

the commission has issued concerning their administration. The use of conductors' valves and air gages in cabooses is increasingly important, because of the increasing length and weight of trains. This part of the report ends with the declaration that the railroads generally have manifested "an admirable spirit of co-operation which has contributed immeasurably to an effective administration of the law."

The division of safety investigates automatic train stops and other inventions presented to the commission, following the plan that was in vogue during the life of the Block Signal and Train Control Board, which was abolished in 1912. Out of a large number of devices presented the Division has examined 184, and opinions regarding them have been transmitted to the proprietors. Of these devices 22 were held to possess merit sufficient to warrant experimental tests, provided the proprietors should present installations prepared free of cost to the government. Of these 22 devices, seven are automatic stops presented by the following: Willson-Wright Safety Appliance Company, Spokane, Wash.; Automatic Train Control & Signal Company (Gray-Thurber), Pittsburgh, Pa.; A. D. Pond, New Britain, Conn.; Railway Automatic Safety Appliance Company, Philadelphia, Pa.; Jones Safety Train Control System Company, Baltimore, Md.; Gollos International Automatic Train Control & Recording Co., Chicago, Ill.; B. F. Wooding, Denver, Colo. Automatic train pipe connectors were presented by J. R. Cobb, Los Angeles, Cal.; Furbin Automatic Train Pipe Connector Company, St. Louis, Mo.; W. C. White, Baltimore, Md. Other inventions in the list are a car coupler, a gasket for hose coupling, an air-brake system, a rail brace, a side-clearance telltale, etc. The Division has made favorable reports on the Gray-Thurber automatic stop and the Robinson connector. The automatic stop of the Jones Signal System Company of Atlanta, Ga., was tested, but without favorable results. The Miller automatic stop on the Chicago & Eastern Illinois was inspected last March.

The report includes a dozen pages of matter which has already been published, in the annual report of the commission.

ELECTRIC TRAIN STAFF ON THE CANADIAN PACIFIC

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The Canadian Pacific has in service a number of installations of electric train staff on single-track sections where traffic is heavy, notably on the Lake Superior division, which is not completely double-tracked and where the staff system was installed on all single-track portions in order to eliminate the delays and inconveniences due to the use of train orders. On other sections, for the purpose of providing for certain junctions and intermediate sidings, several modifications have been devised.

The staff instruments are type S miniature instruments, made by the Railway Signal Company, of Liverpool, England. Metallic circuits are used, and to prevent the possibility of a careless maintainer reversing the polarity, current for the operation of the instruments is furnished by magneto-generators equipped with two taper keys, so that one magneto provides current for the block on either side of the station. These keys are mechanically interlocked to prevent the current from being sent in both directions at the same time. Each instrument is equipped with an indicator showing "staff out; line blocked," when a staff has been withdrawn from either instrument, and "staff in; line clear," when no staff is out. The train staffs are made in such a manner that it is impossible for the staff belonging to one block to be inserted in the instrument of an adjoining block. Permissive movements are made by means of a staff which is divisible into two parts. These parts must be screwed together before the staff can be replaced in the instrument. The capacity of each instrument is 40 staffs, and at stations where the permissive feature is used, 20 of these are divisible. Each station has a telephone, which is worked over the staff line wire.

On staff sections where there are few train movements at night, an "automatic operator" has been installed. A stick relay, the armature of which is balanced and on which there is one

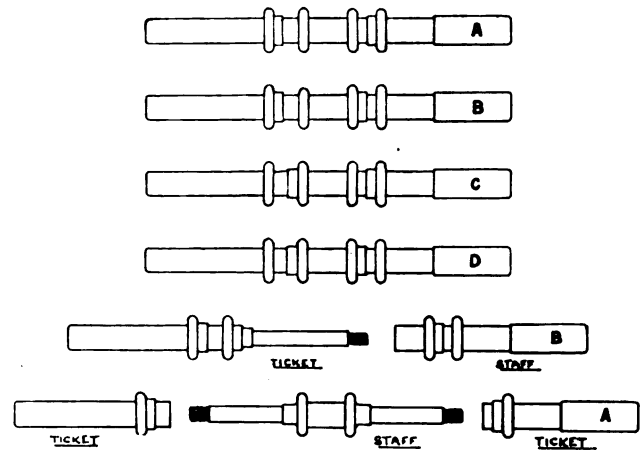


Fig. 1—Divisible Electric Train Staff

normally closed and one normally open contact, the other members of these contacts being on pivoted weights, provides the automatic feature. When the relay is energized the armature is rotated in a direction to cause it to lift the weight

