stamped at the back with a capital "F." Those for speed are stamped "F.s." (Any other marks, such as an "X," are only manufacturing symbols and have no bearing on the timing.) If an engine you are tuning for speed is already fitted with "F.s" cams, it is no use for you to write to us for anything hotter because we have no such thing. With "F.s" cams Sunbeams have twice won the Senior T.T. Race and the French Grand Prix, besides making "fastest time of the day" on innumerable occasions.

In Figs. XII. and XIII. we give diagrams of the timing obtained with "F.s" and "F" cams respectively. These show the angles at which the valves open and close and the position of the piston up and down the stroke at which these angles are obtained. On the $2\frac{3}{4}$ h.p. sporting model and $3\frac{1}{2}$ h.p. light solo Sunbeam, the angles are as given in Fig. XII., but the distance at *A* is 3/32″ instead of $\frac{1}{8}$″ and the distance at *B* and *C* is 11/16″ instead of 13/16″. On the $2\frac{3}{4}$ h.p. and $3\frac{1}{2}$ h.p. standard Sunbeams the timing is as given in Fig. XIII., but the distance at *B* is 13/32″ instead of $\frac{1}{2}$″ and at *C* it is $\frac{1}{2}$″ instead of 19/32″ If the $2\frac{3}{4}$ h.p., $3\frac{1}{2}$ h.p. or $4\frac{1}{4}$ h.p. standard models are fitted with "F.s" cams instead of "F" cams, then the timing of the $2\frac{3}{4}$ h.p. and $3\frac{1}{2}$ h.p. becomes identical with that of the $2\frac{3}{4}$ h.p. sporting model and the $3\frac{1}{2}$ h.p. light solo, whilst the timing of the $4\frac{1}{4}$ h.p. is exactly as shown in Fig. XII.

When checking timing by means of a diagram, it is of the utmost importance to have the tappets set correctly. It is also well to remember that checking by piston position is somewhat crude. If you find that your valves do not open and close at the specified piston positions, there is not necessarily anything amiss. It is only when there is an appreciable loss of power due to considerable wear in either the rockers or the cams that there is any call to fit new parts. If your engine is going well, let well alone.

In racing a good deal depends on finding the magneto timing which exactly suits the engine. Start

with the points separating when the piston is still a full $\frac{3}{8}$" before dead top centre on compression stroke, the magneto then being at full advance. For sheer speed most Sunbeam engines, especially the long-stroke models, will take more than this. Don't be afraid of trying up to $\frac{1}{2}$" lead, on side-valve engines, or even $\frac{3}{4}$" on O.H.V. engines, but in this case remember that the magneto *must be retarded* for starting; in fact, it will not take full advance till it is almost all out.

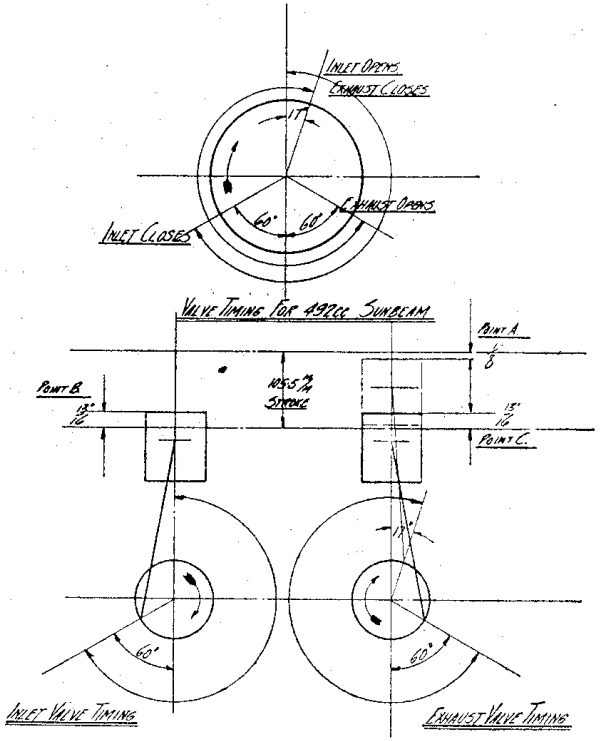

Fig. XII.—Valve Timing with "F.s" Cams.

Carburation is of extreme importance in racing. The ideal to aim at is that the engine shall take exactly full air at full throttle when at full speed and yet the

carburettor must be capable of being opened out suddenly without misfiring or choking. The makers of the Amac supply a variety of throttle slides for racing. These are much more cut away at the back than is the touring slide. Also, of course, the size of jet must be discovered which gives best results; with an Amac it will probably be either No. 38, 39 or 40 for a side-valve or up to No. 44 on an O.H.V. Sometimes the holes in the air cone can stand reamering out a very little, but too much will spoil the vaporization of the mixture.

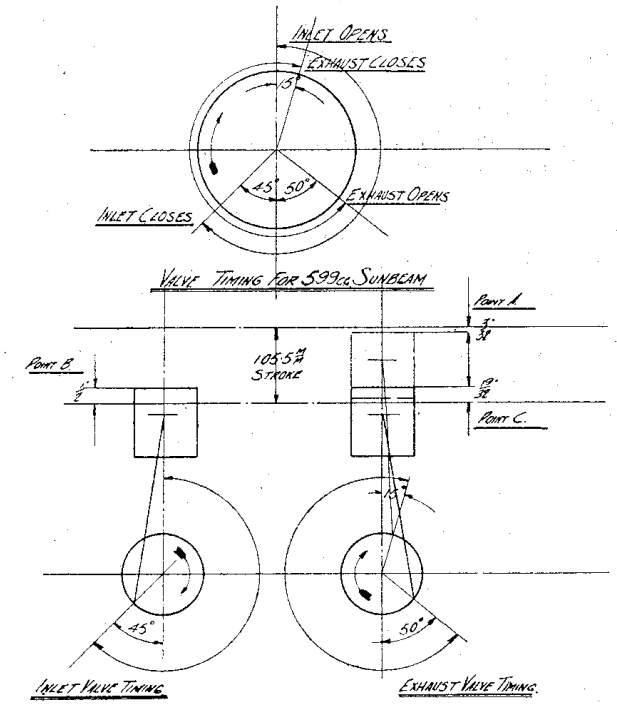

Fig. XIII.—Valve Timing with "F" cams.

As regards racing plugs, one cannot do better than deal with a firm which specialises in this particular field, and set the points according to their direction. Sometimes an engine will evince a liking or the reverse