MAIN-LINE CROSlikelihood
of devices, including operating stands
and bolt locks, do you use on hand-throw crossovers between main
tracks in automatic block signal territory? Please furnish
sketch if practicable.”

Pipe-Connected Machines
With Electric Lock on One

By A. S. HAIGH
Signal Engineer
New York Central, Albany N. Y.

IT IS the practice of the New
York Central, Line East, to use G.
R. S Model-9 hand-operated switch
machines, equipped with Model-10
electric locks, on cross-overs be
tween main tracks in automatic
block signal territory, when new
installations or replacements to ex-
isting installations are made. In
installations of this kind, each end
of the crossover is equipped with
an individual Model-9 switch ma-
chine. The switch machines are
pipe connected, one to the other.
One of the machines is an inde-
pendent machine, which mechanically
locks, by means of a pipe run, the
machine at the opposite end of the
crossover in its normal position. The
independent machine is equipped
with an electric lock which is
actuated by an electric timing re-
lay. The timing relay is housed
in a relay case adjacent to the
switch.
The lock circuit is so arranged
that, under normal conditions,
neither switch can be moved from
the normal position until the pre-
determined time has lapsed after
the electric time locking circuit is
initiated. At the instant the time
locking circuit is initiated, the first
automatic block signal to the rear
of the crossover on each track is
set to display its most restrictive
indication, with subsequent signals
to the rear of these signals display-
ing restrictive indications to the
limits of proper braking distance.
Automatic block signals involved
will not again give a less restrictive
indication until the switches and
time locking devices have been re-
stored to normal.

On the C. & O.

By T. L. CARLSON
Signal Engineer
Chesapeake & Ohio, Richmond, Va.

THE practice on the Chesapeake
District of the Chesapeake & Ohio
is to install a center-lever interlock,
with the operating lever located
between the rails, at the mid-point
of the crossover, as illustrated in
the accompanying sketch. Our
main-line switches are equipped
with hand-operated switch mechan-
isms with facing point lock protec-
tion. These mechanisms are equip-
piped with circuit controllers oper-
ated by either the lock bar or the
point detector bar. The center-
lever interlock device is pipe con-

To Be Answered
In a Later Issue

(1) In passenger terminals,
where trains pull in on stub-end
tracks, have you found it desirable
to install color-light type signals
to warn enginemen when they are
approaching bumping posts? If so,
what type lamp units and as-
pects do you use?

(2) Can a filter of any type be
used on local battery telephones
or the line circuits for the phones
to suppress interference induced
by high-voltage power circuits
nearby? If so, what type of a filter
should be used?

(3) With reference to the in-
stallation of a guy on a corner
pole in a pole line, what method
do you employ to determine the
proper direction and pull of the
guy?

(4) How do you terminate and
connect to open pole line sub-
marine type telephone and tele-
graph cables at the shore ends of
the cable? Please furnish simple
sketch if practicable.

(5) How do you control oper-
ative grade signal markers with
reference to track occupancy? If
practicable, please furnish simple
circuit diagram.

(6) What are the advantages
and disadvantages of using circuit
breakers in lieu of fuses and man-
uel switches in 110-volt a.c. power
circuits which feed low-voltage
transformers and/or rectifiers in
signaling and communications
systems?

If you can answer any of
the above questions, or, if
you have a question you
would like to have someone
answer, please write to the
editor.
connected to the locking bar of this standard switch mechanism. The lock bar in this case is changed to operate independently of the switch lever.

Before either switch can be reversed, the center lever must be reversed to withdraw the locking bars. The circuit controllers on both switch mechanisms are operated by the lock bars to either shunt the tracks or open the switch-repeat circuits. Normalizing the entering switch of the crossover before the departing switch is reversed will switch the crossover. Normally, each switch mechanism is mechanically locked through the pipe line connected to the center lever. Under these conditions, it would not be possible to move either main-track switch mechanism to the reverse position. Each switch mechanism is equipped with a circuit controller, the contacts of which are actuated by the movement of the pipe line connected to the center lever.

When the crossover is to be reversed, the padlock on the center lever must be unlocked and re-}

Crossover Center Locked

By B. F. DICKINSON
Engineer Telegraph & Signals
Pennsylvania, Pittsburgh, Pa.

OUR method, which is illustrated in the accompanying diagram is as follows: Each end of the crossover is equipped with a switch mechanism known as a locking switch stand. At the center of the crossover a lever and stand is located between the two rails of the crossover. A pipe line extends from this center lever to the switch mechanism at each end of the crossover. The center lever cannot be restored to the normal position to remove the shunt from the track circuits until the switches at each end of the crossover have been restored to the normal position, as these switches are mechanically locked in the normal position only. The locking lever is located in the center of the crossover, so that should a car be left standing on the crossover and the main-track switches placed in the normal position, the center lever could not be placed in the normal position.

Shows Arrangement With Electric Switch Lock

By W. R. BAKER
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SEVERAL railroads have extensive installations of the so-called “center-lock” crossover device, with or without electric switch locks, depending upon requirements. These devices make use of handthrow switch-and-lock movements equipped with a loose locking bar on each crossover switch. In addition, a center stand with a lever traveling 180 deg. is placed between the rails in the center of the crossover. The lever is connected by means of cranks and pipe line to the loose locking bars in each switch movement. Before the switches can be thrown, the center lever must first be thrown to unlock the individual movements. The first movement of the center lever withdraws the lock bars from the lock rods, at the same time operating circuit controller contacts, which shunt both mainline track circuits. After movement of the center lever is completed, the switches may be thrown in the usual manner.

Main-line hand-throw crossover switches are usually No. 10, on 13 or 15-ft. track centers, the distance between the points of the switches being 194 ft. for 13-ft. centers. Should an engine or car be left on the crossover, it would be impractical to bolt lock either switch by throwing the center lever, due to its...
Circuits for main-line crossover with electric lock on center lock lever.

Unbalances Defined and Manufacturing Requirements

WITH reference to the accompanying sketch, capacitance unbalances are defined as follows:

1) Phantom-to-side—1, 2 and 4 represent the four wires of a quad, of which 1 and 2 form one pair and 3 and 4 form the other pair. Unbalance between phantom and side 1-2 = (C1-3 + C1-4 - (C2-3 + C2-4)) + G1-G2. Unbalance between phantom and side 3-4 = (C1-3 + C2-3 - (C1-4 + C2-4)) + G3-G4.

2) Side-to-side and pair to pair—1, 2 and 3 represent the same as in preceding case. Unbalance between side 1-2 and side 3-4 = C1-4 + C2-3 - (C1-3 + C2-4).

3) Phantom-to-phanto—1 represents the two wires of one pair of a quad connected in parallel, 2 represents the two wires of the other pair of the quad in parallel, and 3 and 4 represent similarly the pairs of another quad. Unbalance between phantom 1-2 and phantom 3-4 = C1-4 + C2-3 - (C1-3 + C2-4).

4) Phantom-to-pair—1 represents one pair of a quad; 2 represents the other pair of the quad; 3 and 4 represent the two wires of a pair not in same quad. Unbalance between phantom 1-2 and pair 3-4 = C1-4 + C2-3 - (C1-4 + C2-4).

These unbalances may be measured by means of capacitance bridge involving a considerable number of computations, both in determining the direct capacitance and computing the unbalances according to the definition. A special equipment was developed by the Western Electric Company, known as the 4A capa...

The information contained in this item was received from the Western Electric Company and the American Telephone & Telegraph Company—Editor.