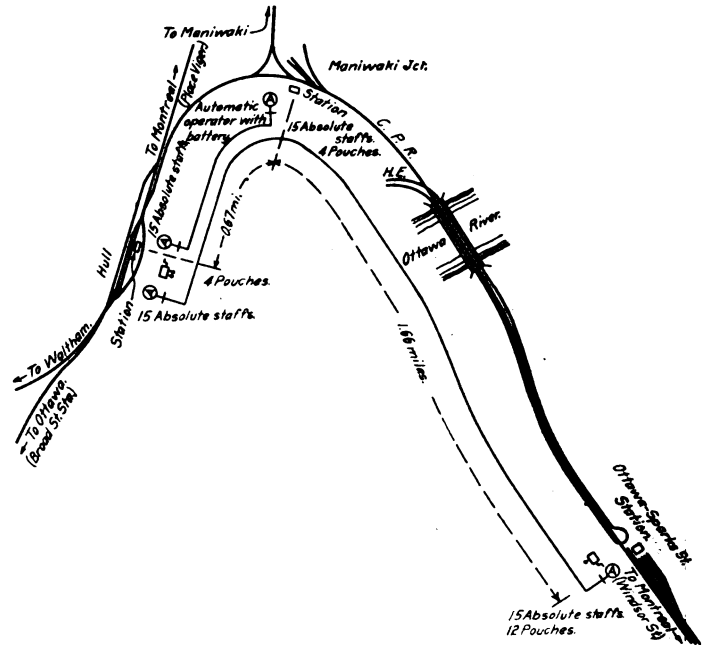


Fig. 2—Hull-Ottawa Staff Section

on which the normally closed contact is fixed, and when current is broken, the weight causes the armature to rotate in the opposite direction a sufficient distance to close the

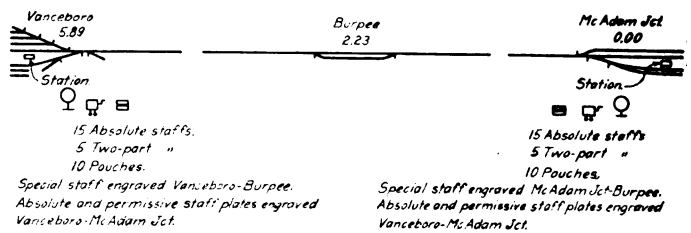


Fig. 3—McAdam-Vanceboro Staff Section

other contact and cut in a local battery which energizes a coil to release the staff at the opposite end of the block. It is possible to operate a staff block without an operator at either station, by using this attachment at both ends.

In a staff block between Hull and Sparks street station, Ottawa, it was necessary to install an auxiliary pair of instruments at Manawaki Junction on account of a branch line connecting at that point. The four instruments are alike and a staff from one may be deposited in any other; and a train obtaining a staff for this block may move between any two of the instruments. When all staffs are in the instruments one or the other of the two pairs of instruments is out of phase, and a staff can be obtained only from the pair which is in phase. Thus when a train starts from one block instrument, having taken a staff out of the only pair which is in phase, this throws the remaining pair of instruments out of phase at the opposite end of the block so that no staff can be obtained at that end. This arrangement could be used with a greater number of auxiliary pairs.

A special staff block has been installed at Burpee, between McAdam Junction, N. B., and Vanceboro, Me. When it is desired to have two trains meet at Burpee, special staffs are used. At McAdam, which is the initial station, a special instrument is provided, having two drawers. The top drawer, containing the special "passing staff," is mechanically locked in the closed position, while the bottom drawer is normally open and cannot be closed until a regular staff has been inserted. At Vanceboro, a similar instrument is provided, but the top drawer is normally open. This is called the dummy drawer, as it is used only for the operation of the circuit controller and no staff is ever placed in it. The bottom drawer contains the special passing staff and is mechanically locked in a closed position.

