

Description of the Simmen System.

The elements which enter into the system may be divided as follows:—

- (1) A record sheet of train movements in graphic form.
- (2) An automatic means for the recording of train movements upon the sheet.
- (3) A means by which the dispatcher can display "danger" and "clear" signals on moving trains (or any other type of signals).
- (4) A direct telephone connection between the engineer, on his engine, and the dispatcher.
- (5) A new, simple, inexpensive and effective cab signal.
- (6) An inexpensive automatic stop, based on a new principle, by which the stops and proper speeds are enforced over every foot of the road.

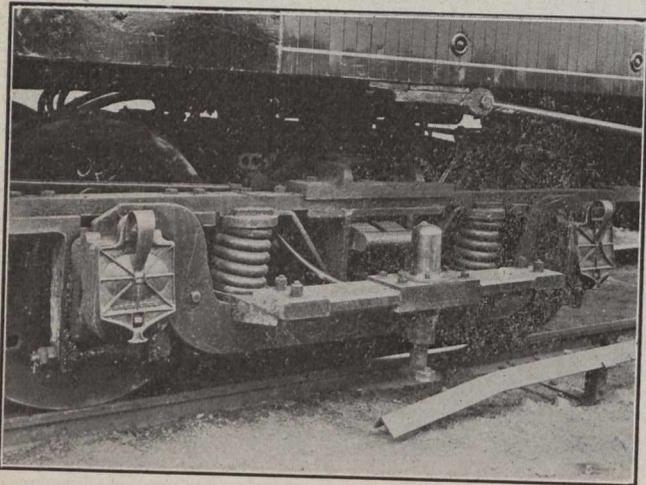


Fig. 4.—Shoe About to Make Contact on Third Rail.

Dispatcher's Record Sheet.—The record sheet is divided into time lines in one direction (10 a.m., 10.20 a.m., etc.) and block lines in the other, (e.g., Sunnyside, Humber, Mimico, Long Branch, etc.). (Figs. 1 and 2). On a single track road, blocks usually run from passing siding to passing siding and are spaced on the sheet proportionately to their length.

Each day a new record sheet is placed upon the dispatcher's recording table. The recording table is provided with clock-work for continuously moving the sheet, and with electrically operated perforating needles. Two such perforating needles are provided for each block, one recording eastbound movements and the other westbound. The record sheet, when placed, is regularly and continuously moved by clockwork, so that the correct time line, as marked upon the sheet, is always directly under the perforating needles.

It should be pointed out here that it is quite feasible to have proper schedule lines printed upon the actual dispatcher's charts if this should be considered to be of any practical advantage to the dispatcher. The size of the record depends upon the amount of traffic and upon the length of the road.

A time scale of three inches to the hour will give good results for traffic where trains are running on a thirty-minute schedule, but for heavier traffic a scale of six inches to the hour will usually be found better. For an average single track division of 100 miles, the record chart need not be over 14 inches in breadth.

Space is provided on the margin of the sheet for such notes as the dispatcher may desire to make. In addition to the record the system provides for automatically recording a number of other facts, such as the kind of signal displayed to a train, etc.

An Automatic Means for the Recording of Train Movements Upon the Dispatcher's Sheet.—At every siding along the road there will usually be four "third" rails placed at suitable locations. These third rails are insulated from the track and their length depends upon the speeds attained upon the particular road. For fast traffic they are from 70 to 80 feet long. Two of these rails are for the direction of westbound movements and two for eastbound. One "eastbound" rail is placed near the beginning of a block, and is known as the "home rail." The other is placed at a point one to two thousand feet back from the beginning of a new block and is known as the "distant rail." Similarly with the "westbound" rails.

A locomotive or motor car is provided with a shoe which makes an electrical contact with the third rails when sliding over them. (Figs. 3 and 4). When a shoe is in contact with a third rail, the (normally) open circuit between the third rail and track, is closed, the closed circuit then running from third rail through the contact shoe, and apparatus on cab, to a ground return on the truck and track rails.

The third rails (home rails) at siding are connected by wire to dispatcher's office and there are connected to one side of the dispatcher's switch.

From the other side of the dispatcher's switch a wire connects through the winding of the main relay to the pole of the storage battery, the other pole of the storage battery being connected to ground at track rails. The instant a contact shoe on a train makes contact with a third rail a circuit is established as follows. From storage battery in the dispatcher's office, through wire, main relay, dispatcher's switch, wire, third rail, contact shoe, signal relay on cab, ground on truck, and track rail, back to dispatcher's battery. The closing of this main circuit energizes the main



Fig. 5.—Motorman in Cab. (Shows Position of Red and Green Lights.)

relay which in turn closes a local circuit through the perforating magnet as follows:—

From storage battery through wire, perforating magnet, armature of main relay, to negative side of storage battery. The perforating magnet, being energized, acts on its armature, which forces the perforating needle upwards, thus perforating the dispatcher's record sheet and recording upon it the time and place of a train passing siding. The perforating circuits provide only for a single punch upon the recording sheet when a train is passing a third rail. To