to the automatic control, filling and enclosing of the canister containing liquids (abstergents, chemical products etc.) An advanced strip step by step by the cylinder A transfers from one gauge to another a group of two canisters. The five stations (loading, control, filling, enclosing and evacuation) progress simultaneously their cycle, so that both canisters are served once. When to the CONTROL station is detected a fault canister, the information is transferred to the next stations, to prohibit the filling, enclosing and the evacuation of the fault canisters. The information transfer to the next stations is ensured due to an offset register.

The entire cycle is described through the phase functioning diagram, as it could be seen in the figure 1. In the control phase, after the closing of the canisters, by the cylinder D, is controlled their air tightness, with a 2/2 distributor. The sensors q and q' transmit signals if the canisters are filled. In the filling phase, after the elevation, the canisters are quickly filled by the distributors G and H, until the point detected by the sensor *r*. Then the filling process is made slowly until the point detected by the sensor *S*.

The entire cycle is described through the phase diagram, as it could be seen in figure 2. After the motion A + of the transfer cylinder, the operations are progressed simultaneously, following their own cycle. [2]

The sensors ordering scheme is classical:

- each double effect cylinder is ordered by a 4/2 bistable distributor, with pneumatic command;
- the rotating pneumatic engines L and L' are ordered by a 3/2 distributor, with pneumatic command;
- the touching sensors of the working tools positions are displaced according to the phase diagram. [3]

