4815—June 1—Authorizing the G.T.R. to cross with its additional track on Ferguson Avenue, Hamilton, Ont., the two tracks of the Hamilton Street Railway.

4816—May 19—Authorizing the G.T.R. to construct a branch line and two spurs therefrom to reach the establishments of the Toronto Carpet Company and the Malta Vita Food Company, Toronto, Ont.

4817—June 2—Granting leave to the Essex Terminal Railway to cross with its track the track of the W.E. & Lake Shore Rapid Railway in Township of Sandwich West, County of Essex, Ont.

4818—May 18—Ordering the G.T.R. to protect the crossing of the Berlin & Waterloo Street Railway at King Street in the Township of Waterloo, Ont., by means of mechanical folding fence gates to be installed, operated and maintained by the G.T.R.

4819—May 18—Requiring the G.T.R. and the C.P.R. to place and keep a flagman at the Church Street crossing in the City of Toronto, Ont.

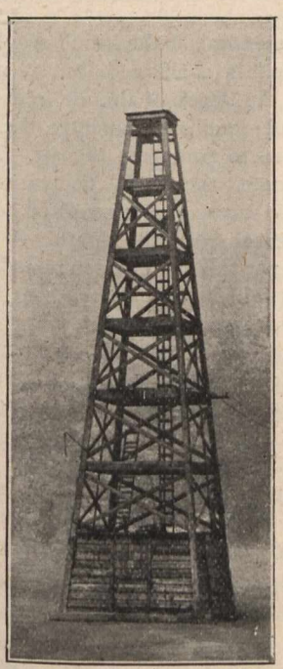
4820—June 4—Amending Order of the Board No. 2,413, dated the 1st day of December, A.D. 1906.

4821—June 5—Granting leave to the Transcontinental Railway, to operate its line of railway for construction purposes only, across the track of the C.P.R. near Bazile Station, Province of Quebec.

4822—June 5—Approving highway crossing of the G.T.P.R. in Section 11, Township 27, Range 15, W. 2nd Meridian, Province of Saskatchewan.

DIRECT AIR PRESSURE PUMPING.

During several months of the year 1907 an extended series of tests was made on a driven well, near the plant of the Westinghouse Air Brake Company at Wilmerding, Pa., to determine the amount of water raised, air required and other necessary data relative to pumping by direct air pressure. As wide a range of conditions as possible was covered in regard to different sizes of pipe and different combinations of "lift" and "submergence," obtaining for each condition the most suitable and economical arrangement. The "lift" is the vertical distance from the water level in the well to the point at which the water is discharged. The "submergence" is the distance from the water level down to the point in the well where air is admitted to the discharge pipe.

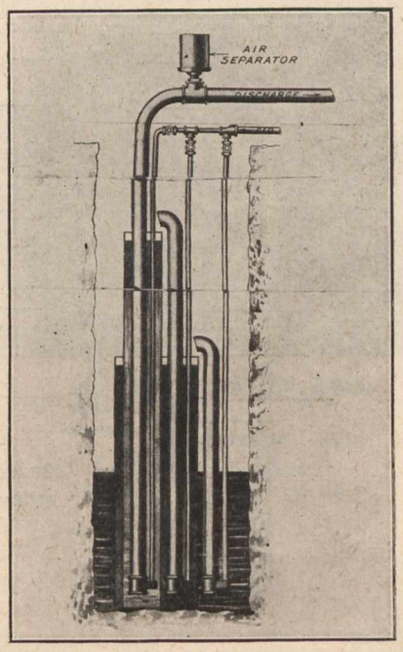


Derrick with Platforms.

Since the variety of combinations of these distances and sizes is infinite, a limited number of each were determined upon, which would give enough points on a curve to cover practically the entire range for each size of pipe.

Arrangement of Apparatus.

The well used is 174 feet deep from the surface of the ground, has 6-inch casing, and the water level is ordinarily from 16 feet to 20 feet below the surface. An oil well derrick was constructed over the well, with platforms at various heights to provide means for altering the lift. The space inside the derrick, below the first platform, was housed in to protect those making the tests, and provide suitable space for the tanks, measuring apparatus, etc., required. Each length of pipe was measured and marked as it was placed in the discharge pipe, so that an accurate knowledge of the distance to the air inlet and to point of discharge was always at hand. To measure the distance from the ground to the water level a float was used, consisting of a tin tube, about ½-inch in diameter and 4½ feet long, hermetically sealed, weighted at the bottom, so as to float vertically, and pointed at both ends to assist in its introduction into or removal from the casing. A stout "Silver Lake" cord was fastened to a ring in the upper end, and brass markers were attached to this cord every four feet, each marker stamped with the distance from the water level point on the float.



The air supply was obtained from a one-inch connection to the air system of the Westinghouse air brake shops. The arrangement of piping, reservoirs, etc., is shown diagrammatically in Fig. 1. Two air storage reservoirs, 30½ by 84 inches, received air from the supply through a three-way cock, so that only one tank could be charged at one time. At the other end of these tanks connection was made through a similar three-way cock to the line to the well. In this line was placed a 14 by 33-inch reservoir, a globe valve and a cut-out cock. The shop air system averages from 140 to 160 pounds pressure, to which the storage tanks were charged. Tank No. 2 was used for measuring the air in the tests, and Tank No. 1 for starting the pumping operation. The volumes of these tanks and their piping was obtained by water measurements. A special test gauge was attached to tank No. 2. The globe valve in the well line was used to regulate the pressure in the latter. Such pressure was always much less than the storage pressure and had to be held constant. The cut-out cock was used for cutting off all supply to the well. The small reservoir simply increased the volume of the well line to make it easier to hold its pressure constant.

The special fitting used for admitting air into the discharge pipe is also shown in Fig. 1. It consisted of a pipe sleeve enlarged on one side, the upper surface of the enlarged part being drilled and tapped for three air pipes and 1¼-inch gauge pipe. With the large discharge pipes there was not room enough inside the casing to get a large air supply pipe, so that two or three smaller sizes were substituted. By this arrangement also the effect of changing the sizes of air supply pipes was easily obtained, since any