

nal. Three distinct indications in addition to the Stop indication are necessary to give this informaton. This, then, is four-position signaling, which I consider justifiable as a general rule.



## Lock Releasing

*"What are the relative merits of the practice of using one clockwork time-release or one time-release lever for the release of the locking of an entire group of signal levers, as compared with the practice of using a separate release for each lever in the group?"*

### Levers are Grouped in Terminal Interlocking

L. E. Carpenter

Signal Supervisor, Pennsylvania, Philadelphia, Pa.

In first cost there is little difference, the one-time-release plan being slightly cheaper. The first installation in which we became interested used one time-release lever. We were somewhat opposed to it, as it was on a large terminal plant, and we felt that, if the release should be started for one route and it should be necessary to release a second route, the release must either be restored and started again, thus lengthening the time the first route was held; or, the second route must be held until the first route was released before the release could be started for the second. However, the delays that we feared might result have not been experienced.

However, in later installations, which are practically all in terminal territory, we have grouped the levers, using two or more releases for the entire plant, so as to reduce the number of delays that might result for the reason given. To date, this practice has been very satisfactory.

The advantages of the plan of using one release are: Less apparatus on or near the machine, resulting in neater appearance, as well as reducing the chances of error on the part of the leverman in manipulating the wrong release. Where a release for each lever was installed, one with a latch was used, and the signal controls were passed over the release contacts closed when the release was wound up. Delays and reported failures were not uncommon, due to the release having been manipulated to change a route and then being overlooked and not wound up again. A release without a latch is used where only one is applied; thus, the possibility of the delays mentioned is eliminated.

### Group Release Is Less Expensive

E. F. D. Rapelye

Chief Signal Draftsman, Illinois Central, Chicago

Regarding the relative merits of the use of one clockwork time-release or one time-release lever for the release of the locking of an entire group of signal levers, as compared with the use of a separate release for each lever in the group, I would say that the use of the group release is less expensive in first cost and in maintenance. Furthermore, the use of the group release results in an appreciable saving of time in the operation of the machine, and should, therefore, speed up the movement of trains, although at times it may unnecessarily delay the movement of some trains.

However, in some instances, individual releases, especially if they are automatic in operation, perform a very

important function. I have in mind an electric interlocking which was recently installed at a very busy suburban train terminal. A description of this individual automatic releasing circuit, together with a description of a plug box and group clockwork time release circuit, is given under the caption "Time Release Selector," on pages 10 and 11 of *Railway Signaling* for January, 1932.

While the plug box and group clockwork release circuit, as described in the article mentioned above, is used for the release of switches, the same principle can be applied to the release of signals.



## Shortening Masts

*"When replacing semaphore signals with color-light signals, what is the best method of shortening the masts; how is the mast cut off?"*

### Acetylene Torch Is Useful

Leroy Wyant

Signal Engineer, Chicago, Rock Island & Pacific, Chicago, Ill.

When replacing semaphore signals with color-light signals there are usually other problems besides shortening the masts. Where the bottom-post mechanisms have been used they must be removed from the case and the case must be revamped. Usually the ladders should be altered. The battery arrangement for the operation of the color-light signals is frequently changed. Considering these various angles to the matter, my recommendations are as follows:

For miscellaneous signals here and there send out from the store a case, pole and ladder of proper size, length, etc.; replace the semaphore signal and return it to the store or shop where it can be reconditioned and used for the next change. The old case provides a convenient shipping "crate" for the mechanism. At the shop the usable parts can be properly salvaged. The old paint can be removed from the pole and case; rusty and damaged spots or special openings which have been made in the case can be patched; the ladder can be worked over to the type required for color-light signals.

To change out an entire installation of semaphore signals, I would procure a few cases, poles and ladders properly fitted for color-light signals and use these to replace a rotating quantity of the old signals. I would then have these old signals taken to the outfit where the cases could be cleaned, patched and refitted for color-light signals; ladders and poles cut and refitted; then taken out to replace a second batch of old signals, etc.

An acetylene torch is the best for cutting off the poles at the shop or in the field. All signal, maintenance and construction outfits should be equipped with them.

### An Efficient Procedure

C. H. Cameron

Canadian Pacific, Toronto, Ont.

It is an easy and simple job to convert any semaphore signal to a light type if the proper procedure is followed. The following method has been used with success: First, the light unit is fastened to the existing mast at the proper height above the rail head and then focused and aligned. Single-unit searchlight signals are usually fastened at about 14 ft., measured to the center of the lens.

Next, drill the hole in the mast for the control wires

of the new unit, and then install them in place. The signal circuits that require revision can be altered in the meantime, and when all is ready the changeover is made. Of course, the spectacle casting and lantern of the old semaphore is removed at the time and that leaves only the mechanism which may then be unbolted and lowered. This applies to top-of-the-mast-mechanism signals only.