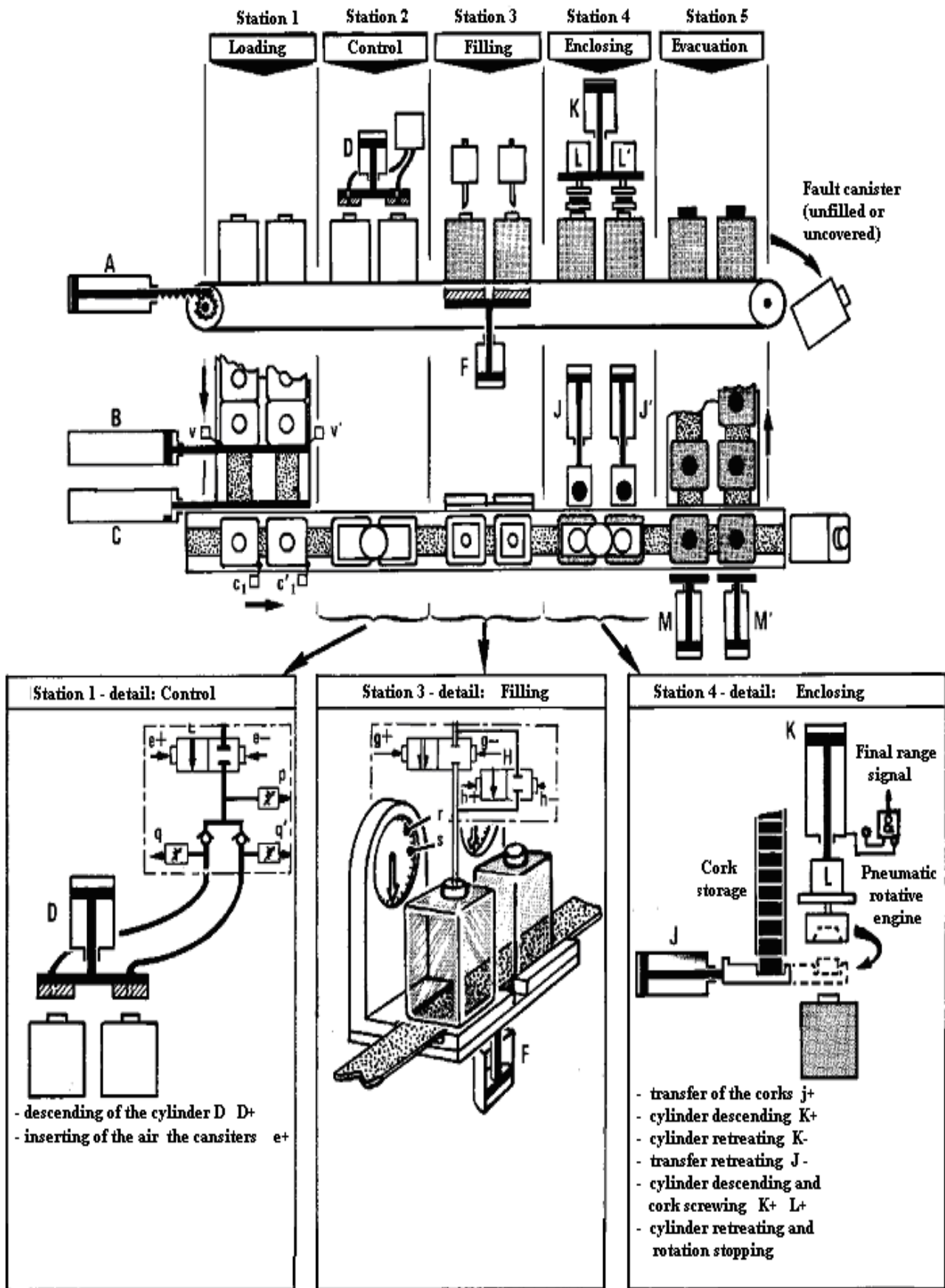


Figure 1: The automatic machine for the canisters filling [1]

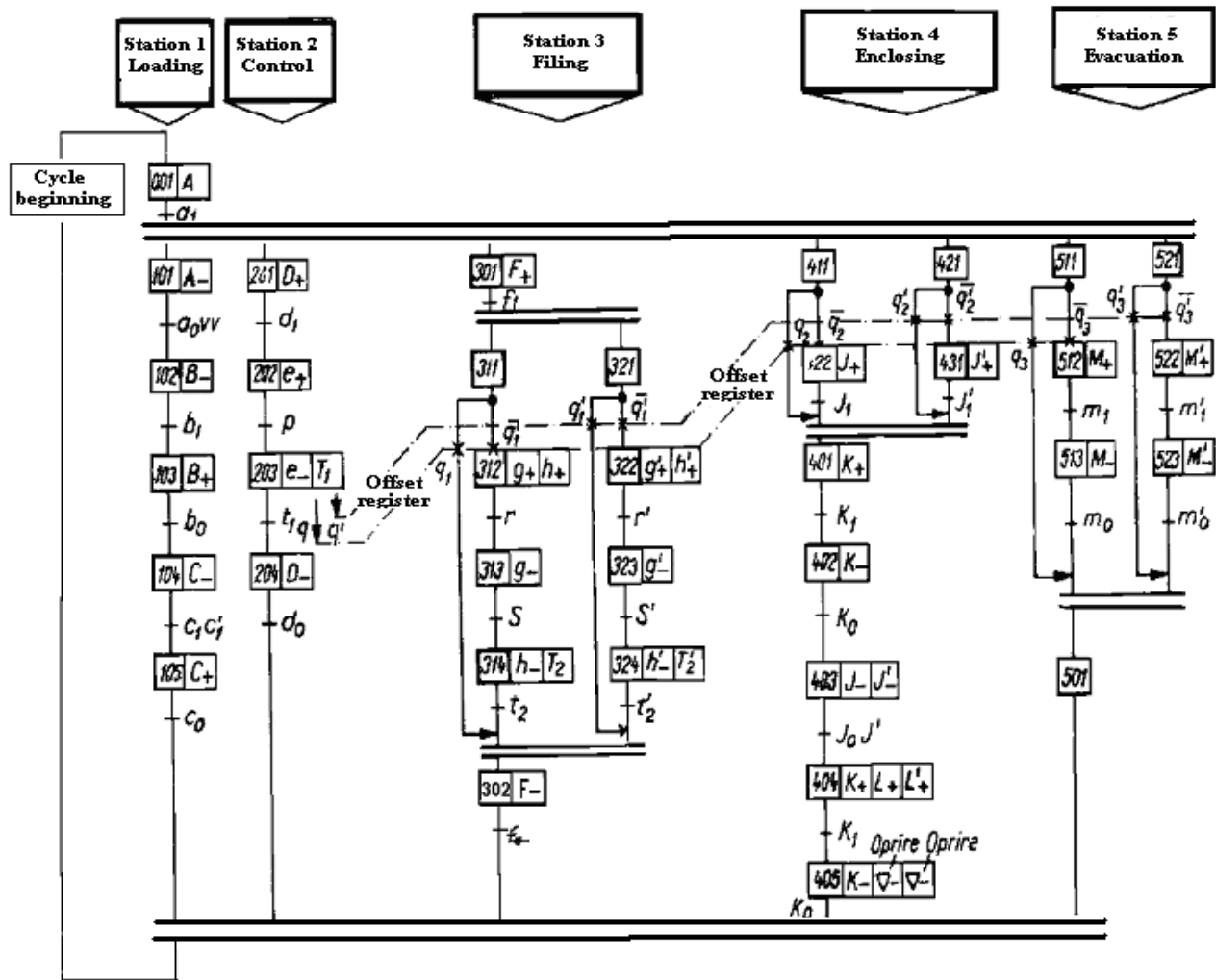


Figure 2: The phase diagram for the described cycle

In the phases diagram there are pointed out all the parallel lines corresponding to each station, so that:

