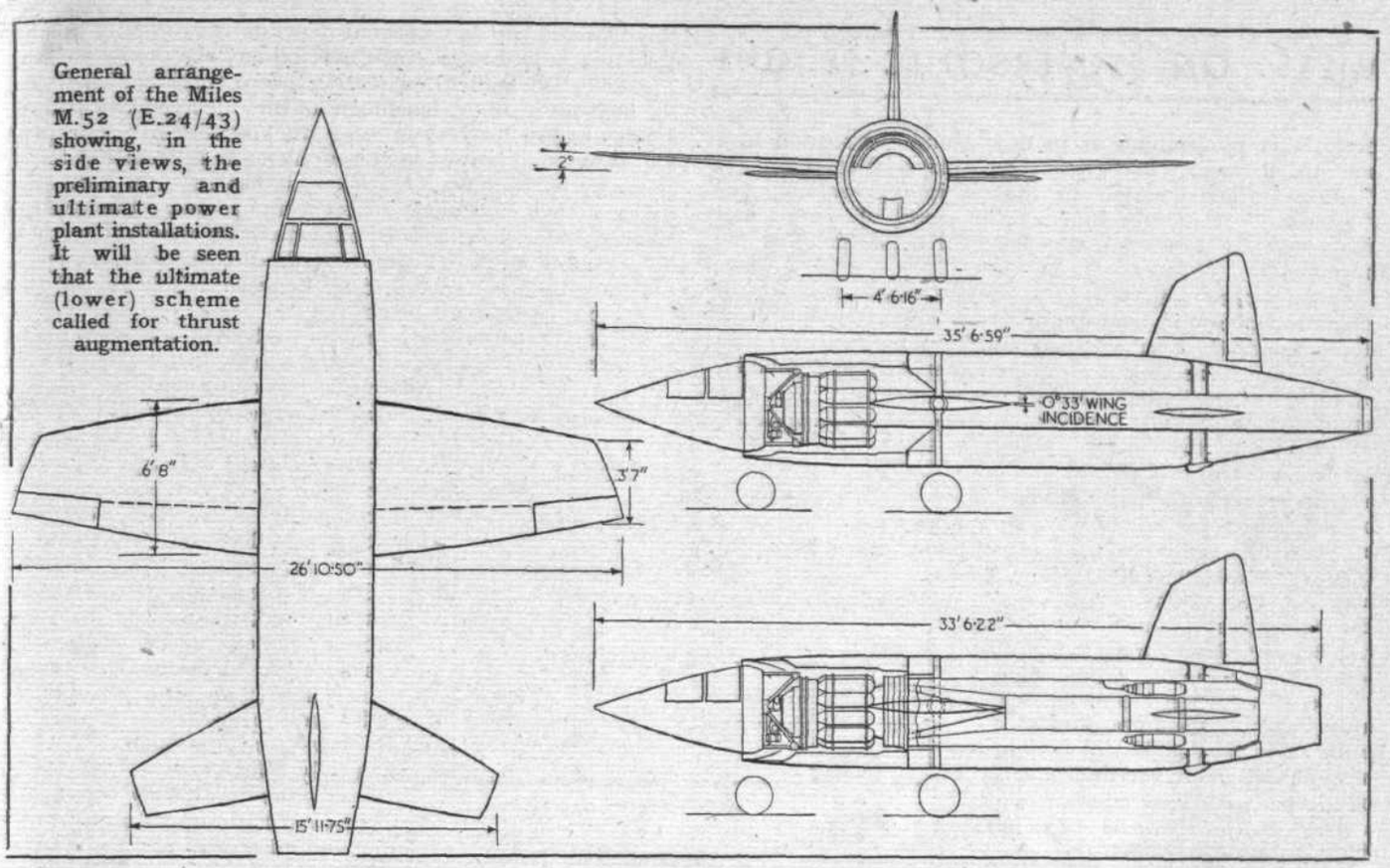


General arrangement of the Miles M.52 (E.24/43) showing, in the side views, the preliminary and ultimate power plant installations. It will be seen that the ultimate (lower) scheme called for thrust augmentation.

Miles on Supersonic Flight

Background of M.52 Development : Design Problems Analysed

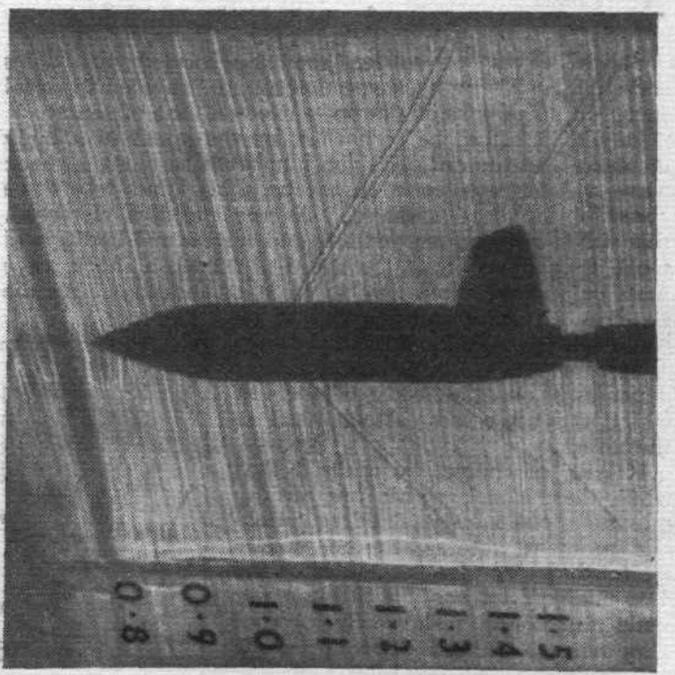
ESSENTIAL features of the Miles M.52, or E.24/43, supersonic research aircraft were described in *Flight* of September 12th. To supplement this information Miles Aircraft, Ltd., have prepared a Paper outlining the research undertaken before the design of the M.52 was crystallized and setting out the problems associated with flight at supersonic speeds. The gist of the Paper is given below.

Towards the end of 1937, runs the Paper, statements were made before a learned society that there appeared to be no reasonable hope of building a useful aircraft for work beyond the speed at which compressibility stall occurred. Apparently this was the general opinion of the meeting at that time, as only Sqn. Ldr. Whittle registered a protest against this attitude to the future possibilities of high-speed flight. Some six years later, however, Miles Aircraft, Ltd. were actively engaged on the design and construction of a machine that was not only to fly in this "impregnable" region, but which, the designers had every hope and confidence, would fly right through the "barrier" and achieve 1,000 m.p.h. in level flight, this speed being approximately twice that considered possible a few years before. Surveying briefly the general problems encountered the Paper states:

Compressibility

At low speeds it may be assumed that air is incompressible and the density everywhere in the field is the same, but as is well known with high-speed aircraft, this assumption causes large errors, and allowances for compressibility effects must be made, and, of course, the closer the speed of the aircraft to the local speed of sound, the greater are these effects. The speed of sound in the air is proportionate to the temperature only, the density and pressure having no direct effect. The velocity of sound decreases with height up to the tropopause, and remains materially constant above this height in sympathy with the temperature.

If we consider a body moving through air at speeds considerably less than that of sound, a flow pattern is obtained in which the air is deflected some distance in front of the



A model of the Miles M.52 during wind tunnel tests under conditions corresponding to 900 m.p.h. Shock waves are clearly visible.