

**TRAIN STAFF INSTALLATION ON THE N. Y., N. H. & H.**

By W. F. FOLLETT

The electrification of a section of single track steam road along the Connecticut river between Cromwell and Middletown, Conn., created a demand for an absolute and inexpensive signal system for the protection of the steam trains and electric street

tric train staffs are operated, therefore making it necessary to put the controlling lever in the normal position before the electric train staff can be operated to remove another staff. This movement, of course, through the interlocking forces the operator

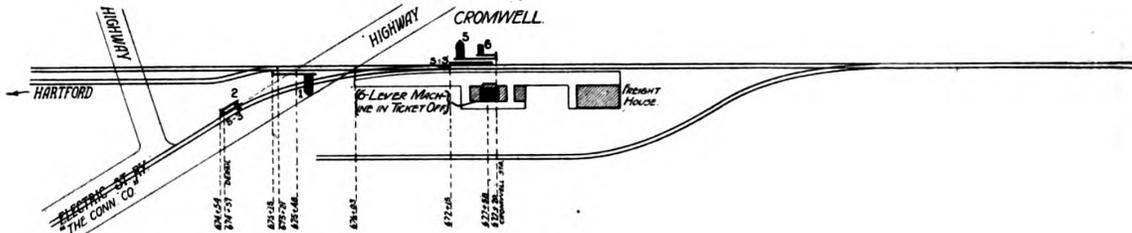


Fig. 1

cars, which were to use this section of track jointly. The Electric Train Staff, using absolute staff only, seemed to solve the problem in every particular.

Fig. 1 is a track plan of the section protected by the train staff system. A four lever interlocking machine and electric train staff were placed in the ticket office of the station at Cromwell, and an electric train staff was installed in the cabin at the Junction at Middletown. In connection with these two electric train staffs, were installed two staff locks. The object of these locks was to act as an auxiliary to the train staff by locking up signals permitting trains to enter the section protected. At each interlocking station a lever was equipped with a train staff lock and interlocked with the rest of the system so that a signal permitting trains to enter the section of track between the two stations could not

to put the signal permitting trains to enter the protected section in the stop position.

Upon a train entering the signal section, by this arrangement, the enginemen or motormen are required to have a staff, and also a proper signal displaying the proceed indication. As only one absolute staff can be had at a time, and as it is neces-

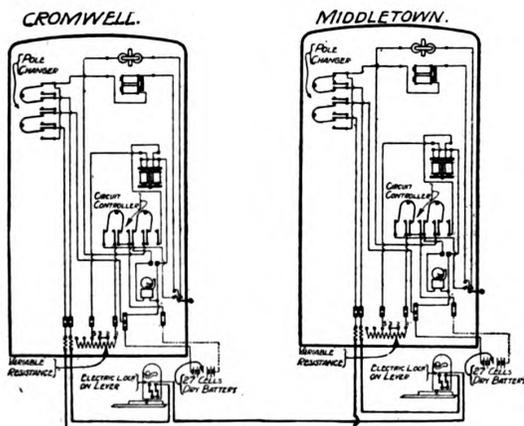


Fig. 2

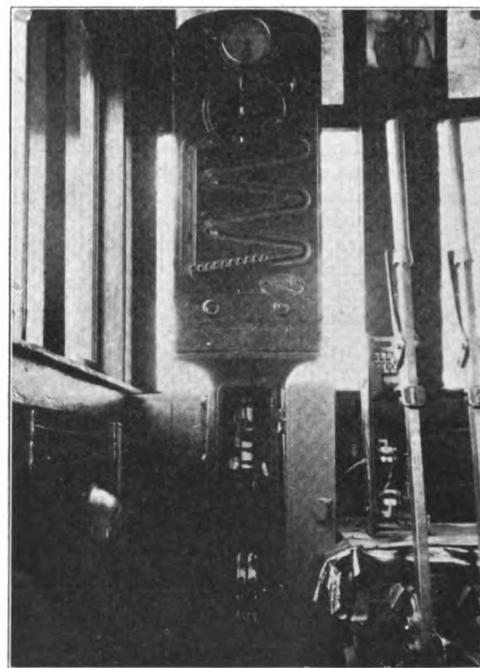


Fig. 4

be reversed until the lever controlled by the train staff lock was reversed, and in order to reverse the controlling lever it is necessary to take a staff out of the electric train staff instrument and with it unlock the staff lock releasing the controlling lever. This operation opens the circuit by which the elec-

sary to have the signals at both ends of the signaled section in the stop position to remove a staff, it is possible to get the required protection without the usual electric slot on the block signal, and its controlling track circuit.

