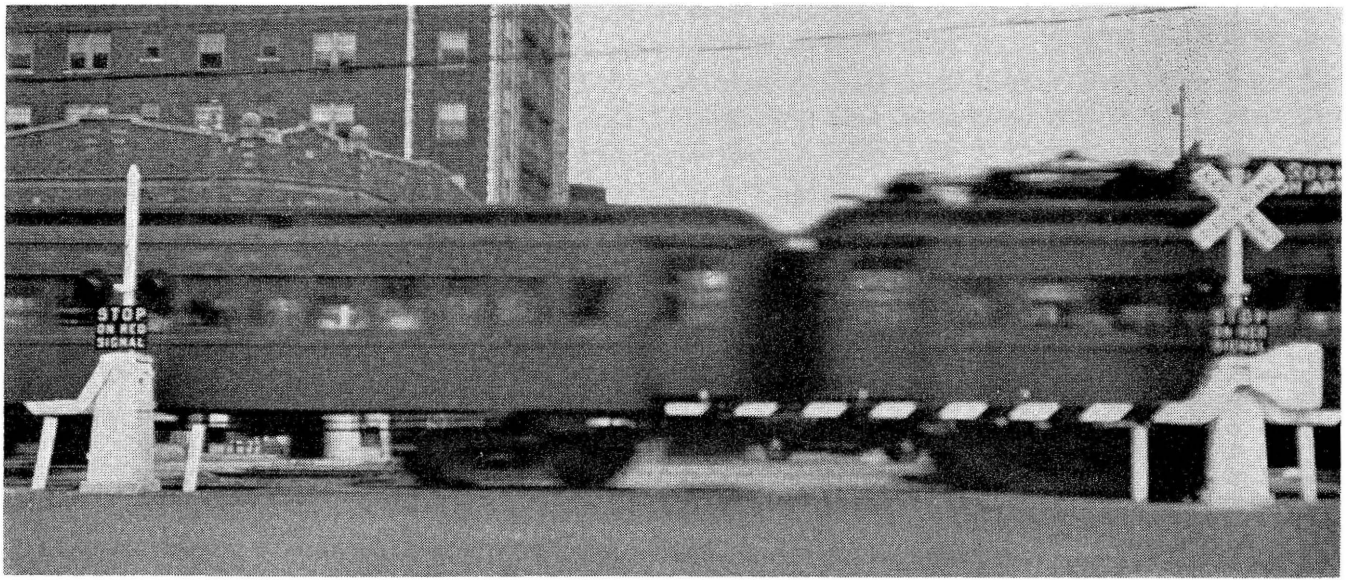
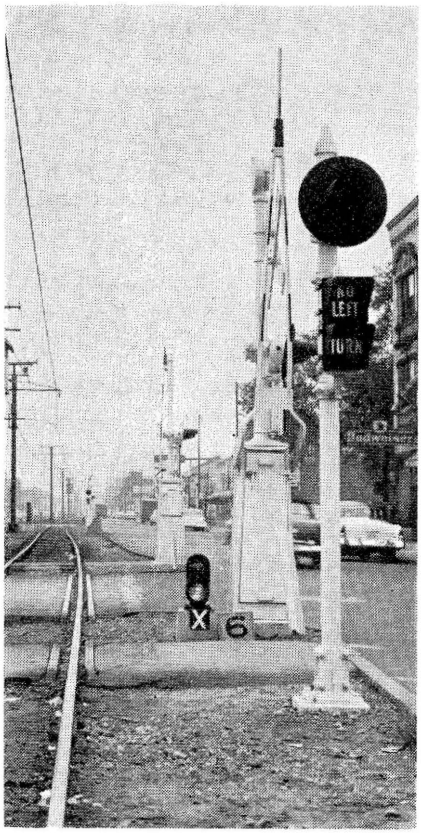


Flashing-light signal and "Stop-On-Red Signal" sign are mounted on mast of sidewalk gate and street gate

Length of Train Selects Control

of Crossing Gates on Illinois Central

Protection is improved at 11 crossings on heavy traffic suburban line where manually-operated mechanical gates are being replaced by automatically controlled electric gates with flashing-light signals



Crossing protection indicator is a two-aspect dwarf signal

THE DOUBLE-TRACK South Chicago Branch of the Illinois Central extends at grade through the South Shore residential area. Between Stony Island ave. and Merrill ave. there are 11 streets, spaced about 300 to 400 ft. apart, which cross the tracks at grade. For many years, all of these crossings have been protected by manually-operated gates. In most instances, the gates at two crossings, such as Bennett ave. and Euclid ave., were controlled by a gateman in a tower midway between the two streets. The gates at East End, Ridgeland and Cregier were, and, up to the present time, still are controlled from a tower at Ridgeland.

