

Spring Switch at Branch Line Terminus

AN INTERESTING example of the adaptation of the features of a spring switch to railroad operation is the installation placed in service on April 23, 1936, by the Pennsylvania at the Chestnut Hill, Pa., terminus of the Chestnut Hill branch. Approximately 37 inbound and 41 outbound multiple-unit electric trains are operated daily in suburban passenger service. At North Philadelphia, $6\frac{1}{2}$ miles from Chestnut Hill, the branch connects with the main line, over which the Chestnut Hill trains are operated into or out of the Broad Street suburban station, Philadelphia. Runs are also made over the branch, occasionally, by steam excursion trains and short freight trains. A passenger

coach storage yard, with a capacity of 56 cars, is located adjacent to the Chestnut Hill station, the lead track switch to this yard being involved in the layout.

The accompanying sketch, Fig. B, shows the track and signal facilities formerly in service, involving two crossovers, a turnout, two derails, and five signals, operated by a Union Style P-4 electro-mechanical machine, with four mechanical levers and eight electric levers, from a signal tower near the station.

With the installation of a spring switch, equipped with a facing-point lock, at the station end of the trailing crossover for inbound movements, and the revision of the controlling cir-

Pennsylvania utilizes spring switch features in turning back trains at end of double-track Chestnut Hill Branch—Electro-mechanical interlocking removed

cuits to provide semi-automatic operation of the interlocking, the electro-mechanical interlocking was retired, the second crossover was eliminated, and the lead track switch and the outward end of the retained crossover were arranged for hand operation and equipped with point detectors. The final revised layout is illustrated in Fig. A. All the signals are position-light, the track circuits are of the a-c. type, and power for the operation of the signal facilities is transmitted

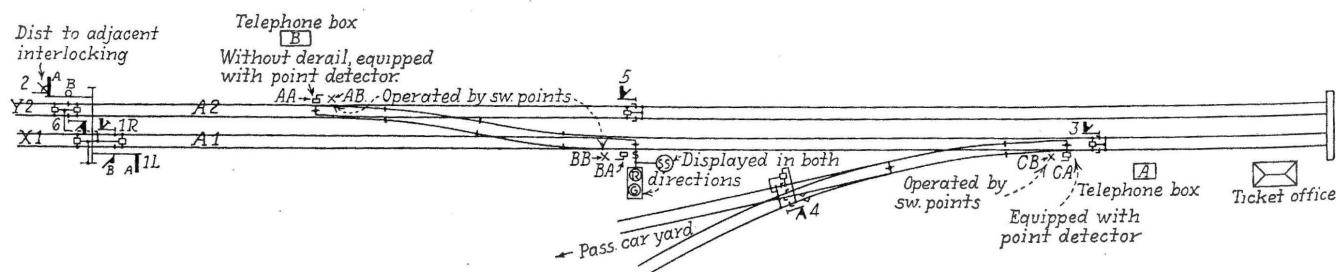


Fig. A.—Spring switch layout at Chestnut Hill



A spring switch indicator target and a color light indicator were provided

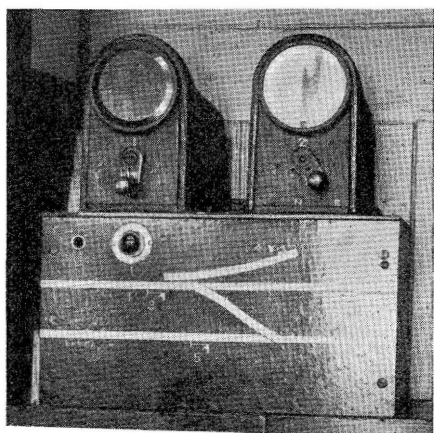
overhead at 3,300 volts, 60 cycles, from a sub-station at North Philadelphia.

Referring to Fig. A: Signals 1LB, 1R, and 2 are controlled by Model 6 electric lock levers located in the passenger station ticket office. Signals 3, 4 and 5 are controlled by push buttons located in telephone box "A", and are operated by trainmen; signal 6 is controlled by push buttons located in telephone box "B", operated by trainmen. Cancellation push buttons are provided for all signals

