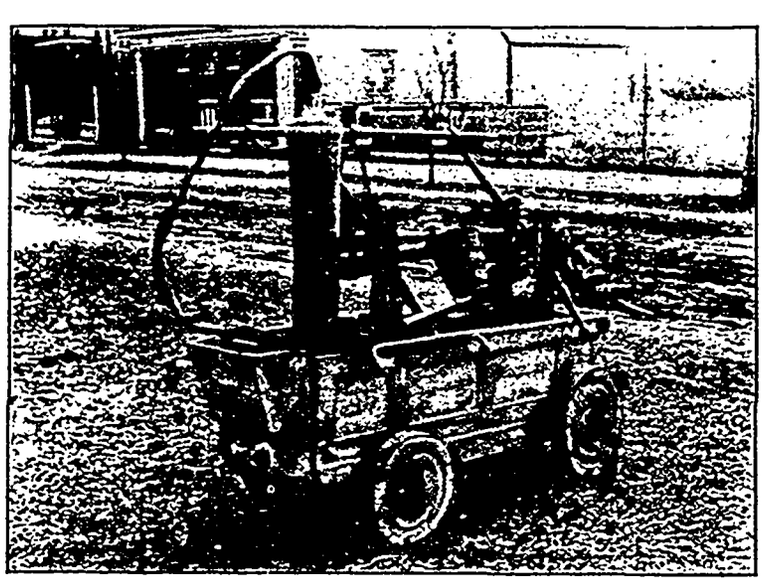
the quantity of gas compressed; the capacity of the reservoirs is known, and each of them was furnished with a gauge showing the pressure at the beginning and end of a trip. If the quantity consumed is excessive, the car is carefully examined to discover the reason. During the first five months of this year, the mean consumption of gas, including that used by the compressors, has been 546 *litres per kilometer traveled* (about 31 cubic feet per mile). The compressors required 16.8 per cent. of the gas compressed, which was too high a proportion, and has since been reduced to 10½ per cent. The consumption, therefore, is less than was expected, and will be further reduced by more frequent trips. At Dessau the promoters of the railway had at first in consideration electric traction, chiefly because they had in the city a central electric station, but they found that the dynamos produced a current of 110 volts, and the expense to transform it to 500 volts would be heavy. New machines and new dynamos would be required and the old one would have become useless. Therefore, as it was impossible to increase the capital or to employ alternating currents, they adopted gas. Since the consumption of the car motor equals that of a large number of ordinary consumers, it will permit economical production of gas in quantity, and if the actual cost of the gas is taken instead of its selling price, its use on railways is very promising. The adoption of gas as a motive force for the street cars of Cologne would require a consumption of 1,960,000 cubic meters of gas per year.

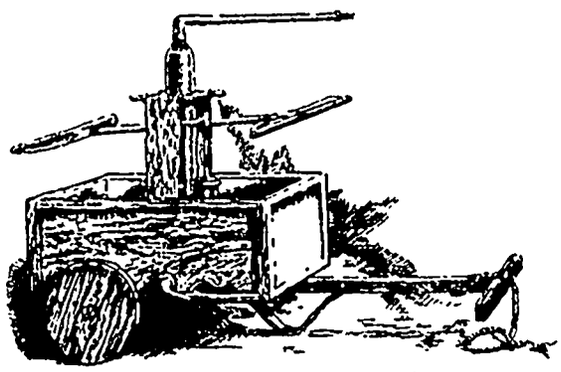
For THE CANADIAN ENGINEER.

OLD FIRE ENGINES.

Considerable interest centres about the fire engine shown in the illustration, not only on account of its great age and the important part it has played in the history of the town of Shelburne, Nova Scotia, but also because it was a royal gift. It was presented to the



town of Shelburne by His Majesty, King George III., and was landed from a man-of-war in 1786. It was only one of many favors which His Majesty showed his loyal subjects, who had emigrated from the older colonies rather than join in the Revolution. The name of the maker has, unfortunately, not been handed down. The pumps, etc., are chiefly of brass and iron, and are apparently in as good condition as ever, but the wooden parts are somewhat decayed. The tank is six feet long, two feet wide and twenty inches deep; pump cylinder four inches, stroke one foot. It has thrown a three-quarter inch stream a distance of 170 feet. There is no suction pipe, the water being lifted in pails and emptied into the tank.



R. H. Buchanan & Co., of Montreal, have an old fire engine which they purchased from Berthier, Que. It was built in 1776, and it is in thoroughly good order to-day. The town of Cote St. Paul has an engine built in 1774 by Phillips, London, Eng. This engine was bought in 1869 from an old iron dealer in William street, Montreal, for $75. It was put in thorough repair, and had new suction and leading hose. A fire company was formed. From all appearances the engine is as good as new to-day. It did good work at several fires. In appearance it is much the same as the Shelburne engine, but the alterations improved it considerably. After the company was formed, money was again raised, and the bell of the old "Protector" engine house was purchased. A company of about 30 men was formed, and at different trials did good fire duty with the engine "Rescue." W. P.

LOCOMOTIVE COUNTER-BALANCING.*

The purpose of adding counter-balance weights to the driving wheels of locomotives is to prevent or minimize the strains and vibrations caused by the momentum or inertia of the moving parts attached directly or indirectly to them. These are of two kinds, revolving parts and reciprocating parts. The revolving parts can be counter-balanced by weights attached to the wheel to which they belong. The reciprocating weights can only be balanced in one direction by adding weights to the driving wheels, as all weights added after the revolving parts are balanced over-balance the wheel vertically, exactly to the same extent that they tend to balance the reciprocating parts horizontally. This over-balance exerts a pressure upon the rail directly proportional to its weight and to the square of its velocity. At high speeds this pressure, which is added to the weight of the driver on the rail, may become great enough to injure track and bridges.

In consideration of the above, your committee have formed the rules which follow, after full consideration of *the following fundamental principles:*

1. The weight of the reciprocating parts that are left unbalanced should be as great as possible, consistent with a good riding and smooth working engine.

2. The unbalanced weight of the reciprocating parts of all engines for similar service should be proportional to the total weight of the engine in working order.

*From a committee report presented at the annual Convention of the American Railway Master Mechanics' Association.