rotate when the engine is not running, thus minimising head resistance, but so fitted that the propeller can at will be brought to rest for landing purposes, etc., by applying the brake.

Pusher power units are more suitable than tractor units, and are always fitted. They simplify the slinging, and are generally more convenient and efficient.

The best position in which to fit the radiator is doubtful, and several views are held. The general requirements are as follows :—

1. The radiator must be so fitted that it can at will be thoroughly protected from the outer air during cold weather flights when the engine is not required to be run or when under repair, to prevent rapid freezing of the radiator water.

2. To give maximum cooling efficiency with minimum head resistance.

3. To be fitted in such a position in those units provided with a reversing propeller that, when running in the reverse direction, the radiator still provides efficient cooling.

4. Ease of inspection during flight.

5. Ease of refilling with water during flight.

6. Means of varying the area of cooling surface, or conversely, the draught, so that an approximately constant temperature can be maintained under varying conditions of air speed and air temperature.

Engines.

The tendency during the War has been to produce a number of highly efficient aircraft engines from the point of view of weight per brake horse-power. In designing these engines, however, reliability over long periods and low fuel consumption have been in nearly all cases a secondary consideration.

The main requirements for a rigid airship engine are :—

1. Reliability.

2. Fuel economy.

3. Ability to develop continuously a high percentage of its maximum brake horse-power, *i.e.*, to run continuously at about nine-tenths full power.

4. Low maximum revolutions, in the order of from 800 to 1,400 r.p.m.

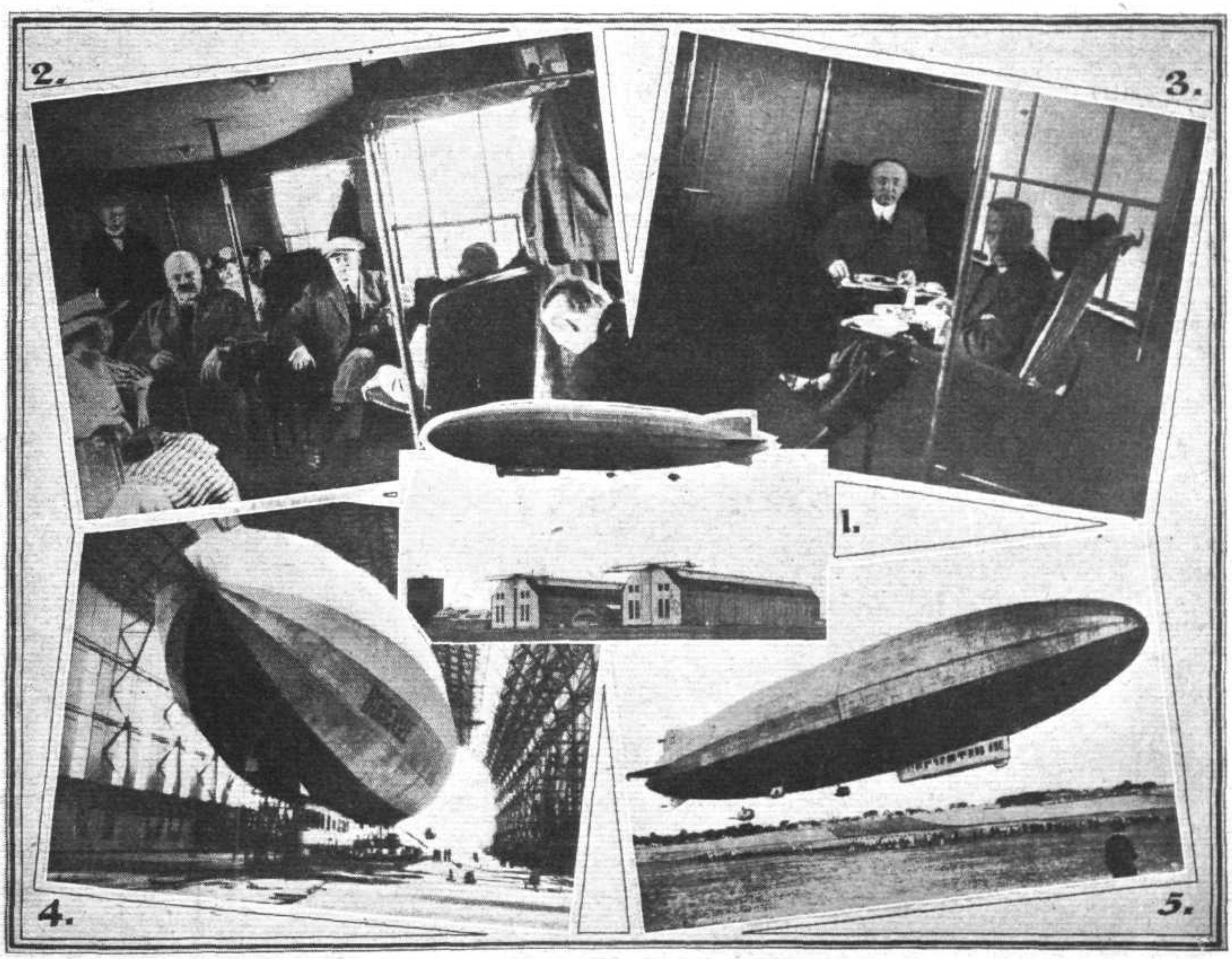
5. Simplicity and ease of carrying out overhauls in the air.

6. Ability to run for long periods without overhaul.

An airship engine possessing such qualities will effect a considerable gain in efficiency over present aircraft engines for long flights, even if it is necessary to allow as much weight as 6 lbs. per brake horse-power. It would appear, in this connection, that the engine requirements of large seaplanes and large bombing aeroplanes are very similar to the above; and it is, therefore, essential, if this country is to regain supremacy in the air, that the aircraft designing resources of this country should be directed towards the production of heavy duty aircraft engines as well as the present high performance type. Low fuel consumption is of extraordinary importance in rigid airships, where long flights of 100 hours and upwards are possible. A saving in fuel consumption of ·05 lb. per brake horse-power means that for every 100 hours of flying no loss in endurance would result if the weight of the engine were increased by 5 lbs. per brake horse-power. A great fault in many aircraft engines fitted to airships during the War is that although reasonably economical in fuel consumption at full power, their economy falls off rapidly when run at the necessary reduction in power to produce reasonable reliability.

A vertical engine is in general more suitable than the "V" type of engine, and should be adopted in all cases where the horse-power required per cylinder is not too great, as it allows for the construction of a narrower power unit of appreciably lower head resistance. A vertical engine is besides, more accessible and easier to repair during flight than the "V" engine.

The most suitable horse-power for airship engines is a matter for careful consideration. As previously indicated, this question is rather a matter for compromise, having regard to the amount of weight desirable to concentrate at a single point, and the number of units required for the ship



THE BODENSEE RIGID: (1) In flight over the shed at Staaken; (2) Passenger accommodation; (3) Feeding arrangement; (4) The craft in its shed; (5) Leaving the landing-ground