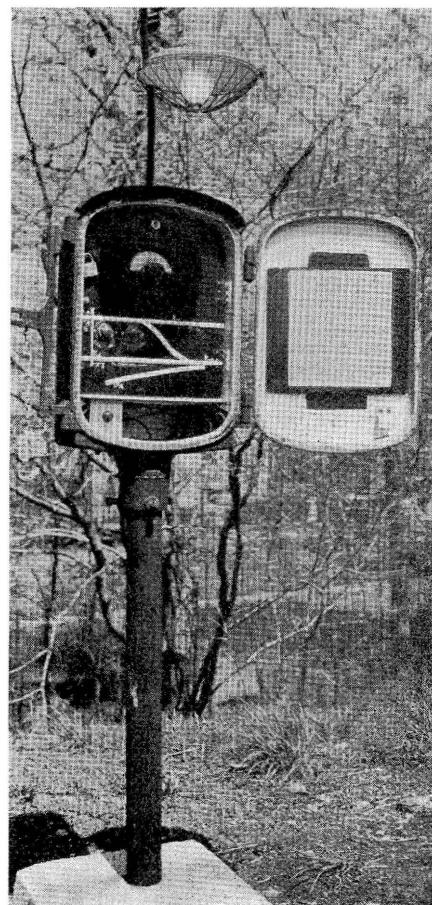
controlled by push buttons. The approach of a train on track section X1 is indicated by the extinguishing of a normally-illuminated electric indicating lamp in each telephone box. Slow releases, one in each telephone box, are provided for opening the control relay for signal 1LB when the ticket office is closed or when the approach is occupied. The spring switch is equipped with a Union Style S-1 facing-point lock and a spring switch indicator target with SS displayed in both directions, and is protected by a special two-indication, red and green, switch-repeating indicator located adjacent to the points and giving indications in both directions. Track section A1 extends only from signal 1L to signal 3, not to the dead end, thus allowing trains to stand on the inbound track at the station without shunting A1 track circuit.

Control Circuits

The more important of the circuits for the control of the signals at this location are illustrated in Fig. C. From these circuits it will be noted: That the red and green aspects of the special spring switch position-repeating signal are controlled through con-



Control machine in ticket office



Trainmen's station "B"

