which govern the position of signals. With current flowing through the coils in the normal direction certain contacts are closed which allow the signal to go to the clear position. With current flowing in the reverse direction, these contacts are open and the signal is prevented from going to clear, but is held at the caution position. Thus a polar relay takes the place of two neutral relays.

8. If a pole changer fails to latch and stands on center the signal controlled through that pole changer will fail in the danger position. (This refers to the style "S" signal.) W. H. S.

Remaining Questions

The remaining eight questions of the list sent in are given below and the readers are requested to assist in furnishing proper answers for publication in the February issue.

9. Why is it that voltage of a line circuit is greater at the battery than at the relay end?
10. What is an ohm, an ampere, a mil-ampere?
11. A relay has two volts across its coils and 1 amp. is flowing through the coils. What is the resistance of the relay coils?
12. Give two reasons for using an external resistance with a track battery.
13. To increase the voltage at the track relay would you increase or decrease the external resistance?
14. What is meant by approach locking at an interlocking plant?
15. What is a time release used for at interlocking plants? What is its use?
16. What is a doll arm? (a) What does it indicate? (b) What is a permissive signal? (c) What is an absolute signal? (d) What is the day indicator that distinguished a permissive from an absolute signal?

Winter Care of Batteries

What special care should be given storage batteries subjected to low temperatures?

Lead type storage cells designed to be used on the a-c. floating system should ordinarily operate for from four months to a year without the addition of water to replace evaporation. Accordingly, it is advisable to arrange so that it will not be necessary to add the water in freezing weather.

No fear need be felt that electrolyte will freeze and crack the jars. Although electrolyte does what is termed freezing, it does not freeze solid, but forms a slush which has no mechanical strength and which does not result in jar breakage. Where jars are broken due to freezing, it is because there is water on top of the electrolyte, which has not mixed with it.

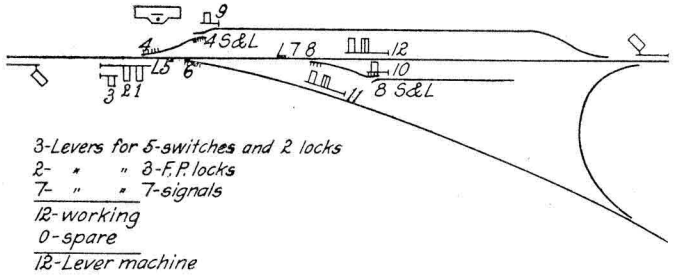
All batteries should be examined as late as posible in the fall before freezing weather is likely to begin and sufficient water added to the cells to bring the level of the electrolyte up to the water line. No further addition of water should then be necessary until after freezing weather is over.

If, however, it is found necessary to add water during freezing weather, special precautions should be taken to see that the water is mixed with electrolyte before it has a chance to freeze; otherwise, cracked jars may result. Draw off some of the electrolyte or water with a syringe hydrometer immediately after the water is put into the cell. Then pour this back by compressing the bulb of the hydrometer, repeating the operating a number of times in order to make sure that the water becomes partially mixed with the electrolyte. Use pure water.

ELECTRIC STORAGE BATTERY COMPANY.

The Why of an Electro-Mechanical Plant

The track plan of an existing 12-lever mechanical interlocking handling the junction switch, one end of a passing track and a storage siding is shown in the illustration. In preparing an estimate for automatic block signaling through this territory on the main line we in-

