"WOLSELEY COACHWORK" - *AUTOMOBILE ENGINEER APR 1935*

WOLSELEY COACHWORK.

Production Methods and Plant Employed in the Wolseley Body Building Section.

COACHWORK of the composite type continues to enjoy considerable popularity with car manufacturers. Their main reason for adhering to the composite method is that it permits design changes to be made at reasonably frequent intervals without entailing great expenditure. It also avoids the necessity for working too far ahead in the matter of design as related to public taste. The pressed-steel body has its advantages, but where a product is intended to appeal to a critical class of buyer, who often is fickle in the matter of design, the composite method is usually preferred. It is for these reasons that Wolseley Motors (1927), Ltd., have concentrated upon the production of composite coachwork, and their body building plant, which adjoins the chassis production shops at Drew's Lane, Ward End, Birmingham, is one of the largest in the country devoted entirely to the manufacture of composite-built bodywork.

This extensive plant is entirely self-contained, and in it all major production operations are undertaken. The work is mainly concentrated in three shops, although one or two operations, such as panel-pressing and welding, are carried out in shops doing similar work connected with chassis production. The main shops in order of progress are the body assembly department, paint shop, and finishing and mounting department. The first two shops adjoin, and the paint shop is connected to the final finishing department by an overhead conveyor, these two shops being some distance apart. This, then, is the approximate layout of the Wolseley body building section, which is equipped with the most up-to-date appliances.

One of the most interesting aspects of the Wolseley body department is the mill, which forms part of the main building. Almost half of an extremely large shop is devoted to milling operations, the aim being that the body members shall reach the sub-assembly in as finished a state as possible, thus reducing the number of skilled operatives required. This has involved the installation of thoroughly modern woodworking machinery and a notable feature of this department is its cleanliness, which is largely due to the installation of Keith and Blackman dust extracting equipment, which by means of pipes adjacent to each machine leads sawdust into main overhead conduits and delivers it to the power house.

The mill equipment comprises machines by various well-known manufacturers. There is ample space round each machine to facilitate the stacking of timber or body members to be machined, and body members both before and after individual milling operations are stacked on six-wheeled trolleys and are ready for transfer to another part of the shop. Timber in the rough is docked along one end of the shop and according to the weekly schedules is drawn upon, being first inspected for faults, and then marked out. It then goes to a circular saw, one of which is of the pendulum type produced by Thomas White and Sons. This type of saw is favoured since it avoids overhead gear and is entirely self-contained. The circular saw has a speed of 3,000 r.p.m. and is particularly light to operate, the saw being drawn across the timber by a convenient handle.

Amongst other interesting equipment which the mill contains is an automatic double-ended tenoning and cross-cutting machine, also made by Thomas White. This machine, which is illustrated in Figs. 4 and 5, embodies four endless tracks, two at each side, the two lower tracks carrying suitable stops which convey the timber to be machined past circular saws arranged at each side. Having thus been cut to length the motion of the endless chains carries the work a stage farther to cutters mounted on horizontally arranged spindles, one above and one below the

Fig. 1. A high-speed router and typical instrument board jig.

