CHAPTER VI

UNION SWITCH & SIGNAL

CTC and New Cab Signals

Centralized traffic control systems have become an accepted part of the American railroad scene. So far, however, their use has been limited to areas of relatively heavy traffic.

But with the recent development of a new signal system by Union Switch & Signal, it is now expected that the use of CTC will be greatly expanded, since the arrangement makes it possible to install CTC profitably along lines where lighter traffic is the rule.

CTC, of course, permits handling large sections of a railroad, or perhaps even an entire railroad, from one central point. Here a dispatcher, using a miniature model of the tracks under his control and a series of lights, can watch over the movement of all trains in the area assigned to him.

Until now, however, marginal operations—that is, those where fixed costs tend to offset small profits resulting from light traffic —have not been able to afford the capital outlay needed to install new CTC equipment. The new Union development, it is anticipated, will now permit improved operations on light-traffic lines. This will mean an increase in track capacity, a reduction of operating expenditures, and a speeding up of the movement of freight all along the line from shipper to consignee.

The new system fully complies with the standards of Interstate Commerce Commission regulations as well as with the Association of American Railroads code, and it is said to be comparable in operational costs with the traditional timetable-and-train-order method of controlling traffic through block systems.

Here are the basic features of the new CTC system for light-traffic lines:

1. Each controlled siding has a power switch and the normal complement of three signals at one end only. Where meets and passes are scheduled, trains will generally enter the siding from that end.

2. A spring switch, coupled with a dwarf signal, is set up at the other end, which is intended to be used only for leave-siding moves.

3. There are approach signals established in advance of the two main-line controlled signals; these are located at the power-switch end of the siding, at no less than normal braking distance from the controlled signals.

4. The block thus established extends from one power switch location to the next power switch location.

5. No following moves are entailed, since these signals can be displayed to authorize entry of only one train at a time into the block.

6. However, the railroad's own traffic conditions can be taken into account when the system is set up, so that power switches may be established at alternate ends of adjacent sidings if the traffic pattern demands it.

Among the many advantages provided by this new light-traffic CTC system can be counted the fact that it provides complete track circuit protection for all main-line moves, that sidings are not track-circuited, that all main-line moves continue to be made under signal direction and protection, and that electric switch-locks may be installed as required.

In addition, it is always possible to expand the system, whenever the railroad's executives think it advisable or necessary, to include a "take siding" aspect at that signal which is located in advance of the spring switch. At any time, too, the system can be expanded to become a full-scale CTC installation by setting up power switches at both ends of sidings and adding automatic signals to permit following moves.

Another recent Union Switch & Signal development that is

helping to service freight traffic more safely and faster despite poor visibility weather in classification yards is the new CY inductive cab signal system.

Essentially, this is a setup that makes it possible for a yardmaster to control as many as four switch engines in his yard simultaneously, simply by operating toggle switches. A four-unit light post and a bell in the cab of each locomotive serve to keep the yardmaster's instructions in front of the engineer. The system puts the signal in the cab, where it can always be visible to the engineer despite rain, snow, fog, curved track, or any other adverse conditions.

The four lights on the compact unit within the cab are used to direct the engineer to carry out any one of that number of directions: approach hump, hump, back up, stop.

A change in signals to the cab, called to the engineer's attention by an automatic single stroke on a special bell to which the system is hooked, are carried from wayside to locomotives by inductive coupling between a modulated carrier current and a weather-proof receiving coil mounted on the locomotive. A pole line running parallel to the tracks supports an elevated wire that conducts the modulated carrier for operation of the signals.

In the yardmaster's office, equipment consists of a power supply unit, an audio oscillator unit, and a carrier modulator unit, all mounted on a standard communications rack. Interference is virtually eliminated through the use of a coupling unit that serves to block other frequencies.

No motor-generator set is required, since power for the equipment is supplied directly from the sixty-four-volt locomotive battery. By merely moving a channel-selection switch in the cab to the "off" position, the entire locomotive equipment may be de-energized when not in use.

Employing the same basic principles of induction that make possible the operation of the CY cab signal system, Union Switch & Signal has brought forward Identra—an important step in railroad automation.

Developed primarily for use where trains operate on close

headway, this new Indentra system enables trains to register their identity at the same time as they notify a control operator of their location. Together with other available equipment, the new device can be used to provide such services as automatic route line-up and automatic announcing systems.

With the Identra system, a block is no longer merely occupied —it is, in effect, occupied by a specific train, whose identity can be made known to a control operator or flashed automatically on an illuminated sign.

One feature of the new system is that no source of energy or electrical equipment is required on the train itself. Only an inert tuned coil is carried on the train, and it is mounted in such a manner, either on the locomotive or on any car, that it inductively couples with a wayside coil when passing a given location where the coil is stationed. It is also easily possible to change identity of the tuned coil when desired.

At the wayside point, the stationary coil is also mounted so as to couple inductively with the coil on the passing train. Electronic equipment is housed in an instrument case at the wayside point, and the fixed-position coil is connected to it by means of a short cable. Consisting of a power-supply unit, an amplifier unit, and a frequency-selector network unit for each identification frequency, this equipment serves to energize a relay as the train passes; a signal is consequently sent forward to the control tower, automatic sign, or switch point, where routing can be automatically set.

The electronic equipment, heart of the system, is mounted at the wayside point in a shockproof rack and amply protected, so that the Identra system can operate at all train speeds in any kind of weather.