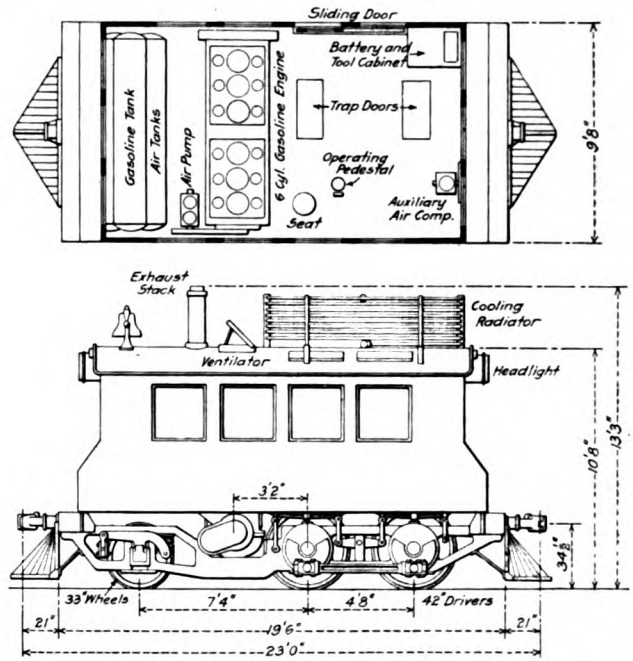
To obtain the special passing staff McAdam, the "initial" station, first withdraws an ordinary staff and inserts it in the bottom drawer of the special instrument at that station. The drawer can then be closed, which mechanically unlocks the top drawer, from which the special passing staff can then be taken. Opening the top drawer operates the circuit controller which connects one of the keys of the magneto-generator to the line wire, operating Vanceboro's special instrument. Vanceboro then closes the dummy drawer, which operates the circuit controller on that instrument, cutting in the lock-coil which releases the drawer at McAdam containing the special passing staff. McAdam then unlocks the bottom drawer at Vanceboro by turning the handle of the magneto. Both special staffs and a regular staff have now been withdrawn from their respective places, but the regular staff is locked in the drawer of the special instrument at McAdam. The special passing staffs are then delivered to the trains which are to pass at Burpee. These staffs confer right only to that station. When the two trains reach Burpee, they exchange staffs, and proceed. The special staffs are thus always returned to the stations from which they were originally issued.

A pusher staff is provided for the use of an engine assisting a train through a portion of a block. The instrument provided for this purpose has two drawers, one of which is open and the other, containing the special pusher staff, mechanically locked in the closed position. The regular staff is withdrawn and deposited in the open drawer of the pusher attachment and the drawer closed, which mechanically releases the other drawer. After the pusher staff is withdrawn, the regular staff is again withdrawn. The opening of the pusher staff drawer opens the line circuit; and when the pusher returns and replaces the pusher staff and closes the drawer, the line circuit is closed; and the regular train, continuing on to the instrument at the opposite end of the block, inserts the regular staff at that point.

OIL FOR RAILWAY FUEL IN HONDURAS.—The Vaccaro Bros. & Company Railroad, operating from Ceiba into the banana lands, has equipped one locomotive for burning oil instead of coal, the present fuel, to ascertain the desirability and economy of oil as a fuel. If the experiment proves a success, it is possible that not only the locomotives but the shops and various kindred enterprises controlled by this company will be equipped for the use of fuel oil.

GASOLENE SWITCHING LOCOMOTIVE

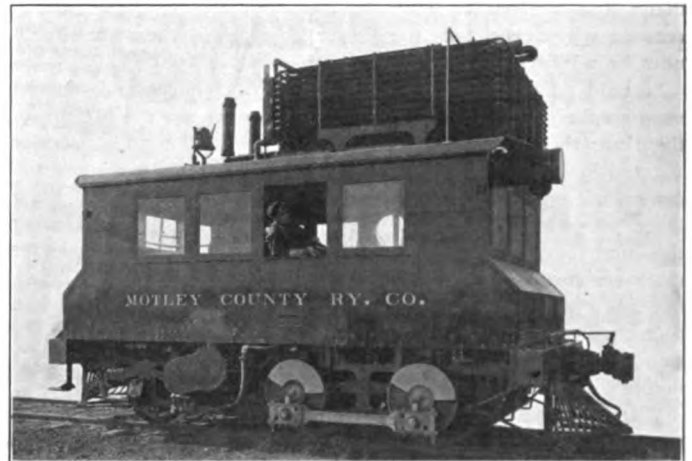
The Motley County (Tex.) Railway recently purchased a 300-horsepower gasolene switching locomotive from the McKeen Motor Car Company, Omaha, Neb., to be used in freight and switching service between Roaring Springs Junction, on the Quanah, Acme & Pacific and Matador, Tex. It has a tractive effort of 12,000 lb. at a speed of six miles an hour, and is mounted on six wheels, four of which are driven by a six-cylinder, Type C,



Gasolene Switching Locomotive of 12,000 lb. Tractive Effort

gasolene engine, having cylinders 11 in. by 15 in. The frames are of cast steel, and the cab is an all-steel structure extending the entire length of the locomotive. The usual locomotive type of spring suspension with equalizers is used to transfer the weight to the wheels.

The engine bed is attached to the side frames, acting as an efficient brace and reinforcement. It is of the company's latest



McKeen Gasolene Switching Locomotive for the Motley County Railway

model, being provided with an increased water circulation around the valves and cylinder head, tungsten steel valves, triple piston rings and water-jacketed intake pipes. Special provision has been made to enclose the flywheel, crank case, cam shaft, water and air pump driving mechanism. The engine is lubricated by a combination splash and automatic lubricating system.

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