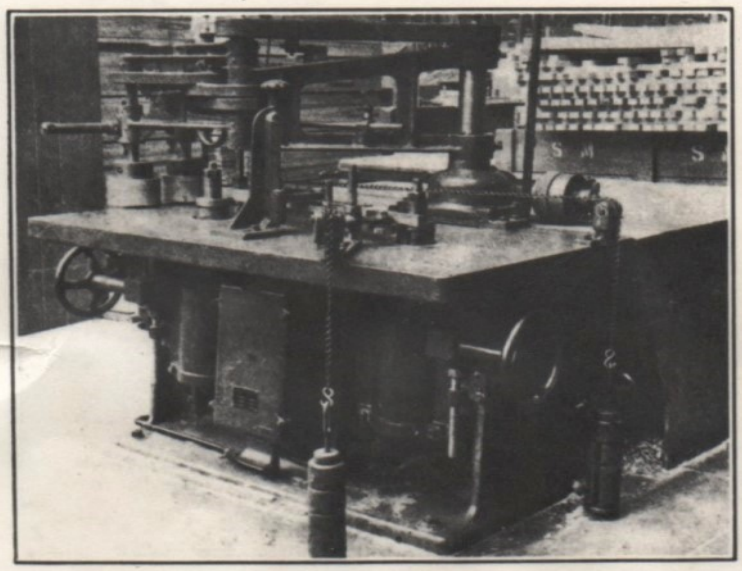

Fig. 2. A double-spindle vertical moulder for pillar shaping.

Fig. 3. A White straight-line edger with conveyor-type bed.

feed line on each side. These cutters are set to give the required depth and length of cut, and tenon the end or ends of the member. At the far end of the machine the work is dropped on to a table and passes to an adjacent rack. On one side the tracks, together with the adjacent tenoning heads and circular saws, have lateral movement as one unit accomplished by electrical aid, and in this fashion timber of varying length is accommodated.

Another interesting White machine is a straight-line edger shown in Fig. 3, embodying a circular saw mounted above an endless track. This track is several inches wide, and one of its features is that it can be made to stop instantly by pressure on a pedal. This machine is used for approximately shaping the body members, prior to cleaning up to exact shape.

The mill also contains an extremely useful machine in a Robinson double spindle vertical moulder with double roller feed, which permits the shaping of large quantities of irregular timber with extreme rapidity, in fact, when this machine is in operation five men are required to tend it, some of course being occupied in applying the jigs, and others in feeding and removing the machined timber. The machine, which is shown in Fig. 2, incorporates a pair of automatic feed rollers. Timber is fed diagonally between the two cutter heads by means of the rollers, and the cutter heads may be adapted for either plain or mould cutters.

At the Wolseley works it has been found advantageous to shape the ends of the jigs to a rounded V contour rather than to the stepped register previously employed, as the improved method avoids jig breakages and permits the work to be fed through the rollers in a continuous stream. Adjustment for varying thickness is an easy matter and is accomplished without stopping the machine. Three rates of feed are available, these being 15ft., 30ft., and 45ft. per minute, and in the case of the machine employed at the Wolseley works rubber-covered feed rollers are used to avoid marking stock.

