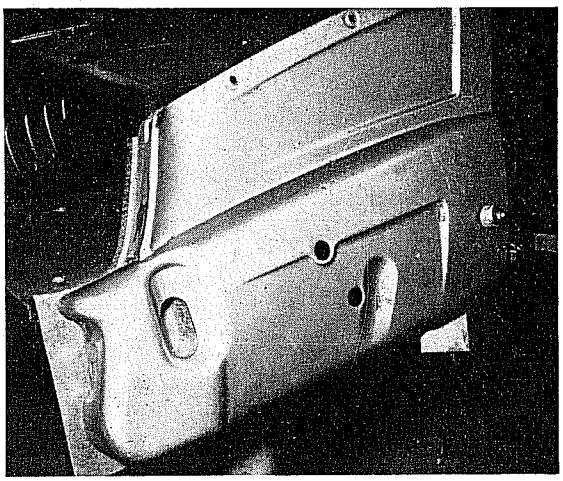


Fig. 28 (above).—Side panel set up for planishing

producing high-quality pressings for the motor and allied trades for many years.

The components produced for Ariel Motors Ltd., comprise :—

(i) Body side panels ;
(ii) Headlamp cowls ;
(iii) Front shields ;
(iv) Legshields.

Body Side Panels (Right and Left Hand)

These panels (Fig. 28)—formed from 22-gauge material—provided a problem in the early stages. No double-action presses were available, and a Wilkins and Mitchell press No. 844, equipped with air cushions, was eventually used for the job. Although the dies were fitted with draw-beads, a great deal of experimenting with blank sizes, material specifications, cushion pressers, etc.

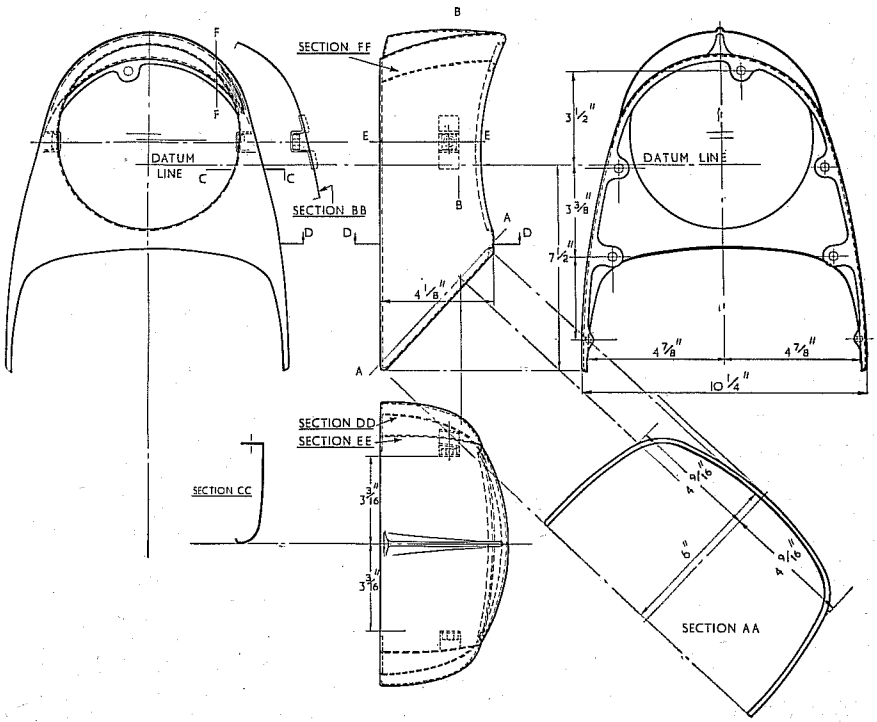


Fig. 29 (right).—Drawing of headlamp cowl (22-gauge deep-drawing steel)

due to the stiffening plate welded into the frame, as previously described.

The body of the machine which is assembled by A. J. Homer consists of eight main components assembled in jigs (Fig. 27) at first by gas and spot tack welding. Final welding is by spot welding at the Ariel works. These body pressings are produced by Fletcher Bros. (Pressings) Ltd., Holyhead Road, Handsworth, Birmingham 21, who also produce other pressings for the " Leader " motor-cycle. This company is a member of the Concentric Group of Companies, and has been had to be carried out before the panels could be successfully formed to full depth in one operation.