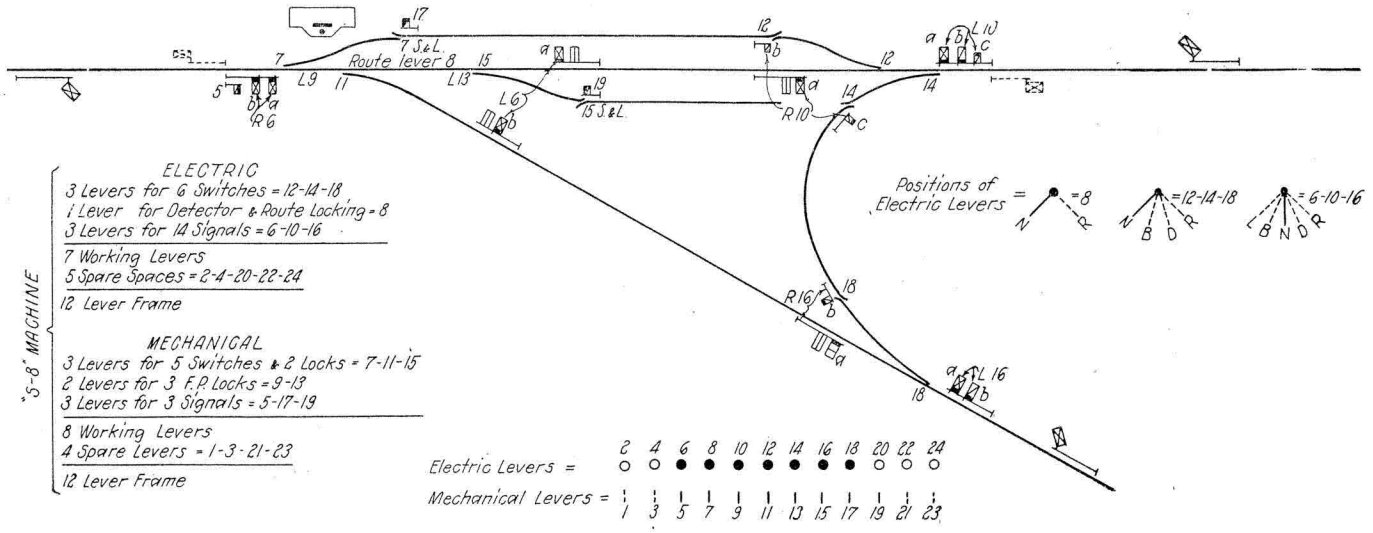


Track Plan of Existing Mechanical Plant

tend to include apparatus for the control and operation of the outlying switches of the wye and the heading out passing track switch. Cannot this be done by adding the necessary electric levers to the present 12-lever mechanical machine, making it an electric-mechanical machine? W. S. D.

Answer

The layout shown on page 497 of the December *Railway Signal Engineer* lends itself very nicely to a power interlocking plant, particularly because of the distance



Track and Signal Plan Showing Proposed Additional Unit Using an Electro-Mechanical Machine

from the junction to the outlying wye and passing track switches. However, if traffic requirements at this point are such as will allow 25 or 30 sec. for the operation of the outlying switches by means of low voltage switch machines, an electro-mechanical scheme can be adapted to the layout.

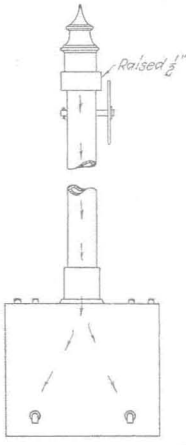
The accompanying sketch of the track and signal plan with the machine scheme is self-explanatory. Anyone familiar with signal association symbols can read this at a glance. The total requirement for the new layout will be 8 working mechanical levers, and 7 working electric levers. This assumes that an S-8 type machine will be used. T. G. W.

Frost Troubles

How do you prevent frost trouble on signal contacts and motor commutators?

First Answer

The accompanying sketch shows a kink that has helped a great deal in free circulation of air through signals of the base-of-mast type. A small stick of wood is placed on top of the mast so as to allow the signal pinnacle



Raising the [illegible] Ventilation

to rest on this stick with an air space of about ½ in. With the vents in the signal mechanism case open this space at the top of the pole permits a free circulation of air, preventing frost trouble on the commutator or contacts.

JUSTIN J. MCCARTHY,
Saybrook, Conn. N. Y. N. H. & H. R. R.

Second Answer

The first precaution against frost trouble with top-of-mast mechanism is not to open the case in cold weather except when trouble develops. Flexible conduit leading from the signal pole to the mechanism must be plugged up to prevent a current of air coming up the signal pole into the mechanism.