Another device developed by Union Switch & Signal to make it possible for the railroads to enjoy the benefits of modern electronic progress is the type EL cab signal equipment.

Designed to retain all the features of the company's earlier and heavier type E equipment, this new unit is 47 per cent lighter, 53 per cent smaller, and about 30 per cent lower in initial

cost. The company maintains that despite the savings in weight, size, and cost, the new equipment does not sacrifice any of the larger unit's reliability, safety, or ease of maintenance.

Embodying latest design principles, the type EL is able to achieve these advantages, in part, by using junction-type silicon transistors instead of the more traditional vacuum tubes in its amplifying unit. It is believed that this marks the first use of the transistors of the silicon type in cab signaling equipment.

Grain-oriented silicon steel strip—noted for its features of high permeability and low loss—has been used for the cores of all transformers and reactors in the unit. Modern-design capacitors, approximately one-third smaller than the type previously used, are employed for tuning decoding circuits.

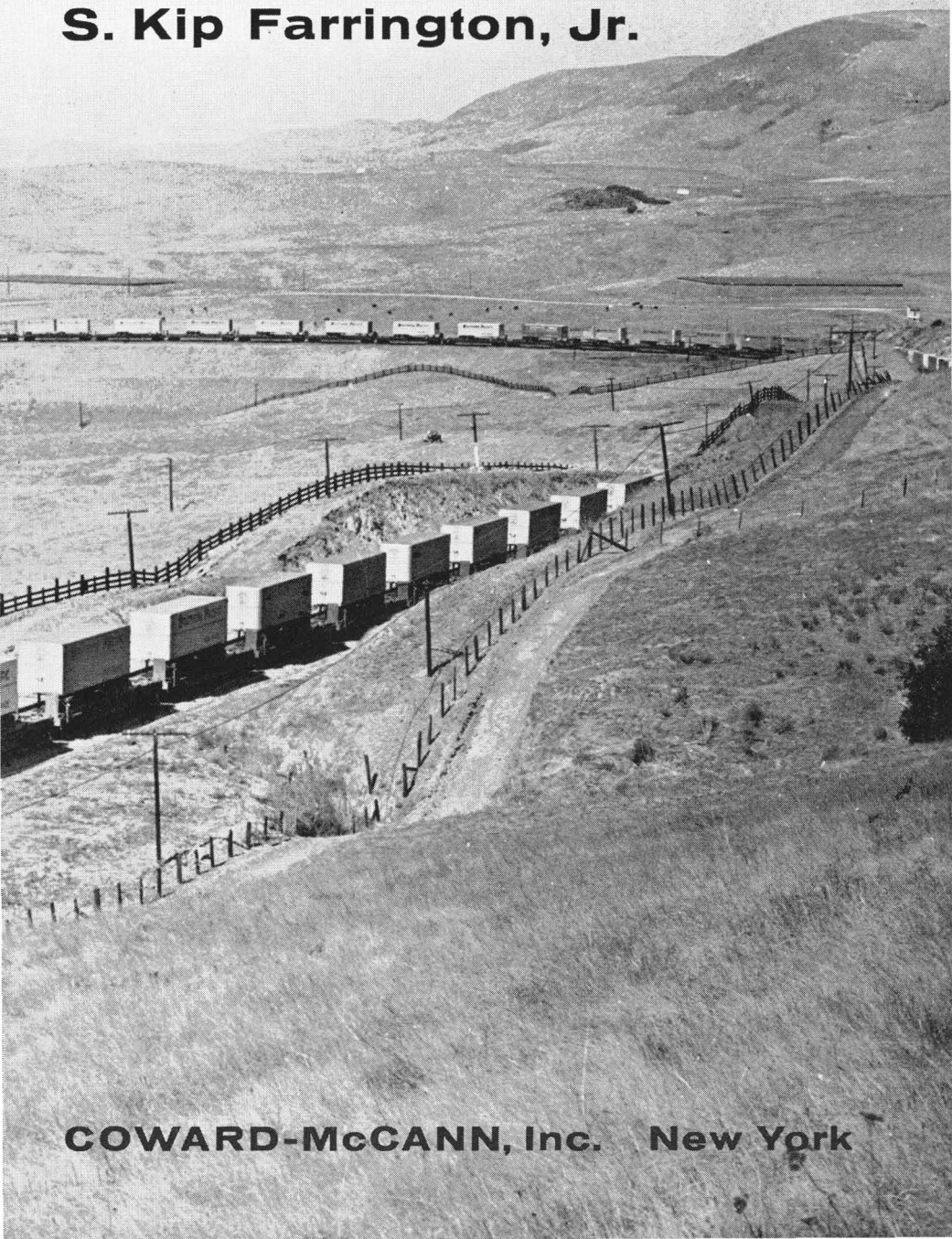
Vibration and shock to the unit have been reduced to a minimum through mounting it on an L-shaped resiliently supported shelf. An adjustable guide bar at the top of this shelf engages two vertical pins, an arrangement that both prevents tilting and facilitates removal of the shelf for maintenance and inspection purposes.

Thus, through the extension of basic automation and electronic principles, embodying the usage of the latest scientific improvements, equipment is constantly being developed to make it possible for all railroads—not merely the largest—to use devices that make for speed, safety, and economy. All this not only is in the interest of the railroads themselves, but helps to bring improved service to the shippers and travelers of America, constantly making available to them faster, safer, and more economical transportation of people and of goods.

RAILROADS

OF THE HOUR

S. Kip Farrington, Jr.



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