All the usual troubles, *i.e.*, cracking, puckering, crowding of metal into corners, etc., were successively met with and overcome, and the best results are now being obtained by using stabilized material.

The gauge thickness is closely controlled, and R. D. Nicol's " Droyt " drawing compound is used.

It is also interesting to note that a small piece of coarse emery paper placed on the blank was the answer to the problem of metal being drawn from several directions and converging at a point which

made crowding of the material almost inevitable, and—although considerable experimenting was carried out with draw-beads—the use of emery paper provided the complete answer.

Subsequent operations included the piercing of the majority of the numerous holes in one operation, and clipping operations to get rid of the surplus material and finalise the shape of the pressings.

All the tools were produced in the firm's own tool room, and because of the fairly modest output required, easily maintained tools were provided.

Headlamp Cowl (*Figs.* 2 *and* 29)

The headlamp cowl is also an interesting pressing, and initially the chief difficulty was to provide a good and presentable finish to the top

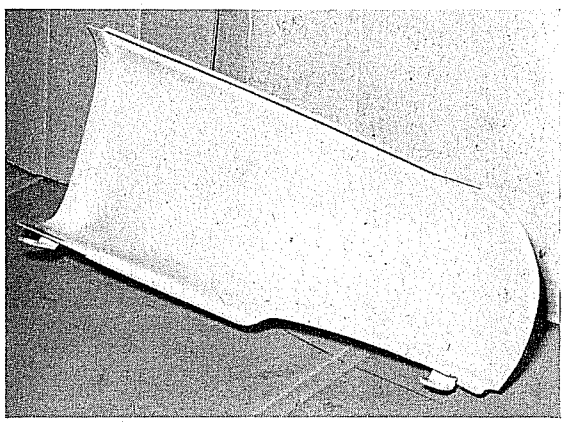


Fig. 30 (*above*).—*Interior view of leg shield*

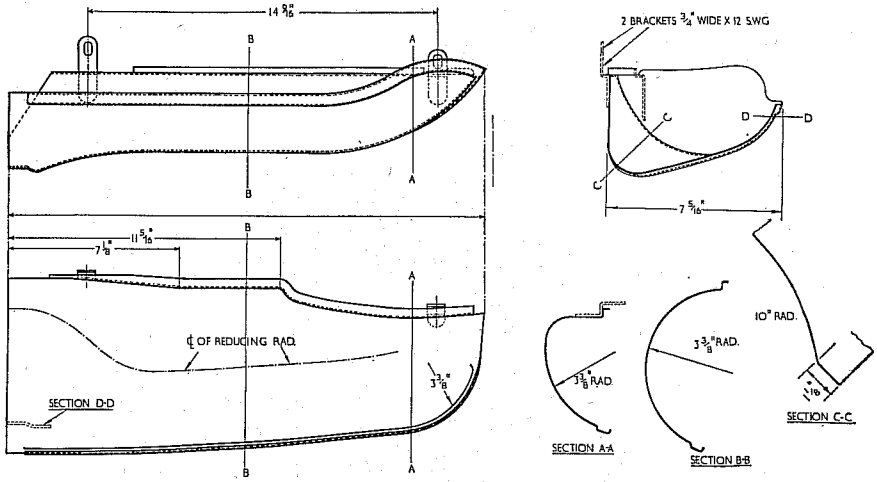
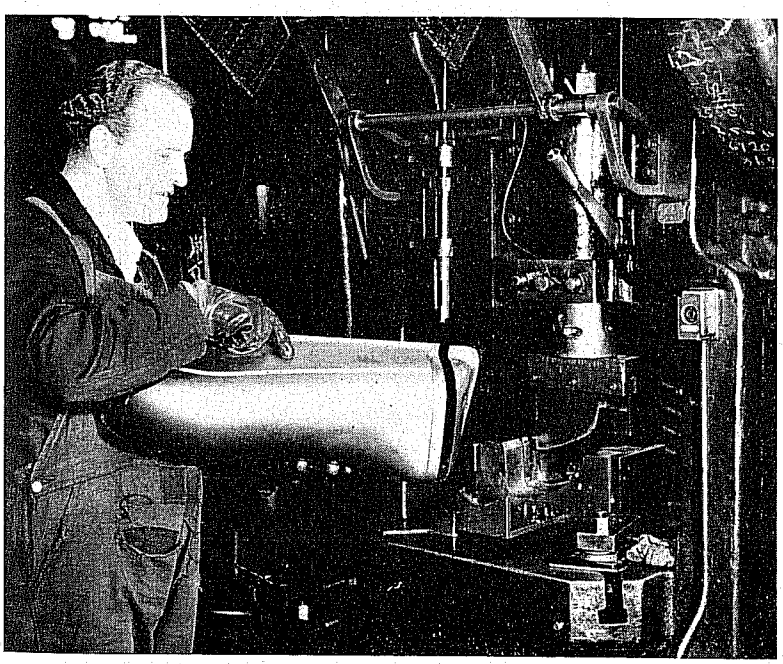