With base-of-mast mechanisms using a glass cover over the commutator, a piece of ordinary blotter about 6 in. long and 2 in. wide, placed inside the glass cover will absorb moisture and prevent frost to a great extent. A can of lime in the mechanism case will absorb moisture. However, one objection to using this lime is that it often air slacks before much moisture is absorbed and forms dust.

A light coating of Pale Semaphore oil or Hydral oil applied to commutators and signal contacts about once a month will assist in preventing frost trouble. When applying this oil a chamois skin or closely woven cloth must be used, otherwise the lint would become clogged on the commutator or contacts. A MAINTAINER.

Sudden Ravings

(As George Ade would (maybe) rave it)

Once upon a Time a Certain Pike had two Birds on the Pay Roll whom the Old Man called Dave and Andy.

Andy had a Degree from a Well Known Temple of Learning which Enabled him to Sport a Frat Pin and Dab Artistic Symbols on the Tracing Cloth. His Pure and Unadulterated Gall acted Like a Gyroscopic Stabilizer in Keeping him on an Even Keel and with Any Kind of a Start he could Glide for at Least Three Hours.

The Gang around Headquarters had never heard of Phycho-analysis but they Pegged the same Answer by calling him "the Pee-Wee" and Tabulating him as a Four Flusher.

Dave had an Unframed Diploma from Utica or Scranton and Kept Still about It in Six Different Languages. His Experience, on a Drafting Table, consisted of *one* Dog Chart, the Unsmeared Portion of which was Eventually Interpreted by a Chinese Laundryman.

The Same Gang did not Pan him—*much*. They Gave Up Guessing at what Dave had in the Bean and Compromised by Calling him the "Penguin" on account of an Interesting Waddle in his Walk.

When Andy Could Set In with a Small Crowd of Izzers, he would Coin new Adjectives and Adverbs in telling What he was Going to Do in the Future.

The Wise Ones Smiled and inwardly Reckoned that Andy had *his* Future Behind Him.

Promotions Detoured around Andy like he was a Bottomless Chuck Hole. The only Thing which actually Ran Over him was an occasional Truck Load of Trouble. When that Fickle Dame, Known as Opportunity, called, he Asphyxiated her with a muzzle-full of Blah.

Andy Kidded Himself into Believing he was a Square Peg in a Round Hole.

Dave Hung Back but Kept Up his Batting Average. When the Boss Put one Over the Plate and Dave Leaned on It, the Results were Usually Tabulated in the Operating Statistics.

Dave never kidded any one. To him, Kidding meant nothing more than the Lack of Birth Control in the Sheep Family.

A few months after Washington had Pulled the Cork and Let the *Genii* of Automatic Stops and Train Control Emit Itself to further Fog Up the Railroad Atmosphere, the Gang tried to Stage a Cat Fight by Throwing Dave and Andy into the Same Barrel.

Andy was Teased Into action First. He Simply Ate Up the Stop and Control Question and Exuded an Artistically Sketched Comedy of How Easy it would be to Comply with the Order. He *Admitted* he Knew More about the Subject than all the Signal Fraternity.

By the Time he Slowed Up and expected an *Encore*, it had Soaked In that what he said Didn't mean Much.

They then tried to Prod Dave Into the Blah-fest—

Dave did have an original Analysis of the Requisites; Some Idea as to the Ranking Importance of Train Control to Automatic Signals; Impressions as to Such Doodads in Non-Signalled Territory; Beliefs as to how the Apparatus and the Hog Head should Coördinate; Opinions as to Wiping Out Rule 99; a Half Baked Decision on the Standardization of Ramps, Warts and Laminations along the Right o' Way and a Lot of Kinks, Graphs, Curves and Curley-gues on Air Brakes, Braking Distances, Increase of Track Capacity and the X Factor in the Formula of Safety.

Yet, Dave Got Up and *Admitted* he Did Not Know Enough about the Subject to Intelligently Discuss It.

Moral: On account of being Empty a Bass Drum makes a Lot of Noise. W. H. F.