By a glance at Fig. 1, it may be seen that a train

may approach the "block" from three different tracks at Middletown. The lever controlled by the staff lock is interlocked with the signals for each of these tracks in such manner that it is necessary to reverse the controlling lever to reverse any of the signals with the route set to Cromwell, but for any diverging route the controlling lever is left normal. This gives the necessary flexibility to the interlocking plant.

Fig. 2 is a diagrammatic view of the circuits, showing an electric train staff at each point and the staff lock operated by the train staff.

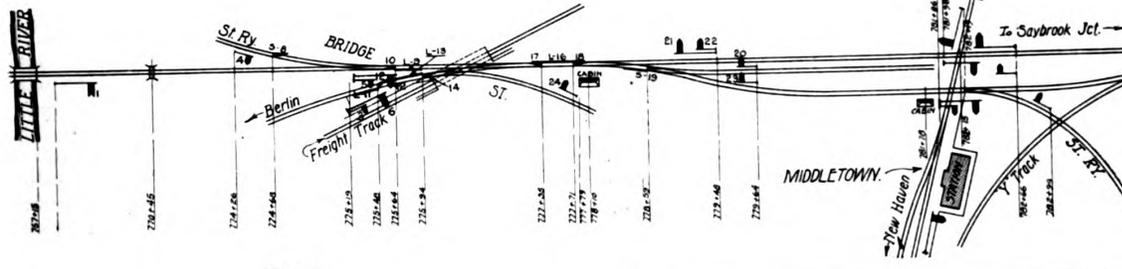


Fig. 1

Referring to the illustration Fig. 3, the application of a staff lock to a Saxby & Farmer machine is clearly shown (the locking bed being covered, however, with a cloth to protect same from dirt and dust). The cover being removed from the staff lock shows the plunger working upon an eccentric, the eccentric being caused to revolve by means of a staff. At the left hand side of the lock the contacts will be seen which control the circuit operating the electric train staff.

The electric train staff instrument with the cover removed can be seen in front of the window.

Fig. 4 is an illustration of the face of an electric train staff instrument, the lower door being open to show the lightning arrester and connections in same.

The extreme simplicity of this system, together

with its reliability and low cost of maintenance and operation, commends it very highly to situations of this kind.

The instruments for this system were manufactured by the Union Switch & Signal Co., Swissvale, Pa., and the installation was made by the Signal Department under the direction of Mr. C. H. Morrison, Signal Engineer.

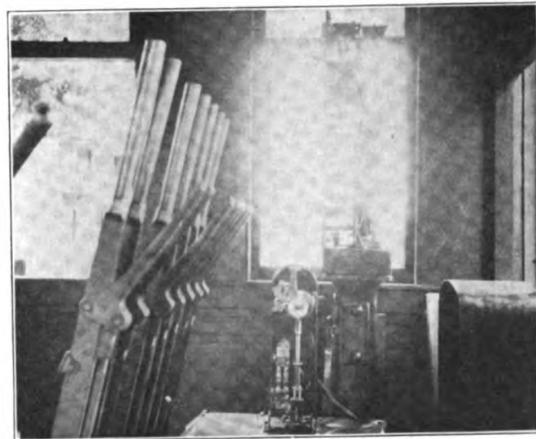


Fig. 3

**TRAIN STAFF SYSTEM OPERATION.**

A train staff system, superseding the present method of moving trains between Bridge Street, Middletown, and Cromwell, and operated under the instructions herein, will be put in service on May 27, 1909. Conductors, engineers and motormen must familiarize themselves with these instructions and be prepared for examination.

**DESCRIPTION OF THE SYSTEM.**

The working of the train staff system is effected by the erection, in the block signal office at Bridge Street, Middletown, and Cromwell, of a train staff pillar which is in charge of the telegraph operator on duty. The two pillars are electrically connected and it is impossible to operate one without the knowledge and cooperation of the operator in charge of the other.

