

Sheet Metal in ARIEL

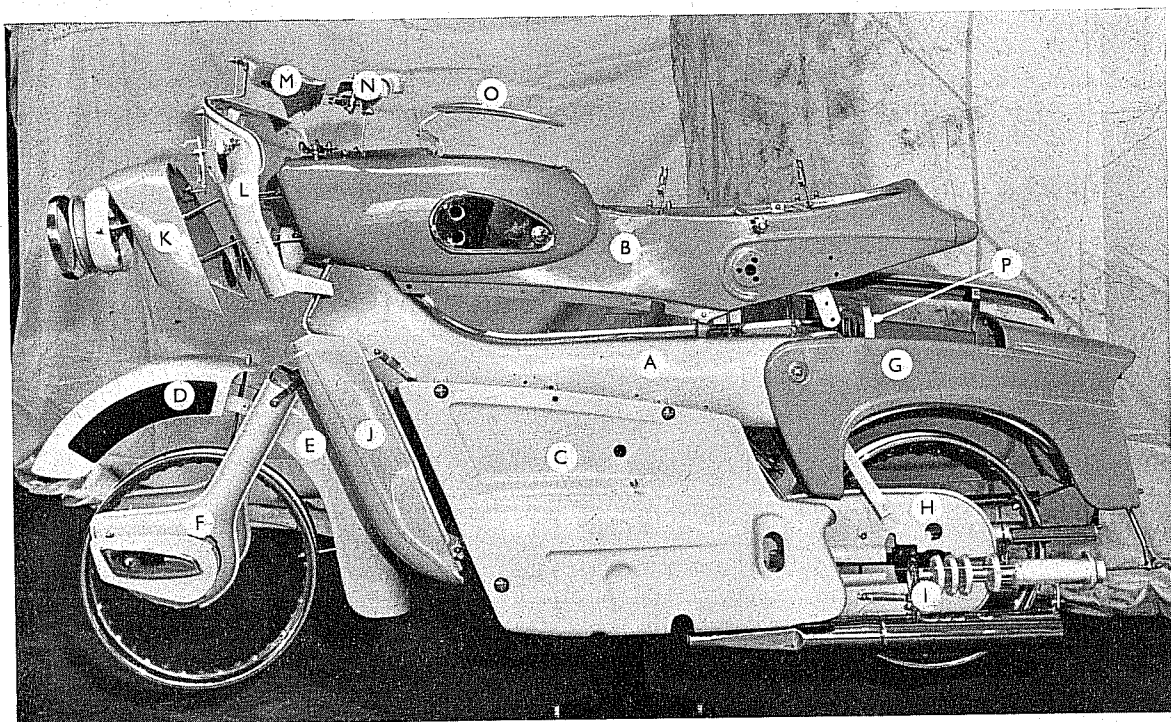
A New Concept in Motor Cycle design . . .

Introduction

WHAT is undoubtedly a most significant step forward in design as far as British motor cycles are concerned was reached in 1958 with the introduction of the Ariel "Leader." Powered by a 249-cc. air-cooled two-stroke engine, the machine is capable of 70 m.p.h., a performance due in great measure to the fact that the main components of the cycle, *i.e.*, the main frame and outer body shell, are of fabricated sheet steel

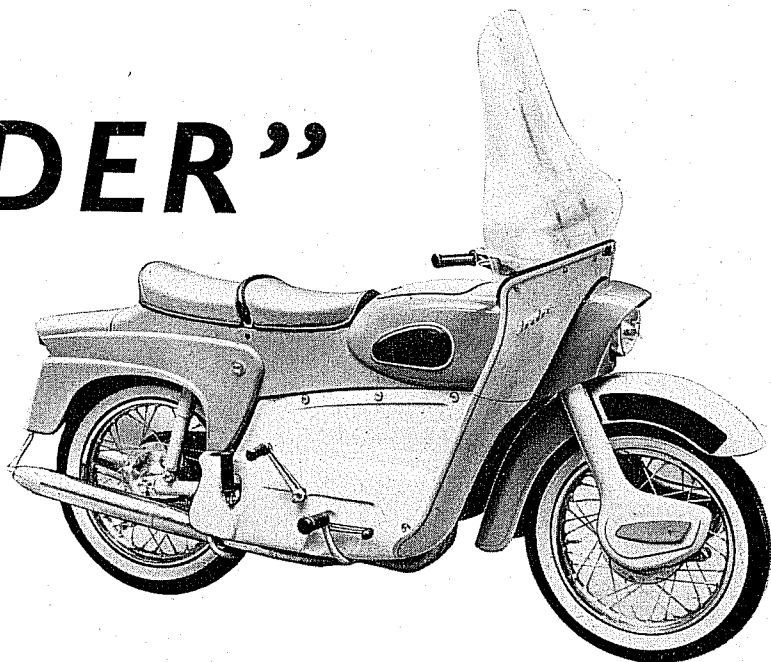
construction (Fig. 1). The machine is almost completely enclosed, but side panels are readily removable to give first-class accessibility to the power unit and transmission. The design of the frame and body is such that there is ample parcel accommodation; the battery and a tool locker are also enclosed within the body; the chain is enclosed in a case composed of two easily removable pressings and the rear end of the body and the rear mudguard hinge upwards to give access to the rear wheel.

