

# All-Relay Interlocking Installed by Rock Island

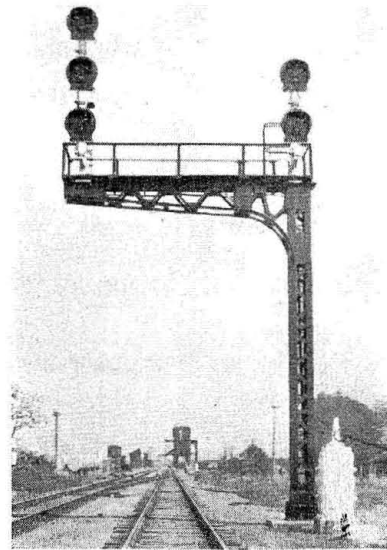
**Three crossovers, two single switches and twenty-seven signals controlled by twelve levers in C. T. C. machine**

**A**T POLO, Mo., the eastern end of the new Milwaukee—Rock Island joint track, the Rock Island has recently constructed an interlocking to handle the junction and crossover switches and signals, the control machine being of the C. T. C. type without mechanical locking between levers, the locking being accomplished electrically on the all-relay principle.

The layout includes the junction of two single-track lines from the east with passing tracks on each road in the approach to the junction. A joint double-track line extends westward from the junction toward Kansas City, and, because trains are operated in either direction on both tracks of this double-track section, high signals are provided for all possible through routes.

The interlocking includes three crossovers and two single switches. A point of special interest is that three main-line switches within home signal limits are not interlocked but are manually operated with switch stands. However, the position of each of these switches is indicated on the control machine. Furthermore it is interesting to note that a buffer-type spring switch is used at the east end of the passing track on the Rock Island, although this switch is outside of the interlocking limits and is not shown on the diagram.

The traffic on the Rock Island through this plant includes five passenger and about five freight trains each way daily, while the Milwaukee traffic includes two pas-

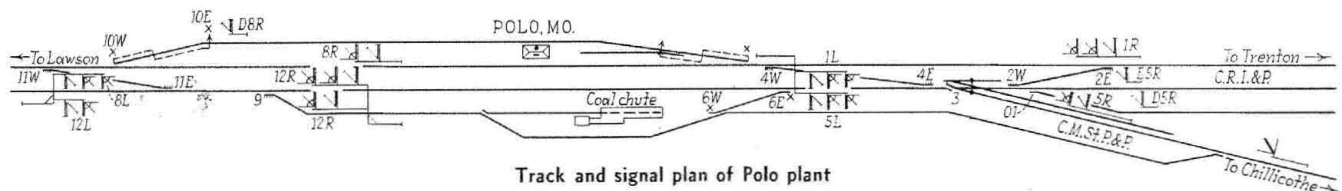


Eastward home signals

is provided for one of the house-track switches No. 10, and for the hand-thrown crossover, No. 6. Two additional levers in the machine are for the control of traffic-direction locking on each of the two tracks extending westward from this plant, to Lawson Jct., a distance of 12 miles.

Two small indication lamps are mounted above each switch lever, a green lamp above the normal position of the lever and a red above the reverse, the respective light being illuminated to correspond with the position of the switch controlled by the lever. The indications of the signals are repeated by lamps representing the signals on the track diagram above the levers. Likewise, this diagram includes one or two lamps in each track section, which are illuminated when the corresponding track circuit is occupied by a train. The lamp indicators located above the traffic levers are controlled in such a way that a green indication is given when the signals are set for the normal direction and red when set for a reverse-direction movement.

The push buttons marked A, B, and C, with white indication lamps above, are for starting the operation.



Track and signal plan of Polo plant

senger and from six to eight freight trains each way daily. In other words, the total number of train movements is about 36 every 24 hours.

The interlocked signals include five high home signals with two three-indication and one two-indication units each, four high home signals with one three-indication and one two-indication units each, and three two-indication dwarf signals. The eight switches are controlled by only five levers and 27 signals are controlled by five other levers. A lever space with indication lamps

of the time-element relays used as time releases, each release being used for a separate section of the plant. The indication lamps are illuminated when the release relay is in operation, so that the operator will know when the light goes out, that the time interval has elapsed and he is then free to change the line-up. The releases "A" and "C" are operated whenever the red light at a signal on the track diagram remains out after a train has passed or the signal lever is restored to the normal position. This is due to the stick route locking still being in effect