A TRAIN STAFF IN THE ACTUAL POSSESSION OF THE ENGINEMAN OR MOTORMAN IS THE NECESSARY AUTHORITY FOR THE MOVEMENT OF A TRAIN, ENGINE OR ELECTRIC CAR IN EITHER DIRECTION.

But one staff can be taken from a pillar at one time. When a staff has been withdrawn from one pillar another cannot be withdrawn from either until the staff previously removed has been placed in the same pillar or the one at the other end of the block. Absolute block in both directions is therefore effected.

**INSTRUCTIONS TO CONDUCTORS, ENGINEMEN AND MOTORMEN.**

1. No train, engine or electric car will be run in either direction between Bridge Street, Middletown, and Cromwell, unless the engine man or motorman has in his possession a train staff, which must be retained so long as his train or any portion of it is in the block. The possession of a staff is authority for the engine man or motorman to proceed regardless of opposing trains. PROVIDED the block signal is in proper position and the conductor's signal has been given.

2. The engine man or motorman is the only person authorized to receive a staff from the operator in charge. On arrival at the opposite end of the block, the engine man or motorman, if he has all his train within the station limits, must deliver staff to the operator.

3. In case a train parts or it is necessary to double, the staff must be retained by the engine man or motorman until all the train is clear of the block.

4. Under no circumstances will a staff be transferred from one train to another. It must invariably be delivered to the operator strictly in accordance with these instructions.

5. When two or more engines or electric cars are coupled together, the engine man or motorman of the last engine or electric car, or the engine attached to the train, must carry the staff, but the engine man or motorman of the other engine, engines or electric cars must know that he has the staff before proceeding.

6. In case of failure of the staff apparatus, trains will be moved by special telegraph orders, as per General Rules.

7. The arms of block signals, as seen by an approaching train or electric car, point to the right hand and govern as follows: Arm horizontal and red light at night signifies — Danger, stop. Arm lowered to an angle of sixty degrees and green light at night signifies — Clear, proceed.

8. All rules relating to the protection of trains are in force, and the General Rules are only modified by the special instructions herein.

**INSTRUCTIONS TO TELEGRAPH OPERATORS.**

9. The telegraph operators at Bridge Street, Middletown, and Cromwell, will have charge of the train staff pillars. The operator on duty at Bridge Street will act as director and have control of the traffic. He must keep himself informed in regard to the position of trains, and be prepared to give important trains the preference.

10. When a train is to enter the block, the operator at the station from which it is to start will signal to the operator at other end of the block by three (3) taps of the bell that he wishes to withdraw a staff. The operator so signaled will, providing

the block is clear, unlock by pressing his bell key and holding it closed until needle shows by moving from "Staff in" to "Staff out," indicating that a staff has been withdrawn. The bell-signal code as provided in rule 923, Rules for the Controlled Manual Block Signal System and Interlocking, will, so far as applicable, be used.

11. On receipt of the bell taps the operator who is to withdraw the staff will turn preliminary spindle handle unlocking machine, and then withdraw the staff. When this is done operator will notify operator at opposite end by pressing his button twice.

12. When a staff has been withdrawn from the pillar the proper block signal will be displayed and on the departure of the train after placing the block signal at "Danger" a record of the time of departure will be made on the block sheet and reported to operator at the other end, who will enter on his block sheet.

13. On arrival of the train at the opposite end of the block the engine man or motorman will deliver the staff to the operator in charge, who will, after seeing the markers, record the arriving time of the train and report to the operator at the other end, who will enter on his block sheet.

The operator receiving a staff will then place it in the pillar and give bell signal 1-2, to notify the other operator block is clear. This must be acknowledged by operator at entrance end by two (2) bells.

14. The operator must not deliver a staff to any person except the engine man or motorman of the train or electric car to enter the block.

15. Operators must not deliver a staff received from a train or electric car to another train or electric car, until it has been placed in the pillar and withdrawn in strict accordance with the rules.

16. Operators must not place a staff in the pillar or report a train to the operator at the other end as arrived or departed until he has positively seen the markers and knows that all the train has cleared the block in the direction in which it is moving.

17. Should the staff apparatus fail, trains will be moved by the train dispatcher as per General Rules relating to the movement of trains by telegraph.