Fig. 1.—Some of the component parts of the Ariel "Leader": (A) Main frame; (B) body; (C) side panel; (D) and (E) front mudguard; (F) front-fork leg; (G) tail cover; (H) chain case; (I) exhaust/silencer assembly; (J) leg shield; (K) headlamp cowl; (L) front shield; (M) instrument panel; (N) handlebar cover; (O) glove-box lid; (P) bulkhead (fitted inside frame at rear of petrol tank)



the "LEADER"

By L. J. Bacon



The machine also incorporates a cowled headlamp (Fig. 2), a front shield continued downwards on each side into leg shields, an instrument panel, pressed-steel front forks brazed into a malleable iron steering crown, and a pressed-steel cowl for the handlebars.

The main frame comprises, in general, two 20-gauge steel pressings welded together down a centre-line flange to form a rigid box-section structure (Figs. 3 and 5). The frame is upswept at the front to allow the steering column to fit into the steering head at an angle of 65 deg. The frame cross-section is rectangular with radiused corners, and the sides are bowed to resist drumming. The steering-head end of the frame is slightly tapered and at the rear it widens and is forked

to form the anchorages of the upper ends of the rear suspension spring units.

Fitted inside the frame is a 2½-gal. fuel tank (Fig. 4) composed of two identical 20-gauge pressings welded together. Behind the tank a perforated and ribbed bulkhead is bolted in.

Three box section brackets welded underneath the frame (*see* Fig. 3), also fabricated from 20-gauge sheet, are used to support the engine. The forward two are so positioned that most of the load is taken in shear, and these two brackets are braced by a welded-in channel section bridge piece. The rear bracket, a single unit, incorporates two sleeves, the upper one for the engine attachment bolt and the other for the rear fork spindle. This bracket is also used for an air-silencer chamber, and a stub projecting from the bracket is used for a replaceable air filter.

The rear fork is of welded D-section tube; and below this is a roll-on stand, carried in two engine-unit lugs.

The deep front mudguard is made in two halves with guttered edges, the two halves overlapping at the fork stanchions to which the halves are sealed with rubber beading. To the inner pressing of each fork stanchion is welded a curved channel-section bracket with the flanges facing outward. Welded to the inside of the valances of each mudguard are similarly curved top-hat sections which slide over the brackets. Each mudguard is fastened by two bolts which screw from the inside into captive nuts, and one upward into the fork yoke.



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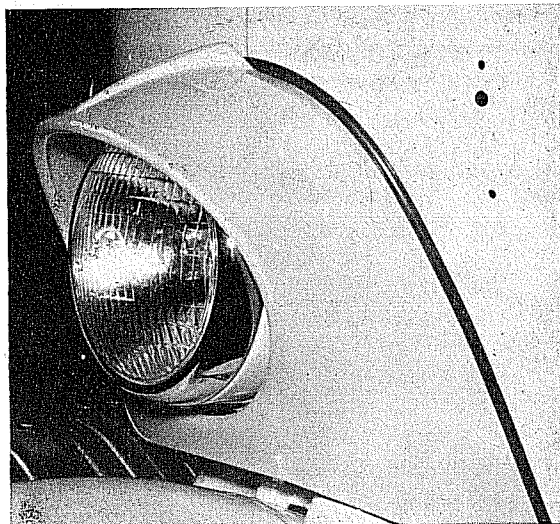


Fig. 2 (above).—Close-up of headlamp cowl

Fig. 3 (right).—Main frame complete with engine-mounting brackets



Fig. 4 (below).—Petrol tank



The body shell that encloses the main frame comprises eight main pressings in 20-gauge steel, *viz.*, the upper mid section, tail portion, two side panels, two lower legshields, frontal fairing incorporating the legshield upper ends, and the headlamp cowl. The upper mid section is itself a welded fabrication of five main pressed components. This mid section is bolted to the main frame, and its forward section is shaped rather like a conventional petrol tank that fits over the steering head. On top of this section behind the steering head is a lockable pressed steel hinged cover giving access to the parcel locker.