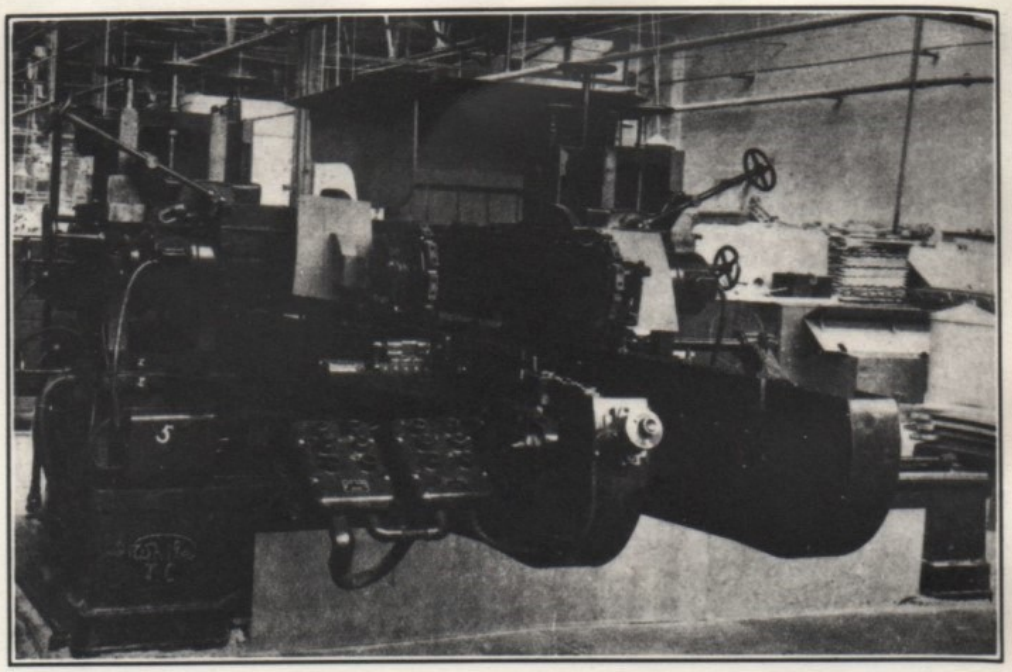

Fig. 4. The double-ended tenoning and cross-cutting machine.

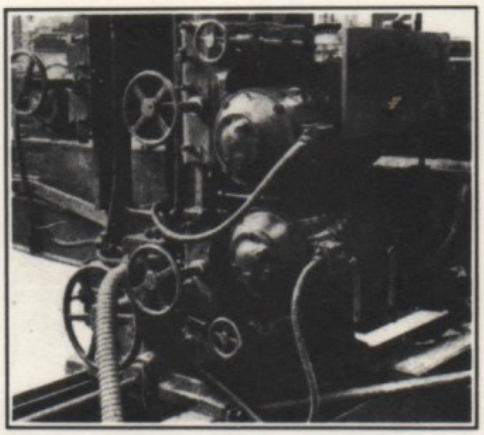

Fig. 5. A view of the cutting heads on the double-ended tenoning machine.

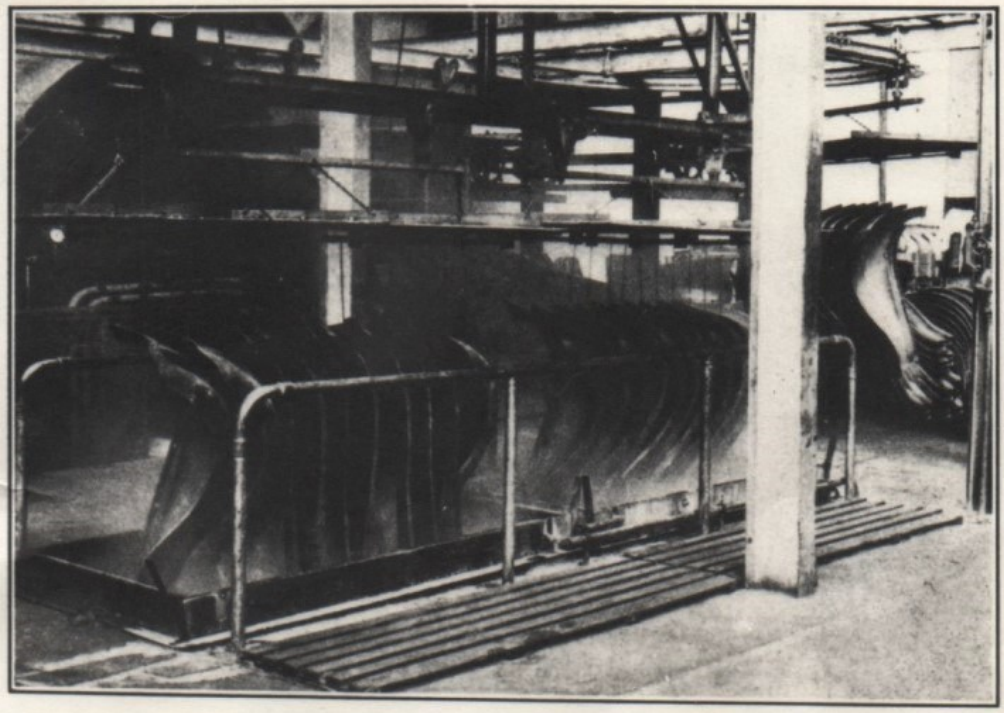

Fig. 6. A batch of wings being lifted from the Bonderising tanks.