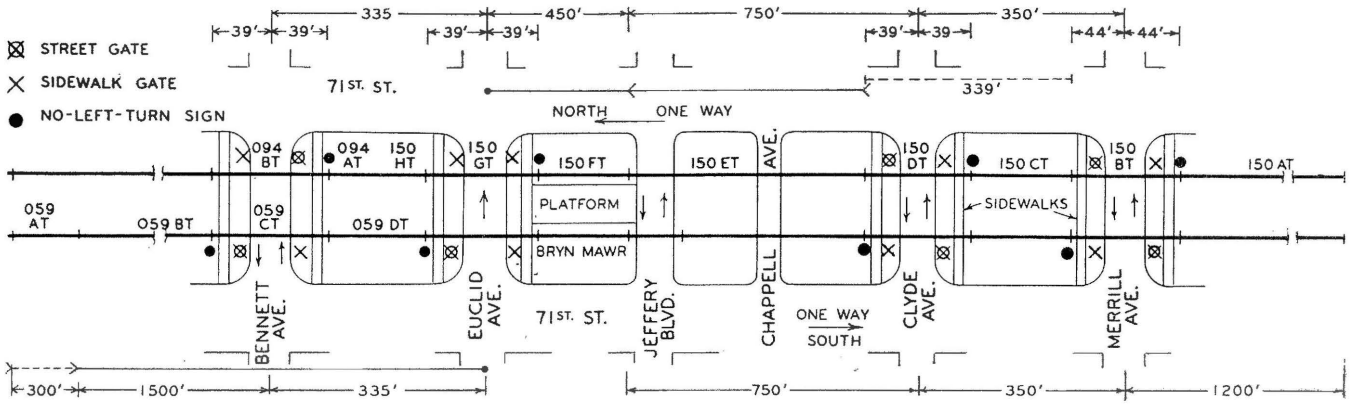
Trains on Short Headway

The principal traffic on this line consists of suburban trains, which are made up of electrically-propelled, multiple-unit cars. During morning and evening peak periods, six-car or eight-car trains are operated on headways ranging from 6 to 8 minutes. During the day, four-car trains are operated on 20-minute headways. From 1 a.m. to 6 a.m., two-car owl trains are operated every hour. At irregular intervals, a diesel-propelled local freight train is operated over this line.

In order to provide improved protection, in service round-the-clock every day, with no chances for human error or oversight, the Illinois Central, in cooperation with city and state authorities, has developed a program to replace the old manually-operated gates with new automatically-controlled flashing-light signals and short-arm gates. This new form of protection has now been installed at four crossings; Bennett, Euclid, Clyde and Merrill avenues. Plans are underway to make similar installations at the remaining 7 crossings in this area.

Gates, Signals and Bells

The gates are the short-arm type which extend half-way across the street, thus obstructing the lane of traffic which is approaching the crossing. An exception is that the one gate at Euclid ave. extends three-fourths of the way across the street because this is a one-way street across the tracks. In addition to street-gate arms, there are four



This plan illustrates special controls for protection at Euclid ave. crossing

arms which obstruct the sidewalk pedestrian approaches to each crossing. A flashing-light signal, with a "Stop-on-Red-Signal" sign, is mounted on each of the four gate masts at every crossing. On the mast for each street-arm gate, there is a crossing bell. Where applicable, "No-Left-Turn" signs were installed on 71st st.

The flashing-light signals and gates are controlled automatically by track circuits. With conventional control in effect, when a train enters an approach section, the bell and the lamps in the flashing-light signals and on gate arms are operated about 5 seconds as a pre-warning. Then the gate arms are released and are lowered in about 10 seconds.

At stations, the tracks are separated, 25 ft. between centers, so that the station platform is located between the two main tracks. At Bryn Mawr, the station platform extends from Jeffery blvd. to Euclid ave., about 410 ft. Thus this length is enough for a northbound train of up to four cars to stop at the platform without obstructing the sidewalks or roadway at either Jeffery blvd. or Euclid ave.