Fig. 31 (*left*).—*Dimensioned drawing of leg shield* (22-*gauge deep-drawing steel*)

Fig. 32 (*below*).—*Clipping operation on sides of leg shield* (*Sweeney and Blocksidge No.* 38 *press*)



of the cowl, *i.e.*, the portion which the rider would see when seated in the saddle.

As originally designed, the rib was not included, and it can readily be imagined that the combination of the two large radii—running at right angles to each other—resulted in puckering and crowding of the metal.

The method originally used was to notch out a V-shaped piece of metal and close the edges together to provide the contour called for by the drawing, but as welding and pressing operations were involved, the method proved very costly.

In consultation with Ariel Motors Ltd., it was decided that pushing up the surplus metal to form a rib would not

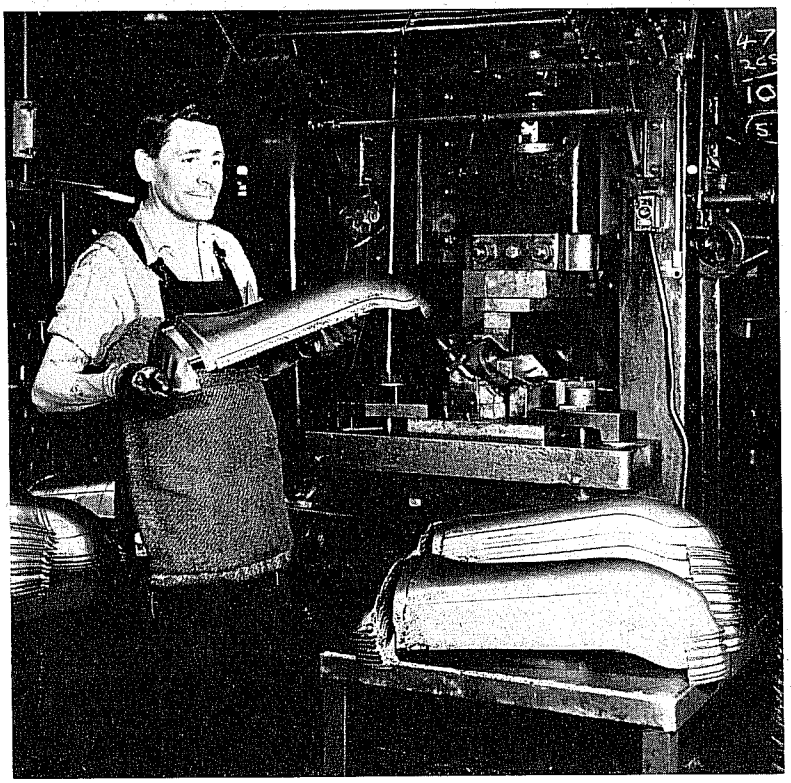


Fig. 33 (left).—Clipping operation on bottom of leg shield

Fig. 34 (below).—Dimensioned drawing of handlebar cover (20-gauge deep-drawing steel)

only improve production, but also result in a more streamlined and pleasing appearance.