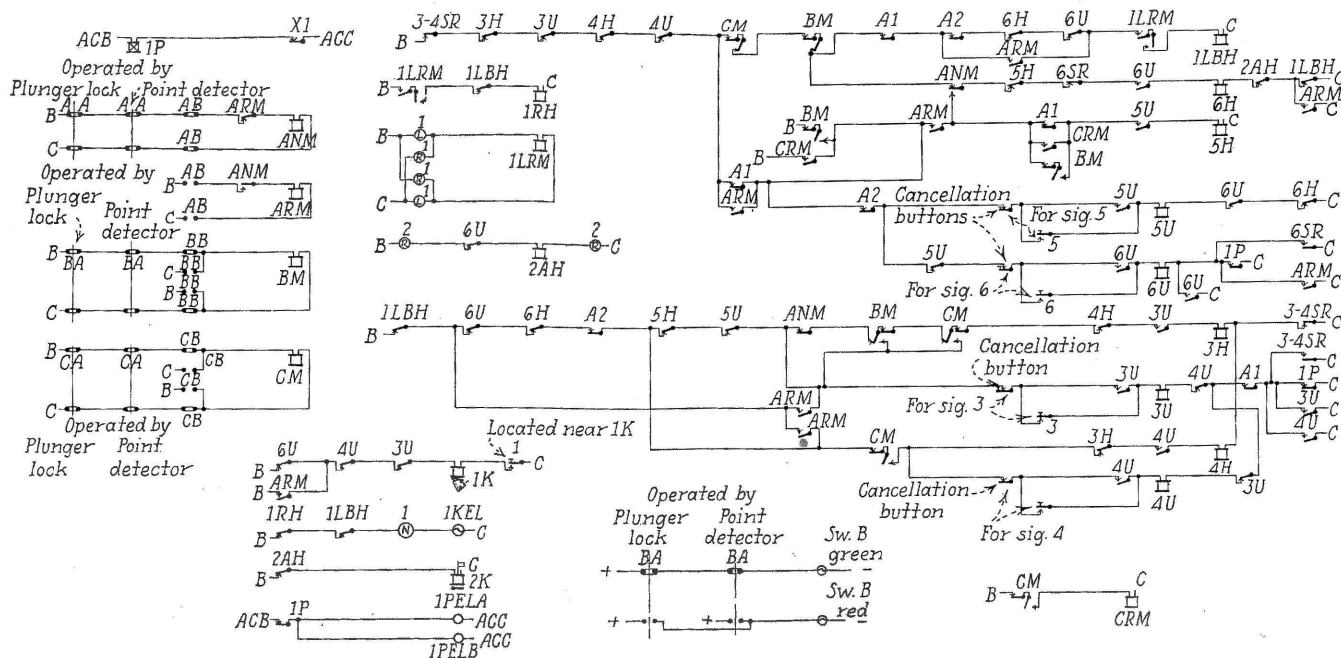


Fig. C.—Principal control circuits at Chestnut Hill

tacts on the spring switch plunger lock and point detector, the contacts in the green control being in series, and the contacts in the control of the red aspect being in parallel. Switch repeaters BM and CM are polar relays (Model 12). A special battery-saving push button is located near Model 6 lock lever No. 1 with a normally open contact in the lock circuit. Selection between 1R and 1L is obtained by the use of a lever-position repeating relay (1LRM). If lever No. 1 is thrown to the left and allowed to remain there, signal 1L acts as an automatic signal, clearing up to give a caution-slow-speed indication after the passage of an inbound train when the train clears A1 track section. Opposing signals are checked in the stop position through their control relays. If the ticket office is closed and lever No. 1 is thrown to the left (which is the practice required when an operator is not on duty) signal 1L may be taken away and circuits for other signals prepared by operation of 3-4SR, or 6SR (effective through ARM de-energized and 6U and 6H energized). Display of a push-button controlled signal is obtained, normally, by the operation of the proper push

button, which picks up a special (U) stick relay, the holding circuit of which may be broken by operation of the proper cancellation push button.

The instructions for the operation of push button station A by trainmen are pasted on the door of the pedestal type terminal box in which the equipment is located and read as follows:

"Buttons for clearing signals must not be pushed until after all switches are set in proper position for movement to be made.

"After movement is made via switch reversed, switch must not be put normal until train is back of holding signal.

"To clear signals No. 3 and No. 4 (when block office is closed or when light on board is not burning) turn knob to right and hold while 'clearing button' for signal is being pushed—then release knob—signal will clear in one minute.

"To clear signal No. 5 push No. 5 clearing button.

"Signal can be restored to stop position by pushing cancellation button."

Likewise, the instructions for station B read:

"Buttons for clearing signals must not be pushed until after all switches

are set in proper position for movement to be made.

"After movement is made via switch reversed, switch must not be put normal until train is back of holding signal.

"Signal can be restored to stop position by pushing cancellation button.

"To clear No. 6 (when switches are set for straight track) push No. 6 'clearing button.'

"To clear signal No. 6 when switches are set for crossover movement (when light on board is burning) push No. 6 'clearing button.'

"To clear signal No. 6 when switches are set for crossover movement (when light on board is not burning) turn knob to right and hold while No. 6 'clearing button' is being pushed, then release knob. Signal will clear in one minute."

This installation was designed and installed by the signal department forces of the Pennsylvania.

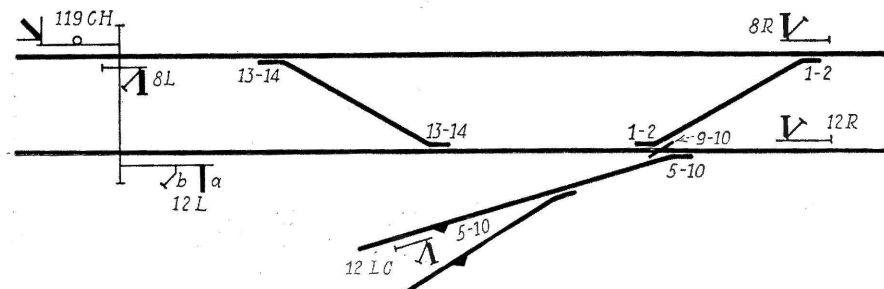
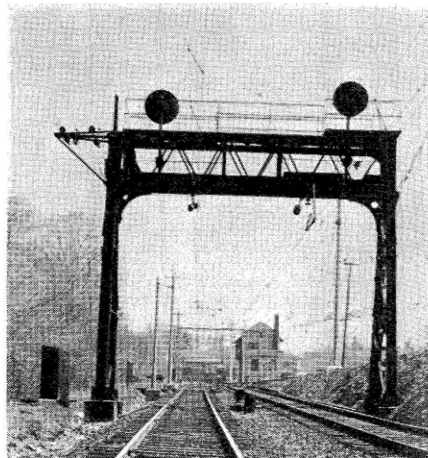


Fig. B.—Former layout with electro-mechanical machine



View looking toward station