The mill also contains a finger-feed surfacing machine by T. Robinson and Son, Ltd., which consists basically of a surface planer with an extra long table and an automatic finger-feed mechanism mounted above it. The finger-feed comprises a number of spring-loaded plungers having tooth-shaped ends which exert a gripping action on the wood, keeping it firmly pressed against the table, the motion of the finger-feed mechanism, which is on the endless track principle, carrying the stock over the cutter block. It is usually found best to feed the stock in diagonally, and the speed with which perfectly planed stock is obtained is of great advantage when dealing with production body-work.

Recent additions to the Wolseley mill include two Wadkin high-speed routers, one giving speeds between 10,000 and 18,000 r.p.m., whilst the other works at from 18,000 to 24,000 r.p.m. This type of machine has a variety of uses and at the Wolseley works it is principally employed for shaping dashboards and trim panels, the latter being cut to shape at the rate of six per operation, the router taking a half-depth cut each time. The underside of the jig, of which a typical example is shown in Fig. 1, contains a groove following the exact contour of the work to be machined, this groove engaging with a stud projecting from the table. Thus it is only necessary to rotate the jig about the stud to obtain the desired shapes.

On this machine also pillars and similar body members receive the grooves which accommodate direction indicators, and many operations of similar type can be undertaken. It does away with the necessity for marking out, boring and jig-sawing operations, and after leaving the router it is only necessary, in the case of an instrument board, to place the work on an appropriate spindle moulder to round off the corners of the cubby hole and instrument panel openings. Altogether the mill contains twenty-one vertical spindle moulders.

Another interesting woodworking machine is a hollow chisel mortiser by

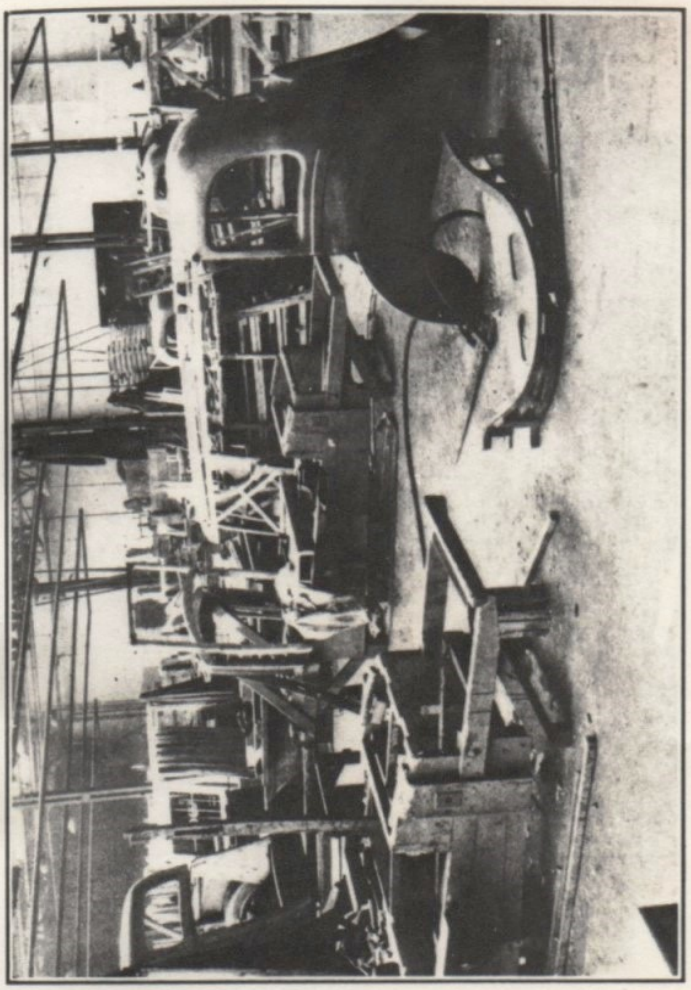

Fig. 8. Body unit assembly prior to placing on assembly lines.