In view of the fact that every train stops at this Bryn Mawr platform for about 25 to 30 seconds, there is no need to put the gates down at Euclid ave. as a two or four car northbound train is approaching and making its stop. To do so would needlessly delay street traffic.

However, the problem was to devise an automatic control to start operation of the protection at Euclid ave. some definite time after the train entered the track circuit. The solution is that, when a northbound train of 2 to 4 cars occupies track circuit 150FT alongside the platform, the protection is not set in operation but a time-element relay is set in motion to introduce a delay of 23 seconds. At the end of this delay, the track circuit takes control to initiate operation of the crossing protection. After the gates are down, the aspect of the crossing protection indicator changes from red to yellow. (This indicator is a conventional two-aspect color-light dwarf signal located beside the track just south of Euclid ave.) When the station work is finished, the engineman starts his train toward Euclid ave. crossing. However, if the aspect of the dwarf signal has not changed from red to yellow, he must stop and wait until the gates are down or until the crossing is protected by flagging.

What About an Eight-Car Train?

A train of six to eight cars is longer than the 410-ft. platform between Jeffery blvd. and Euclid ave. Jeffery blvd. carries very heavy street traffic, but traffic is comparatively light on Euclid ave. Therefore, a northbound train of six to eight cars makes the station stop with the rear end clear of Jeffery blvd., but the first and second cars enter upon and occupy the Euclid ave. crossing. Thus for a train of six cars or more, the protection at Euclid ave. must be set in operation as the train approaches, in the same manner as conventional controls.

Accordingly the northbound automatic approach section track circuit controls for the crossing protection at Euclid ave. must include a means of determining whether a northbound approaching train has more than four cars, as for example six cars. Referring to the diagram, a northbound approaching train of six or eight cars simultaneously occupies track circuits 150BT, 150CT and 150DT. With these three track relays down at the time that the leading wheels enter track circuit 150ET, the crossing protection at Euclid ave. is set in operation at once.

In contrast, as applying for a train of two or four cars, the rear has departed from track circuit 150BT before the leading wheels enter track circuit 150ET. Thus with relays 150CT and 150DT down, and 150BT and 150ET up, a stick relay, NBSR, is picked up. This cuts out the track circuit control by track relay 150ET down. Also, due to the stick relay, when the leading wheels enter track circuit 150FT the crossing protection is not set in operation until the expiration of 23 seconds, as measured by a time-element relay, operation of which is started when the train entered track circuit 150FT, as previously explained.

"Second-Train" Controls

Schedules are such that a train might be approaching close to its approach starting section when an opposing train on the other track is about to clear the center section at Euclid and allow the gates to start to clear. To prevent the possibility of the gates starting to clear, and suddenly drop, which would confuse street traffic, special "second train" circuits were provided.

If the rear of a northbound train is occupying track circuit 150G, and a southward train is just entering 059A track circuit, the gates would stay down. Thus track circuit 059A is added to the southward control, whereas normally, this southward control would not start until the train entered track circuit 059B. Similar "second train" controls are in effect for other crossings.

The 10-volt relay circuits at each crossing are fed by a set of 5 cells of 80-a.h. storage batteries. The

(*Continued on page 42*)

which imprints the copy (the message) on the back of the top ply of paper of this continuous roll. As many as 150 copies can be run off with this machine which takes care of our needs. We purchase the duplicator fluid and paper supplies from the Allen Paper Co., 111 N. Canal St., Chicago, Ill.

No Substitute for Hectograph

By A. E. DeMattei
Superintendent of Communications
Southern Pacific
San Francisco, Calif.

Southern Pacific has not found a satisfactory substitute for hectograph ribbon and gelatine roll duplicating process. While we are aware that other reproduction methods are available, considering the great number of messages that we are required in our operations to make copies of, the cost would be prohibitive to attempt to duplicate telegrams through these other methods principally because each such method thus far presented requires the use of special paper.

The hectograph ribbon and gelatine roll duplication process is used on Southern Pacific exclusively in all of its communication offices. The purpose, naturally, to produce additional copies where required. In each of our offices we use the continuous roll or fanfold paper, and in our operations many messages do not require copies. Others require as many as 2 to 15 copies. The person delegated with the responsibility of running the duplicating machine makes the required number of copies and checks them off to the person for whom intended. In this operation we are able to use one machine to a circuit, whereas if we attempted to make copies by using what is known as 2-3-4 and 5 copy paper, many additional circuits and Teletypes would be required.

