



Note 25B

Inverted-cup tappets

The 14.1 L FIAT which finished 1.5% behind the 7.6 L Peugeot in the 1912 Grand Prix de l'ACF was a 1911-designed type S74 which had been victorious in the American GP of that year and which was developed from the similar 1910 type S61 of 10.1 L which won the Sarthe Club's Formule Libre race of 1911. In ref. (2) it is stated that Laurence Pomeroy Jnr.'s research showed that the S61 was an Ettore Bugatti design of 1909 "either directly or indirectly". The engine had 4 vertical overhead valves per cylinder operated by a single overhead camshaft via 2-valve bridge pieces, with inlets and exhausts alternating along the head. Cam side-thrust was taken by "inverted-cup tappets" fitting over the valve stems and the top of the springs, the 1st use of such a feature (see the picture Appendix to [Note 15](#)). Such tappets were patented by Albert Morin in 1916 (26) and were adopted by Ernest Henri with his double overhead camshafts in the 1919 Ballot for Indianapolis. They eventually became a popular "Car-of-the Year" method of connection between cam and valve stem in the late '50s to late '90s.

An improvement was made by Aubrey Woods in the 1962 BRM and copied by later engines (eg. the Ford Cosworth DFV of 1967 – 1982 (see "[The Unique Cosworth Story](#)")) by having the tappet *above* the valve spring so that the latter were better cooled by oil spray at the cost of a little extra stem reciprocating mass.

In post-1990 valve return systems, where compressed gas replaced steel wire springs, the tappet has sometimes been combined with the necessary piston in the valve cylinder (eg. the Honda RA122E/B of 1992, SO20 (see [Note 15](#) Appendix)).