Front Shields and Legshields (Figs. 30 to 33)

The front and leg shields presented no undue difficulties to produce, although it was found necessary to use stabilized material, and pay particular attention to gauge thickness to ensure that the pressings were free from " kinks " and surface blemishes.

Another firm invited into the team chosen to produce components for the "Leader" was William Pearce (Pressings) Ltd., 44, Ormond Street, Birmingham, 19.

A firm of wide repute in the car and motor-cycle manufacturing industries, about 120 staff are employed, and in the 25 years the company has been in existence, a considerable amount of experience and " know-how " of the complexities of metal forming have been built up.

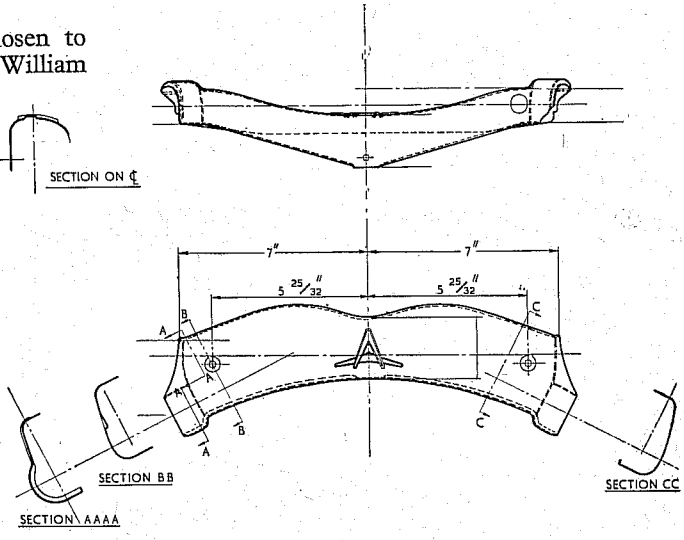
Pearce's undertook to provide 47 components for the machine, and to produce these, approximately 450 sets of tools have been designed and manufactured by the company itself. To meet the time schedule initially drawn up for production samples, the company's tool room developed the tools within nine months, and not one of the samples subsequently submitted was rejected by Ariel Motors Ltd.

The main components being made by Pearce include the instrument panel, handlebar cover, and clutch housing (*see* Figs. 7, 9 and 34). When the original cast brakeshoes were later replaced by others fabricated from heavy-gauge sheet steel, these also were made by the company (Fig. 8).

The company are currently building a new factory in the Brownhills area of Birmingham for presswork and final assembly, and the main press shop is to occupy 7,000 sq. ft. Office and store accommodation, laid out on modern lines, will complete what will be an attractive and efficient plant.

Instrument Panel

The material used for this component is 22-gauge deep-drawing-quality mild-steel sheet with full



finish. The component was too large to be formed on the firm's existing double-action presses, and a Taylor and Challen Model 1664 100-ton open-fronted press was used. Despite this apparent fitting of a " quart into a pint pot," a satisfactory component was produced.

Brief details of the Taylor and Challen 1664 press are as follows :—An open-fronted geared press, the bed and slide are of large area, and both have machined T-slots. The slide is spring balanced, and ample tool space, combined with rigidity of frame, make the press useful for a variety of comparatively heavy press operations. A patent automatic key clutch and one-stroke trip gear are fitted as standard. The machine will cut out a blank in mild steel 19 in. dia. by $\frac{3}{32}$ in. Extra equipment obtainable includes top and/or bottom extractors, spring or pneumatically-operated die cushion (for use with combination tools), and an adjustable stroke giving a range of $\frac{1}{2}$-in. to 4-in. or $1\frac{1}{2}$-in. to 5-in.

The stroke maximum is 7-in. (usual 4-in.) with a usual rate of strokes per min. of 35. Bed area, right to left, is 44-in., and front to back 26-in.

Made from a sheared blank, the panel was first raised and embossed on its top section, then clipped and redrawn. Side cropping and piercing tools were employed for follow-up operations, so that hand work has been virtually eliminated in production.