10. The wing mounting department adjoins the final finishing shop.

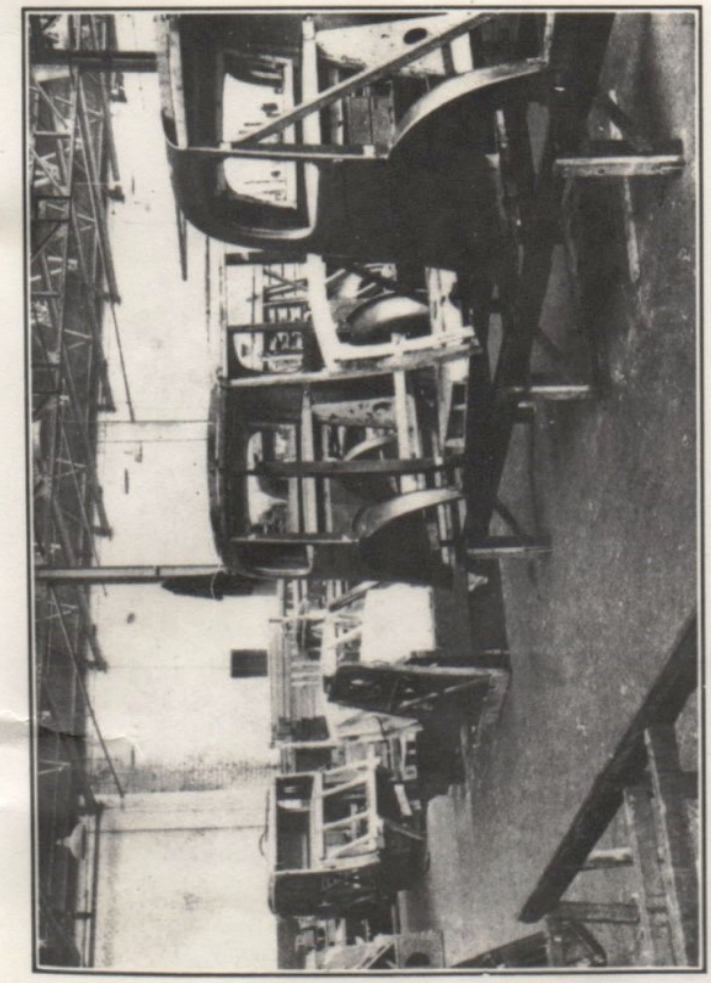

Fig. 7. The beginning of one of the body assembly lines.