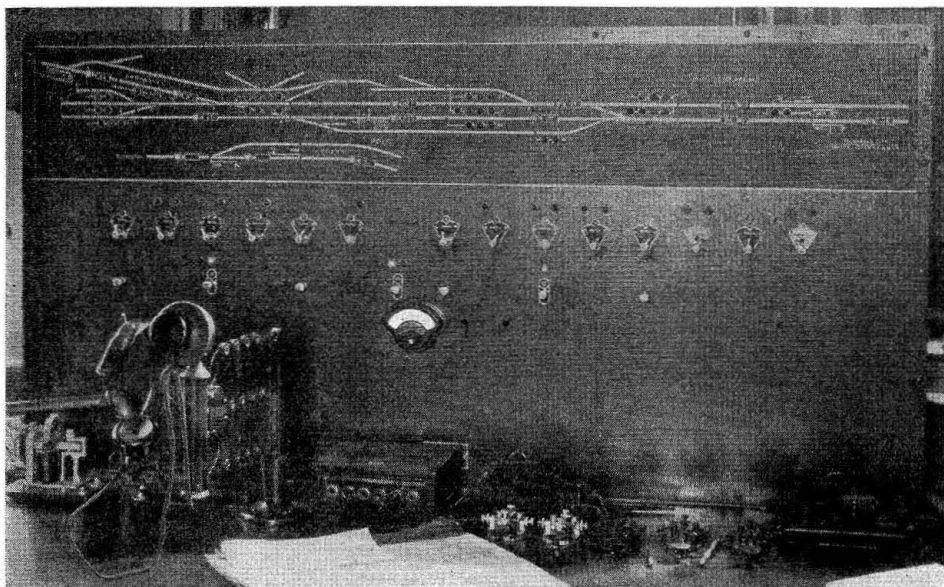
and the release must be operated to unlock the route. The "B" release, which is for the intermediate zone between the two groups of each signaling at each end of the plant, has not only a white light, but also a second red lamp located adjacent to the "B" push button. The purpose of this red light is to attract the attention of the operator so that he will know when it is necessary to operate this particular release.

The four other push buttons located separately under signal levers 1, 5, 8, and 12, are operated when it is necessary to give a call-on signal indication for a follow-up movement to a main-line block that is occupied, or this button may be used for signaling a train through the plant when the high-speed signal fails. For diverging routes to sidings the use of push buttons is not required.

This control machine, furnished by the Union Switch & Signal Company, is constructed along the same general lines as the machine manufactured by this company

must be locked out so that the Type-F controller cannot be operated.

The control machine itself is located on the operator's table in the station at Polo as shown in one of the illustrations. However, all the remaining control equipment, such as relays, batteries, etc., are located in a large instrument house constructed at a point south of the track opposite the station. A total of only 120 control wires are run from the machine to this relay house. These wires, together with control wires for the traffic-direction locking, spares, etc., are all run under the tracks in underground parkway cable. From the instrument house to each end of the plant the circuits are run in aerial cables made of single-conductor insulated wires supported by cable rings attached to stranded Copperweld messenger wire which is attached to the pole line. This cable extends to junction boxes at various points where parkway cable is connected to run under the tracks to switch machines, signals, track connections, etc.



The control machine is of the non-interlocked centralized control type

for centralized traffic control installations. However, on this Polo interlocking, no coded control apparatus is used, the control being arranged on the all-relay electric-locking system, the plans being developed by the Rock Island signal engineer's forces.

### Description of Operation

The switch machines are for 110-volt d-c. operation and receive power from heavy feed wires or busses which extend through the entire plant. The switch lever serves as a pole-changer to operate the Type-F controller located at each switch. The position of the pole-changer contacts on this controller determines the direction of operation of the switch, in accordance with standard Type-F practice. A two-wire polarized circuit from each single switch or crossover, to an indication relay known as the "KR" relay located in the instrument house, checks continuously the position of the switch or switches. The signal control circuits are selected then the KR relays, switch lever repeating relays, the switch circuit lock-out relays, and the opposing signal checking relay. Before a signal can display a proceed indication over a given route, the switch-indication relay position must correspond with the lever position, the opposing signal must be at stop and the switch control circuit

All of the relays in the large house are of the wall type, with spring mounting and are mounted on racks made of 2 in. by 8 in. boards set 6 in. apart on heavy uprights. The racks are set 2 in. from the wall to allow space for wire runs. All incoming wires terminate on porcelain-base terminals or arrestors, which are located on a terminal board at one end of the relay rack. Flexible wire is extended from these terminals to the various relay posts, the wires being held in place by insulated bridle rings screwed into the rack.

The main operating battery for the 110-volt switch machines consists of 57 Exide DMGO-7 cells. This battery is on floating charge through a U. S. & S. Co. Type RP41 rectifier. Two small Weston meters mounted on the face of the control machine indicate the voltage of the main battery and the current discharge for each switch machine operation. The switch machines are the Union Model M-2 while the signals are the Railroad Supply Company three-lens type. These signals are equipped with 10-volt 18-watt lamps which are normally fed from the a-c. supply, but are switched automatically to the storage battery supply in case of an a-c. power outage.

This plant was installed by the Rock Island signal department forces under the direction of Leroy Wyant, signal engineer, all plans having been prepared in his office.