



Introduction

As a result of a long struggle for further increases in engine power and performance, a better understanding of the flow in the inlet and exhaust system has been greatly in need. Almost from the original conception of a practical internal combustion engine, the supremacy between the two- and four-stroke cycles has been waged, so far, the four-stroke has the best of it. However there is considerable indication that the two-stroke is now pushing itself to the fore.¹

The design of the exhaust system has a pronounced effect on the performance of a two-stroke engine is far more sensitive to the arrangement of the exhaust system than a four-stroke engine,² and it has generally been assumed that the controlling factor is the restriction set up by the exhaust system to the flow of the exhaust gases.

1. Weaving, J.H. 1949 Proc.I.Mech.E., vol 161, p.98 "Discharge of Exhaust Gases in Two Stroke Engines"

2. Farmer, H.C. 1938 Proc.I.Mech.E., vol 138, p. 367 "Exhaust Systems of Two-Stroke Engines"

Since the greater demand has been for petrol carburettor engines, in which class the two-stroke engine cannot compete owing to the necessity of a large port overlap for scavenging. This results in the evitable short-circuiting to exhaust of a considerable proportion of the inlet charge, hence results in a waste of fuel. This type of problem, however, does not arise in the fuel injection engine.

In order to obtain the knowledge of the gas exchange processes as a clue to estimate the effectiveness of the tuning of different exhaust systems, the variation of pressure in the combustion chamber, in the crankcase and downstream of the exhaust port must therefore be studied. This is best done by taking the photograph of the pressure traces at those desired points as they appear on the oscilloscope screen.

In the course of the experiment set up for the purpose of studying the effect of exhaust tuning to the performance of a petrol crankcase scavenge engine a series of test was carried out on such an engine. The processes of gas exchange were investigated by means of piezoelectric transducers mounted at the desired point which the pressure variation was to be observed. The pressure traces were photographed by