The hinged dual seat gives access to the rubber-mounted tool kit and battery, etc., and the opening on which the seat rests is braced by a transverse tube that houses a pull-out lifting handle. The battery is suspended by a U-shape steel strap.

The body tail section (Fig. 6) is attached to the mid-section by a pivot bolt at each side; the side

panels that enclose the power unit are attached to the body by five captive screws with coin slots. The frontal fairing is held to the mid-section by seven bolts, and the upper ends of the legshields fit into channels formed at the base of the fairing. The shields are attached to the main frame at the top and to brackets bolted to the crankcase; these brackets also form the lower front end pick-up points for the side panels.

Other sheet-metal components include the instrument panel and a cowl that fits over the handlebars (*see* Fig. 7). Pressed steel panniers can be supplied if required.

The total weight of the machine is about 300-lb.

The production and assembly of the pressings for the "Leader" is truly a co-operative effort on the part of several firms, including A. J. Homer and Sons Ltd., Fletcher Bros. (Pressings) Ltd., Midland Motor Cycle Mudguard Co. Ltd., and William

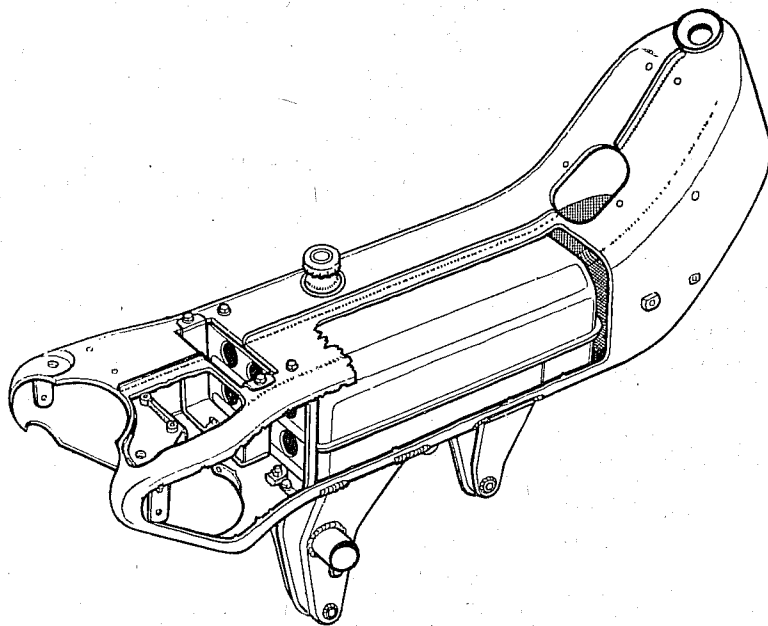


Fig. 5 (left).—General drawing showing construction of main frame cut away to show interior and position of petrol tank

Fig. 6 (below).—Tail-cover assembly

Fig. 7 (below, left).—View of instrument panel and handlebar cover

Pearce (Pressings) Ltd., and for the production of some of the larger pressings a 300-ton Wilkins and Mitchell press was specially installed by A. J. Homer.

As the design of the machine was brought to fruition, it was found possible further to extend the use of sheet metal, for example, for the brake shoes (Fig. 8) and for the clutch unit (Fig. 9), for parts of the front suspension unit, etc. In addition, the silencer assembly is typical of the more conventional use of sheet metal on a motor-cycle (Fig. 1).

Production of Pressings

A. J. Homer and Sons Ltd., Shirley, who are internationally known as manufacturers of motor-cycle and other types of petrol tanks, have a major role in the production of the "Leader." They manufacture the petrol tank, the front forks up to

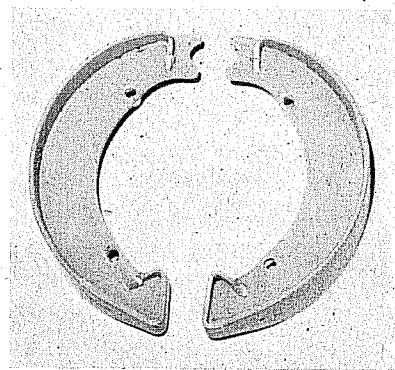
the headstock, the main frame complete, and the bulkheads.

