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The Ventilation of the Connaught Tunnel, Selkirk Mountains.

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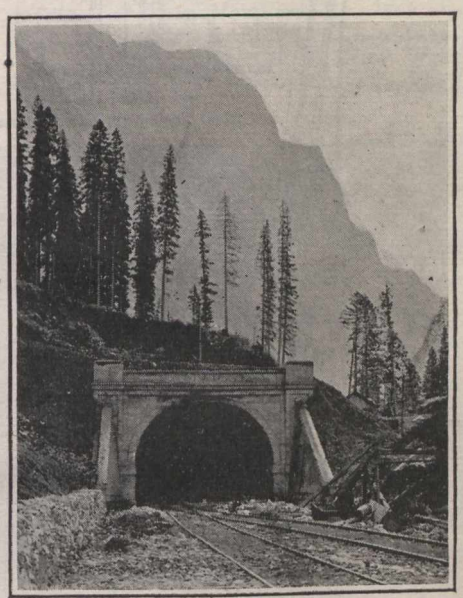
When the Connaught tunnel was first planned, it was generally supposed that it would be necessary to operate by electricity, but upon further studies of the subject it was found that the large cost of installing a plant for this short section and the enormous extra expense of operation, would have entirely wiped out any economical saving made by the construction of the tunnel. Therefore, a study was at once commenced on other methods of operation. As a result of the study a plan was adopted of blowing air through the tunnel by the use of fans, similar to the method adopted by an Italian engineer, in the ventilation of the St. Gothard tunnel, a number of years ago. However, instead of putting up an obstruction at the portal of the tunnel, where the fans are situated, to prevent the air from coming out of that end, a nozzle patented by C. S. Churchill and the late C. C. Wentworth was adopted, plans of which are illustrated in figs 1, 2, and 3. With this system we can with perfect safety operate this tunnel with steam locoomtives.

The principle of the nozzle is as follows: Air is forced into a comparatively large chamber, which terminates in a nozzle inside the tunnel. If the pressure is great enough, there is sufficient energy in the air, leaving the nozzle at high velocities, to overcome the resistance offered by friction, variation in barometric pressure, or other resistance to the flow of air, that may occur in the tunnel. In general, where tunnels are comparatively short, the ventilating plant would be located at the lower end of the tunnel, and trains reduced to a speed lower than the velocity of air in the tunnel, so that the smoke and gases are blown ahead of the moving train. In a tunnel as long as the Connaught one, this method of operation with a fan system was entirely out of the question, but as the tunnel is of a large area, it was decided to establish the ventilating plant at the higher end of the tunnel, and blow fresh air against the approaching trains on the up grade, and thus dilute the gases coming from the locomotive. The dangerous gas generated by a locomotive is carbon monoxide, and it is usually generated in cases of an accident, where the draught to a heavy coal fire is shut off. The ordinary carbon dioxide, the usual resultant of complete combustion, is not so dangerous, and a much larger percentage of the latter gas is permissible. As our locomotives on this section use oil for fuel, in case of a sudden stop the fire can be shut off, and there is no danger of producing the deadly carbon monoxide.



Connaught Tunnel, C.P.R., East Portal

Returning again to the plans of the ventilating system. The usual method is to put the fans at the side of the track, a little above the elevation of the base of rail. In this case, however, since the portal of the tunnel is in a very deep cut, it was decided to put the fans over the portal. Instead of running the fans by engines driven by steam, it was further decided to use Diesel engines. These will only consume 0.4 to 0.5 lb. of oil per horse power of work, while the best we could hope to get from a boiler would be one horse power for every 2 or 2.5 lb. of oil, and possibly not as good results in this case, where the work is only intermittent, the fans being run only at intervals when a train is on the up grade

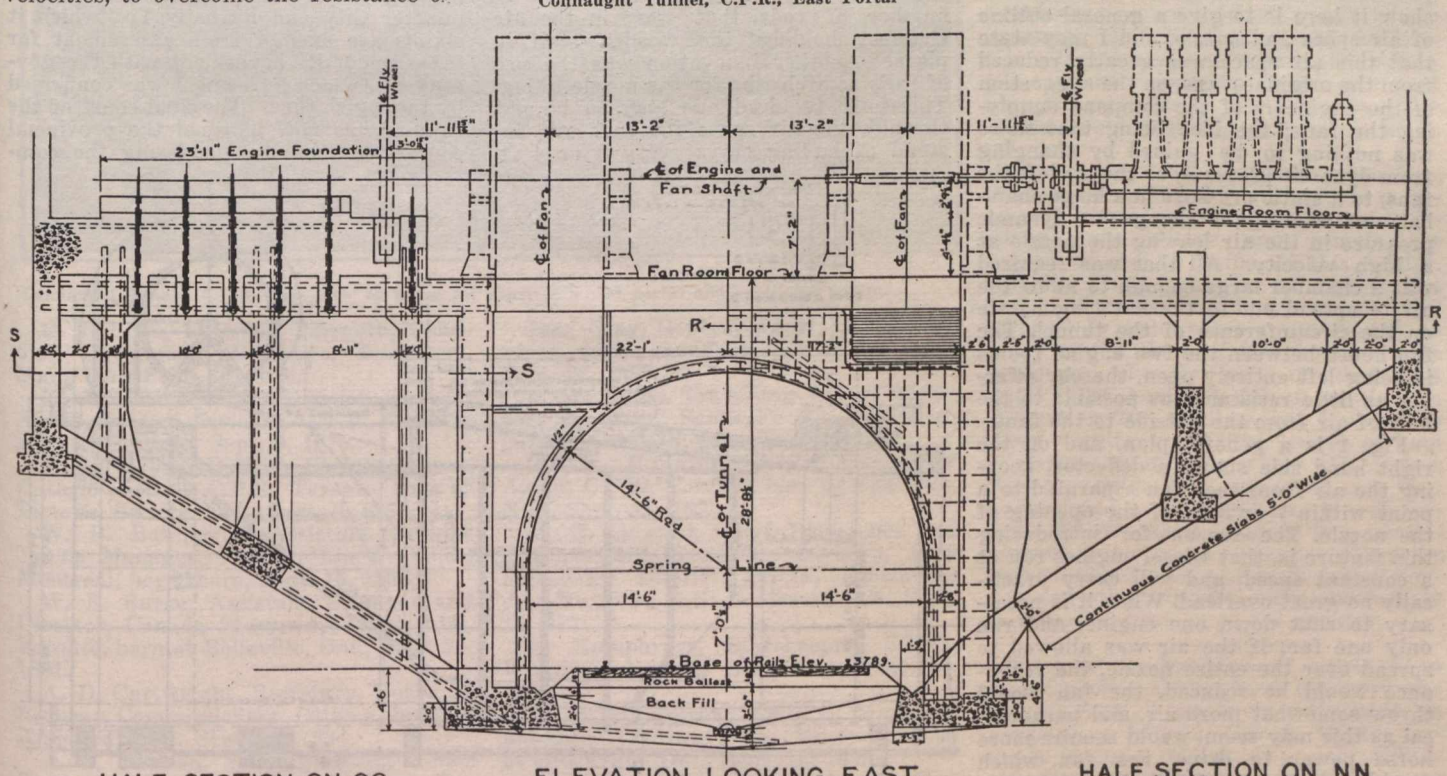


Fig 2.—Connaught Tunnel Ventilation.