The advantages of the hectograph ribbon and gelatine roll duplicating process are of course that we can promptly produce as many copies of a message as may be required and at the same time use the receiving Teletype for single copy messages.

Use Gelatine Roll Process

By C. J. Hanna
General Supervisor Communications
Baltimore & Ohio
Baltimore, Md.

The method of duplicating Teletype traffic on the Baltimore & Ohio is using the hectograph ribbon and gelatine roll duplicating process in most cases, and a drum Ditto machine for a special type of duplicating work. We feel that in our larger telegraph offices where up to 10,000 duplications in a 24-hr. period are necessary, the gelatine roll process is the most economical way that we know of at this time. In addition to the number of duplications mentioned before, we duplicate an average of 60 special train movements per day, which requires thirty copies each or roughly 1800 copies. This special work is prepared on carbonized originals and applied to the drum Ditto machine where up to 100 copies per minute can be prepared.

On many occasions we have made inquiries as to a better method of duplicating Teletype messages. At the present time, we feel that the gelatine roll duplicating process is an adequate method. Other types of duplicating methods require special paper and other processes that greatly increase your cost per copy.

Mainly Wheel Reports

By J. R. French
Assistant Superintendent Communications
Missouri Pacific Lines
St. Louis, Mo.

We principally use our duplicating equipment for wheel reports and these sheets are so large that the only equipment available is flat bed gelatine roll equipment and as far as we know, this is the only method that can be economically used for duplicating these wheel reports. Photographic methods have been developed, but these methods are extremely expensive compared with hectograph duplicating.

There are rumors that manufacturers of spirit duplicating type of equipment expect to have on the market, shortly after the first of the year, machines that will accommodate paper in the usual widths up to 18 in. in length. At the time these machines are made available, it is also understood that they will have in continuous rolls, a type of paper that can be used for spirit duplicating including a carbon paper, as it is necessary that the spirit duplicator use a reverse copy. These rolls will, no doubt, be quite expensive compared to standard newsprint type of Teletype paper, but the main problem will be to decide how to handle messages received on Teletypes that do not require duplication. Therefore, the economies to be obtained by the use of spirit duplication must be thoroughly investigated before a change to this type of duplication is made.

IC Crossings

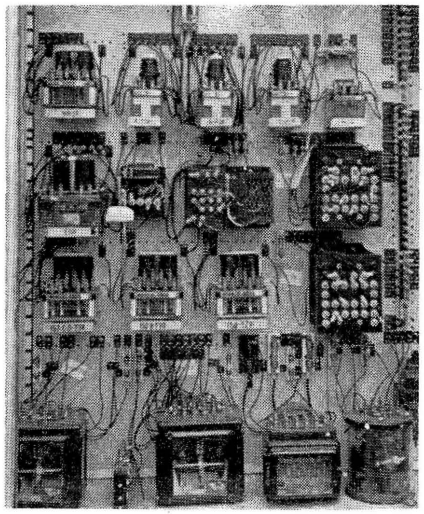
(Continued from page 23)

gate motors at each crossing are fed by a set of 7 cells of 160-a.h. storage batteries. These batteries are the lead type made by Gould, and are charged by Fansteel rectifiers. When the operation of the protection at a crossing is initiated, a special two-rate relay is operated which controls the charge to the batteries at a higher rate, about 5 amp., while the gates are operating and until the battery voltage returns to normal.

The lamps in the flashing-light signals and on the gate arms are normally fed a.c. from low-voltage transformers. If this a.c. fails, these lamps are fed from storage battery.

Clearance Problem

In planning this project, one of the more serious problems encountered was that of clearance; especially in the location of instrument housing. Because the tracks bisect 71st st., it was necessary to locate the housing in between the tracks.



Extra relays for special controls

Away from station platforms, the track centers narrow to approximately 16 feet. Necessary clearance was obtained by using special build instrument cases of narrower depth.

This crossing protection project was planned and installed by Illinois Central signal forces under the direction of George Pipas, signal Engineer, the gates and flashing-light signals being furnished by the Griswold Signal Company, and the relays by the Union Switch & Signal—Division of Westinghouse Air Brake Company.