Petrol Tank (Figs. 4 and 10)

Produced from 20-gauge extra-deep-drawing quality steel manufactured by John Summers and Sons Ltd., the petrol tank is pressed in two identical halves on a Taylor and Challen No. 6 double-



Fig. 8 (right).—Brake shoes



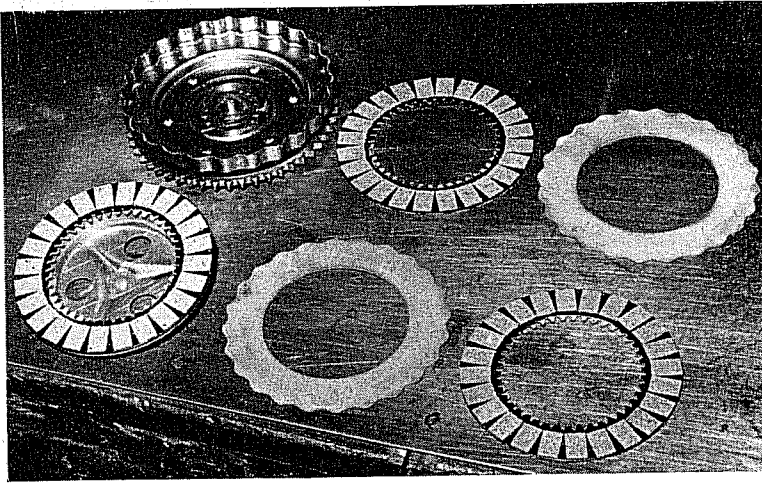


Fig. 9 (above).—Component parts of clutch assembly

Fig. 10 (right).—Dimensioned drawing of petrol tank (extra-deep-drawing steel 0.031-in. thick)

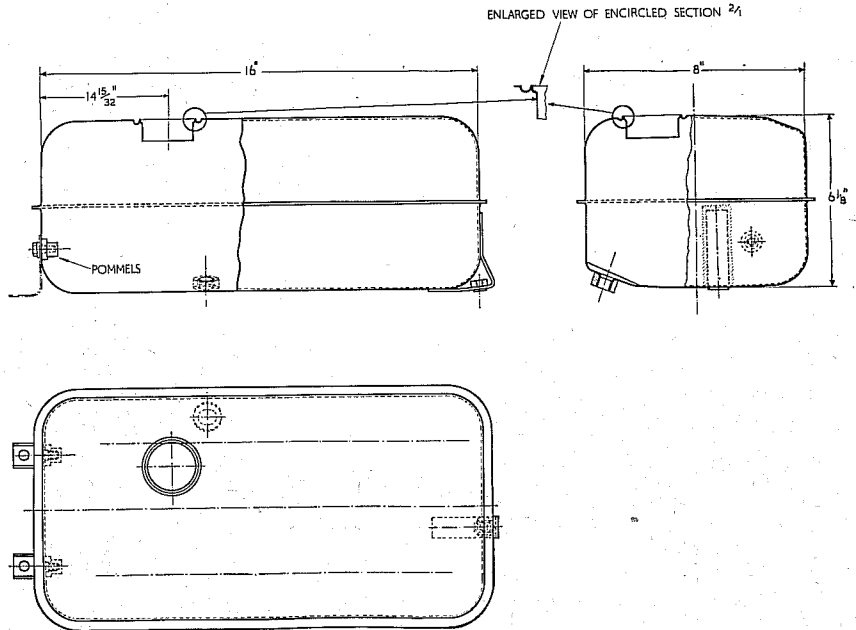


Fig. 11 (below).—Completed fork legs before brazing to steering crown



action press, the sequence being—blank, raise and crop, effected as separate operations. After pressing, the two halves are mounted in a jig and spot-welded together round the flange. Spot-welding is only a “tacking” operation, the final weld round the flange being made by a 100-kVA. British Federal seam welder. This machine has an inclined wheel so that during the seam-welding operation the wheel can clear the front tank mounting bracket attached by spot welding to the

bottom tank pressing before the two halves are tack spot welded. During the pressing operation pierced holes are produced for the filler neck and the petrol tap boss. The filler neck is itself a pressing gas welded into the top of the tank; the petrol tap boss is projection welded (Sciaky 200-kVA. machine) into the bottom of the tank. Also during pressing, holes are pierced to take two threaded bosses, welded to the inside rear end of the tank, to which a right-angled bracket containing four holes is bolted. These brackets form two out of the three mounting points for the tank. A similar boss is incorporated in a simply formed bracket, spot welded to the forward end of the bottom tank pressing; this is the third attachment point for the tank. The completed tanks are