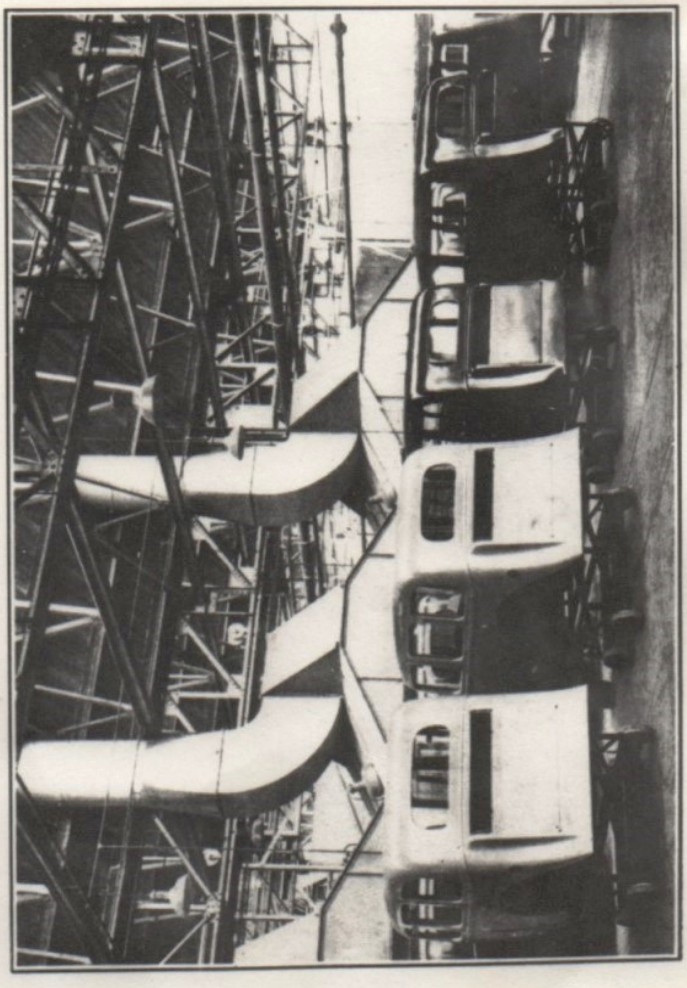

Fig. 9. Bodies about to receive lacquer coats.

GENERAL VIEWS IN THE WOLSELEY BODY BUILDING SECTION.

Thomas White and Sons, Ltd. With earlier machines of this type using a continuous bit, it was found that chips working up through the hollow chisel and emerging from a suitable slot were inclined to bind, causing over-heating and sometimes forcing the chisel sides apart. This has been overcome by the use of a serrated bit which effectually breaks up the chips, enabling them to be ejected much more easily.

A certain amount of grooving work is carried out on a spindle moulder equipped with a wobbling saw, the saw being set at an angle, in relation to the table, and by the application of an emery block the teeth are set to give a perfectly square-cut recess. Greater accuracy is ensured by the use of two saws placed one on top of the other on the spindle. A spherical collar on each side of the saw permits the necessary diagonal adjustment.

The upper half of this shop is devoted to body assembly and in it are carried out all those operations which eventually lead to the production of the completed body shell ready for painting. On one side the doors are assembled and panelled. Finished timber details are drawn from a store between the mill and the body building department, and with the aid of jigs are glued and screwed together to form door frames. The joints are then cleaned on a spindle moulder, and the work is passed to adjoining tables where the flanges over which the panels are to be turned are applied in jigs.

The next operation is to place the flanged door frame on to another jig containing a pressed-steel panel, the edges being then hammered over and finally secured with the aid of a pneumatic hammer. This method gives a clean and permanent fixing and the doors then receive locks and hinges. Adjacent to this department are seven assembly lines, each of which is capable of an output of twenty-five bodies per day.

Across the top end of the shop, that is, above the starting end of each assembly line, there is a department devoted to the assembly of body units. These units comprise the back quarter assembly, the roof, and the front scuttle unit. The bottom frame is also assembled on a chassis jig, and on this the major units are mounted. At this stage the centre pillars are also framed in. The skeleton framework is then removed from the chassis jig and lifted on to a carrier principally composed of angle iron and provided with outriggers corresponding in width to the width of the assembly track. The framed-up body, mounted on its temporary jig, is then placed on the track, which is not mechanically operated, and during its progress down the line receives attention in the hands of various operators and arrives at the bottom end as a completed body shell ready for painting.