If the old semaphore is of a type that has operating rods within the mast, it will be necessary to fasten the control wires of the new unit to the outside of the mast, temporarily. After the changeover is made and the operating rods have been pulled up out of the mast, the new wires may be installed within.

Sometimes it is desirable to use the mechanism compartment of certain types of semaphore signals for the housing of new relays, etc. If so, the circuit wiring of the new light unit may be of a temporary nature, and, if necessary, the extra relays can be temporarily placed in a wooden case made for the purpose and fastened to the side of the mechanism case. Such a temporary housing can be arranged with standard circuits and can be moved from signal to signal as required, thus eliminating the necessity of temporarily wiring each particular location. Such a scheme will reduce wiring costs, as well as speed up the work.

Assuming that the new light unit is in service and that the old mechanism semaphore has been removed, all that remains to do is to lower the ladder to proper position and then cut off the excess mast. It is usually easier to remove the bottom section of the ladder, then loosen the clamp irons and let the remainder slide down into place. Block and tackle fastened to the top of the mast and attached to the ladder, will hold the ladder and platform, if any, and allow it to be slid down into proper place. This method speeds up the work of refitting the old ladder, as it is not necessary to remove it.

If only a few signals are being converted, it is doubtless cheaper to cut off the excess mast with a hack saw, but should a sufficient number of signals be converted, the use of an oxy-acetylene cutting outfit is recommended. It is advisable to fasten a long hand line to the section being cut off, especially if the piece is long and heavy. By use of the hand line, the direction of fall can be chosen, and at the same time the falling section can be jerked clear of the signal, as it might strike something in its fall and cause damage.

It is well to remember that sometimes it is better to fasten the new unit to the full height allowed by the old mast because of curves, stand pipes, etc., that might obscure the view of the light unit, should it be placed at standard height. This method of conversion will also apply to signals of more than one unit, such as those at an interlocker.



## Coding-Relay Maintenance

*"How often should the coding relays in a C. T. C. system be checked and calibrated?"*

**Should Be Inspected by Maintainer Every Three Months**

T. C. Seifert

Assistant Signal Engineer, Chicago, Burlington & Quincy, Chicago

Coding relays in a C. T. C. system should be inspected and checked by a competent signal maintainer every three months, at which time cycle-recorder readings of

each unit should be taken. These readings should then be recorded on a sheet provided for each unit. By so doing, an accurate comparison can be made to determine whether the units vary from the original timing. In taking these tape readings, it is essential that the lever line-up and the normal (pre-determined) voltage for the system be the same as those which prevailed on the previous quarterly inspection. This will cause the long and short impulses to be in the same order each time. By comparison, it can be determined whether these units are maintaining their original timing. Then, if it is found that any one of these units varies a great deal from the original timing and has not reached a possible failing point, it is inspected more often. If this unit should increase or decrease its time so that it comes within the failing limits, it is taken out of service and replaced with a spare unit so that the defective unit can be readjusted.

These quarterly inspections do not cover any complete readjustment or cleaning of the C. T. C. installation. Therefore, at a predetermined time each year, there is a general cleaning and readjustment of all units. At this time each unit is gone over, contacts are inspected and adjusted to the proper spring tension and opening, relay armatures are inspected, and adjusted to proper air gap, all connections are inspected, and each unit is thoroughly cleaned.

In connection with the quarterly and yearly inspections, detailed instructions and information are furnished for the proper adjustment, calibration and cleaning of all code-relay equipment.



## Motor-Car Repairs

*"To what extent are maintainers expected to repair their own motor cars? How are the more extensive repairs made? What is the practice on your road for providing transportation for maintainers while their regular motor cars for any reason are not available?"*

### Velocipede Sometimes Used as Emergency Transportation

W. C. Johnson

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Every signal maintainer should possess sufficient mechanical ability to enable him to make practically all repairs to his motor car, with the exception possibly of a complete general overhauling of the car. On this railroad, signal maintainers are required to make all running repairs to motor cars used by them, even to placing new tires on wheels. Every maintainer's storeroom is equipped with apparatus for hoisting the car, which greatly facilitates repair work.

When a car is in need of extensive repairs or a complete overhauling, it is forwarded to the shops, and, upon arrival there and before any work is done to it, a thorough inspection is made by a competent motor-car man, after which an estimate is made to determine the actual cost of such repairs. If it is found that the repair cost is excessive as compared with the cost of a new car, recommendation is made that the old car be scrapped and a new one purchased. Such procedure seldom occurs before a car has been in regular service for 10 years or longer.