After tooling had started, the panel section was deepened by a considerable amount, and it was at this stage that it was discovered that the component was too big for the double-action press initially scheduled for the job. The tools were adapted to the Taylor and Challen press with successful results.

Handlebar Cover (Figs. 7 and 34)

Produced from the same gauge and quality sheet as the instrument panel, a developed blank was used for the handlebar cover to eliminate a number of cropping tools that would otherwise have been required.

Most of the larger raising tools used in manufacture were produced from nickel-chrome castings, cast to close size control, and the company says that this enabled considerable economies in tool costs over conventional methods.

The difficulties experienced in making the cover were caused by crowding of the metal into the centre section, and skidding during the raising operation, particularly since no tooling holes were available for use as locating points.

Crowding was overcome by incorporating a raised letter " A " as an embellishment on the top face of the cover. A developed blank was reverted to when it was found that a balancing effect created by increasing the blank on the short side led to the crowding reaching impossible dimensions. With a developed blank the embossed " A " was sufficient to overcome this difficulty. Semi-combination type tools were used for the raising of the panel.

Skidding commonly experienced with this type of raising varies considerably, of course, when a discrepancy in the nominal gauge of the metal is encountered, a variation of 0.003-in. being sufficient to make the job impossible.

A pre-bending operation introduced before the raising procedure largely overcame this problem.

The sequence of operations finally adopted for making the cover was, therefore: forming from a developed blank, pre-bent, raising, forming and piercing the back, and turning in the ends to fit in the twistgrip groove of the handlebar.

Clutch Housing

The clutch housing (Fig. 9) is a two-dimensional diameter shell of 16-gauge sheet steel. The open

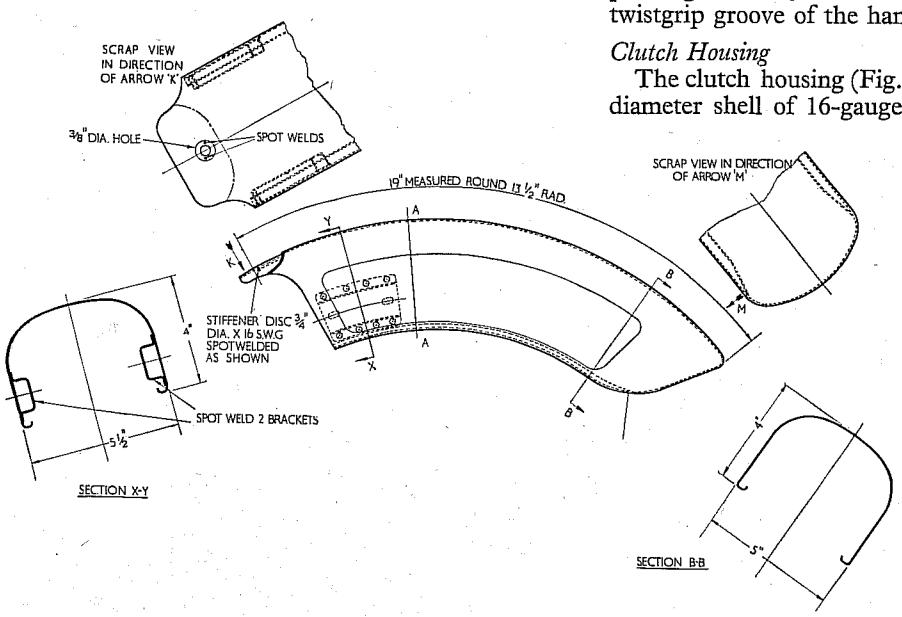


Fig. 35.—Dimensioned drawing of front mudguard leading section. (E.N.2A, 22-gauge)