- the parallel specific to each gauge are progressed simultaneously between an AND divergence and an AND convergence;
- to the station no 2, for control, the phase 203 could lead to provide a signal *fault canister*, q or q' , that would be transferred by an offset register, for its later using to each of the next stations;
- to each gauge, 3,4, 5, two parallel sub-lines corresponds to each of the two canisters, each of the sub-lines could be eliminated in case of the signal q or q' presence;
- the additional modules 311, 321, 411, 421, 511 and 521 allow the activating of the sub-lines corresponding to the stations 3, 4, 5, in case in which a sub-line is eliminated (fault canister);
- the additional module serves to the line continuation, if a sub-line is eliminated (the modular block must contain at least three sequence modules, for a proper functioning in case of the cycle adjustment).

The command scheme (figure 3) points out the following types of starting:

- automatic cycle by cycle
- adjustment, by interrupting the supplying pressure of the sensors
- manual command of each phase through the modular block [1,4].

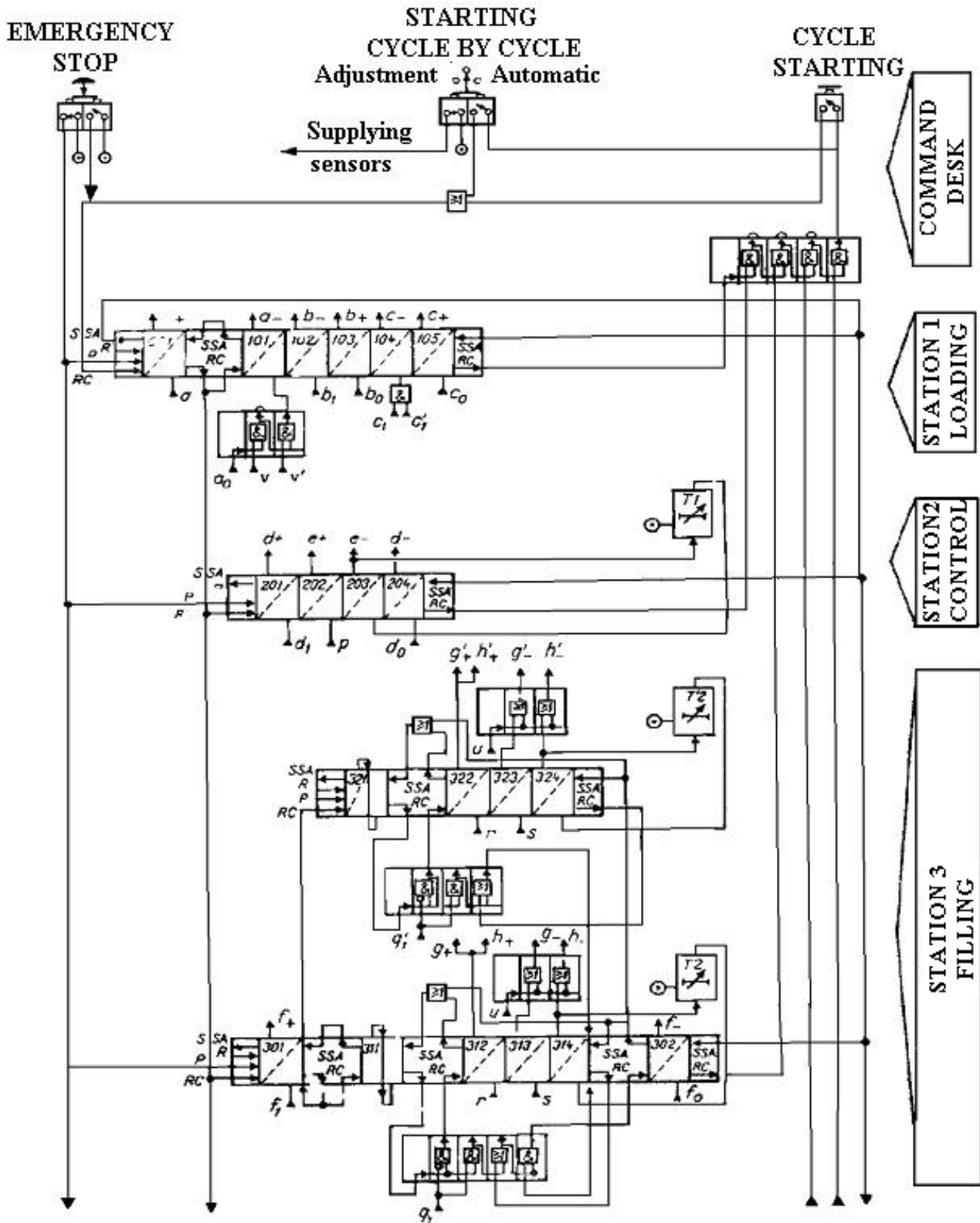


Figure 3,a: *Filling canisters machine command scheme*

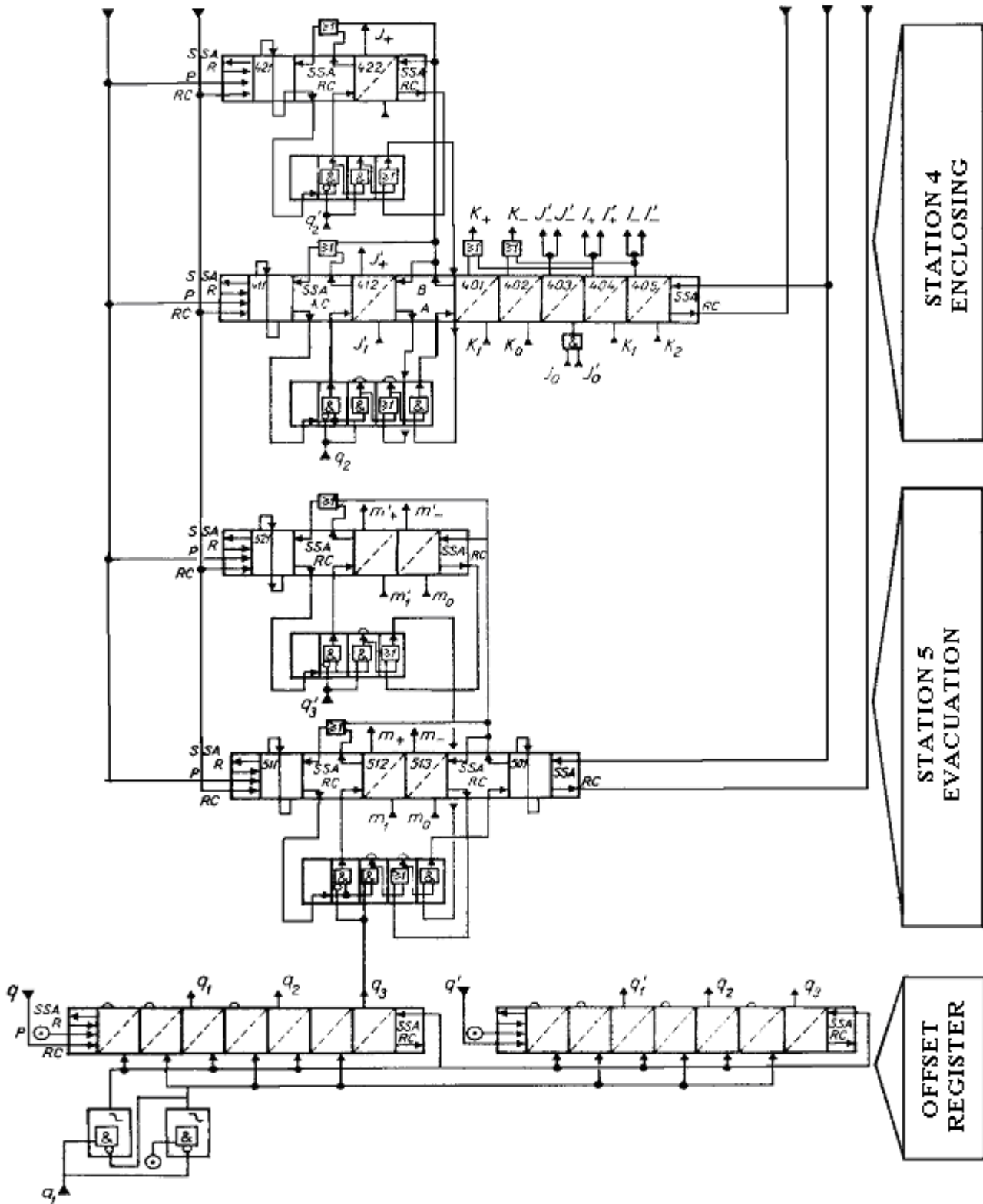


Figure 3,b: Filling canisters machine command scheme

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