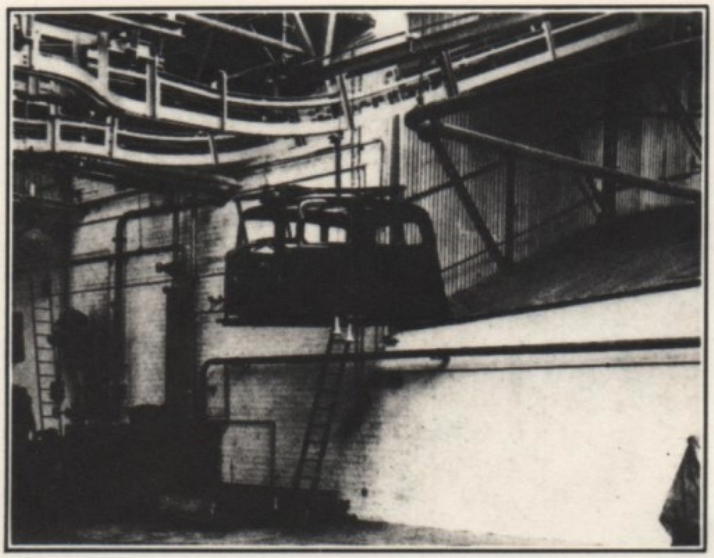

Fig. 11. A cellulose body shell entering the finishing and mounting department.

Fig. 8 shows the top end of the assembly line with a panelled quarter unit in the foreground. To this quarter unit has been applied the roof framework, and the assembly is then ready for lifting on to the chassis jig seen on the left, this jig also containing the assembled bottom frame and the scuttle unit. On one side of this body assembly shop the panels, as received from the tinsmiths after welding, are placed in a jig and flanged, and Fig. 12 illustrates a wheel arch panel during the course of this operation.

The completed body shell is wheeled through to the paint shop, passing first down one side of the building and receiving its undercoats, rubbing down being carried out at the end of this first line. The body then passes back down the centre of the shop, receiving its lacquer coats, each group of spray booths being followed by drying ovens.

The body is once again turned at the top of the shop and passes down the other side for polishing. On this side also wings and casings, brought in by a King dual-duty conveyor from the body assembly department, are stove enamelled after degreasing and Bonderising. When finished these articles are again attached to the conveyor and transported to the trimming, finishing and mounting department. The bodies also are taken to this department by means of the conveyor, and Fig. 11 shows a body as received in the mounting department. This department is equipped with eight finishing lines, each 240ft. long and moving at a speed of 5½in. per minute. Four of these lines are devoted to trimming and the fitting of body accessories, and the remaining four lines are for mounting and finishing.

In all departments a high standard of work is demanded and frequent inspection ensures that no faulty work is allowed to reach a stage where it may interfere with production. In this article more attention has been devoted to the mill than to the remaining departments, but this is because the mill represents quite one of the most interesting aspects of a very efficient plant. Little has been said concerning the trimming department or the panel pressing shop. The panels are produced on Bliss presses, whilst in the extensive trimming department which adjoins the paint shop, the work is conducted entirely with the aid of Singer machines. In this department also some of the higher priced cars are trimmed.

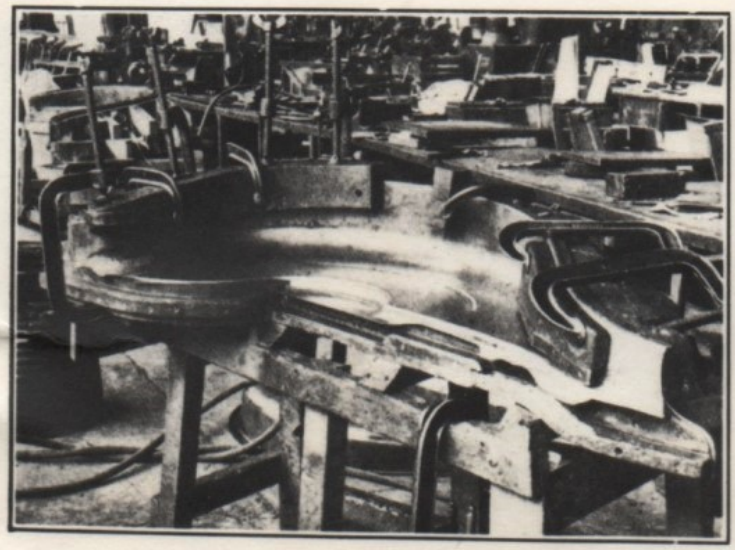

Fig. 12. A jig for wheel arch flanging.

Fig. 13. A typical door panel jig.