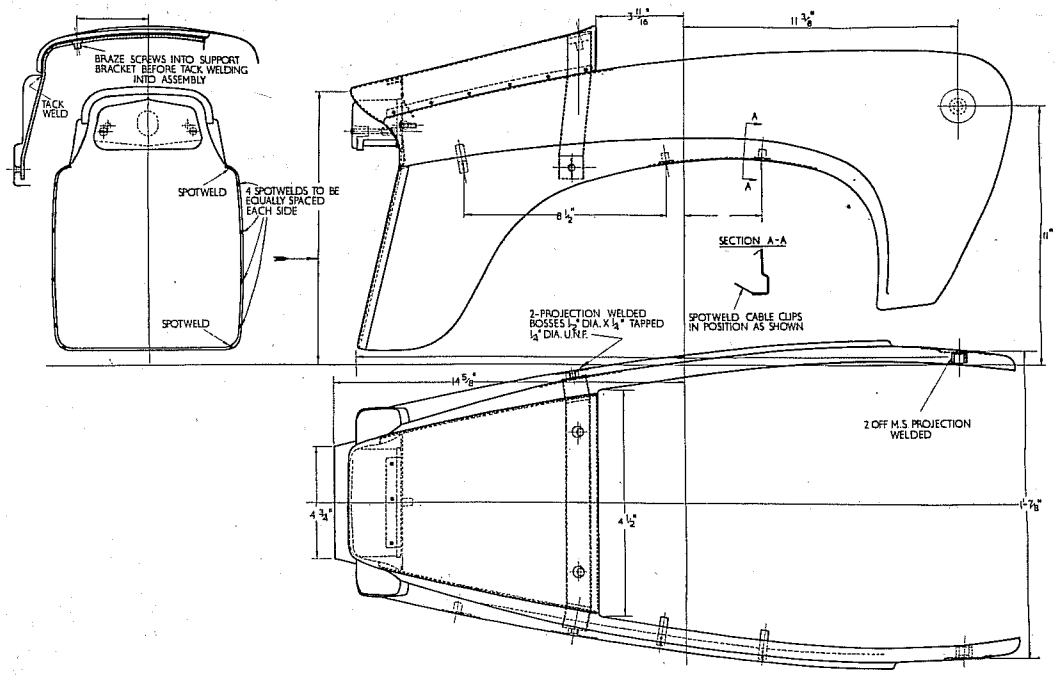


Fig. 36.—Dimensioned drawing of tail cover assembly

end of the large diameter is scalloped around the periphery to match corresponding tongues in the clutch plates.

Using a formed blank, the raising operation is made with semi-combination tools, and the housing is subsequently blocked to impart the critical squareness and flatness required for the plate bearing area.

* * *

Another firm making components for the "Leader" is Midland Motor Cycle Mudguards Ltd., Sandy Lane, Birmingham 10, founded only six years ago as an associated company of Bacol Manufacturing Co. Ltd., a firm specializing in the manufacture of press tools and presswork.

In this comparatively short time the company has expanded rapidly, and additional premises have recently been acquired to contend with increasing demands.

The company is adept at devising tools for the more unorthodox type of presswork. Prototype examples of intricate forms that have recently been made by them include a front mudguard of modern design that incorporates a deep sectioned body fairing, and a cowling that provides not only a shroud for the top section of a telescopic fork, but also a housing for a headlamp unit.

Three major components for the "Leader" being made at the company's works are the front mudguard, the rear chaincase, and the tail cover assembly.

Front Mudguard (*Fig.* 35)

This comprises two pieces—a front and a rear—formed from high grade 22-gauge steel.

Many operations are involved in the manufacture of these guards, from an initial rolling to form a straight section carried out in one operation on a rolling machine; this utilizes six sets of precision rolls driven by a 25-h.p. motor through a reduction gear. After train rolling the section is passed through a curving machine, comprising top and bottom precision rolls and a slipper or former that can be mechanically adjusted to give the required radius. Any radius can be obtained by adjustment of the slipper. The drive to the machine is from a 7½-h.p. electric motor through a chain.

All-special purpose equipment and precision rolls for these operations were made by Midland Motor Cycle Mudguards.

Tail Cover Assembly (*Figs.* 6 *and* 36)

The tail cover assembly is fabricated from four pressings, all of 22-gauge d.d.q. mild steel, comprising a left- and a right-hand side panel, a top cover, and a number plate. The four components are spot welded together, and a raised strap in 10-gauge steel is brazed between the side panels and top cover to provide a rear anchorage for the component on the motor cycle.

Used in the production of these parts are a Hordern, Mason and Edwards 200-ton double-sided double-crank press, two open-fronted presses,