

WOODEN CAR BODY & FRAME CONSTRUCTION & RESTORATION[©]

by James Vetrano

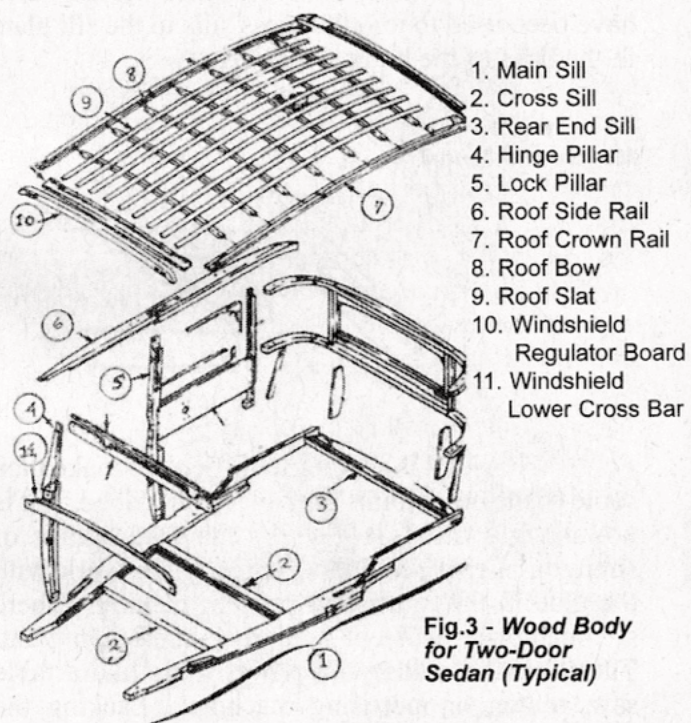
TABLE OF CONTENTS

Part II

AN OVERVIEW OF THE PROJECT JOINERY

AN OVERVIEW OF THE PROJECT

In previous sections we have talked about the type of wood needed and where to purchase it. Then we talked about the tools needed for the job. From here the discussion will become increasingly specific, starting with the joinery methods and concluding with actual project details. Before proceeding to these topics, it will be helpful to look ahead at the finished project. FIG. 3 shows a view of a typical wooden-bodied two door sedan. Some of the component parts have been named to help identifying their location in the project when referred to in the text.



JOINERY

Joinery is the process of making a fast, secure joint between two pieces of wood. The art of joinery is so extensive that entire books have been written on the subject. The gamut of wood joints runs from a simple nailed butt joint of a stud to a plate to a highly complicated, closely fitted interlocking joint sometimes found on oriental furniture. These joints often do not even require glue for strength or stability. Most custom furniture makers use a variety of glued joints somewhere between these extremes in complexity. A builder of a wooden auto-body needs relatively few types of joints.

When building a wooden auto-body it is best to copy the joint used in the original construction, if that can be determined from what is left of the original wood. Some of the joinery methods you will probably need are described below. But first a general word: all joints must be closely fitted. You should not depend on glue to fill a joint with gaps. You need to pare with a chisel or smooth with a rasp or sand-paper all of the mating surfaces so that they fit flush to each other. Then you need to apply glue and clamp the joint tight until the glue sets. The resulting joint will be strong, if the joint has been tightly fitted. Custom furniture builders do not reinforce the joints with screws because screws are unsightly and usually not necessary for the loads to which furniture is subjected. An auto-body, on the other hand, is subjected to a lot of twisting and bouncing that could eventually weaken it. If you do use a screw here and there, be sure the screw head does not interfere with the metal skin covering the wooden body.

Edge-jointed Boards

Sometimes it is necessary to edge-glue two pieces of wood together to make a wider board. Edge-glued boards are very strong. Start the joint by planing the edges straight and smooth. Then glue and clamp them together with bar clamps. (FIG 4). In practice, you may find that when you apply clamp pressure, the two pieces slide around making it hard to achieve flat

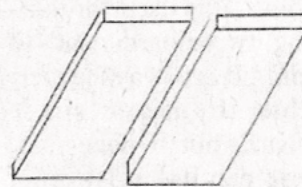


Fig. 4. Edge-jointed Boards

alignment. To overcome this, you can cut a groove in each edge piece to be jointed, and fill it with a spline of thin plywood.

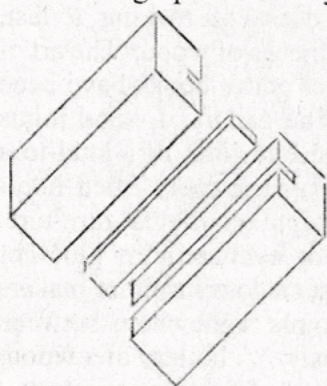


Fig. 5. Spline Joint

This prevents the two pieces from upsetting under pressure of the clamps. (FIG 5) The plywood spline gives a moderate but unneeded extra amount of strength to the joint. Its main purpose is to keep the jointed board level. This joint may come in handy when making floor boards or interior door panels.

Face-jointed Boards

Sometimes you need a board a little thicker than the ones you have. The thicker board might be required for a door pillar or for the sills. You can build up a board to the required thickness by surface-planing the faces to be joined. You will want to start with a sandwich that is slightly thicker than the thickness desired and then finish-plane to thickness after the glue-up. To glue this joint, spread glue on one surface, using a brush if necessary to get complete coverage. Then clamp the assembly with lots of C clamps. Just clamping on the ends is not enough. The board will buckle ever so slightly in the middle, leaving a tiny gap that will not be strong. You need to put C clamps every five or six inches along the length of the board on both edges. If your clamps will not reach the center of an extra-wide board, drive in a few screws down the center of the middle of the board, and draw the boards together with these screws. The screws can be removed after the assembly has dried.

Lap Joint

A lap joint is a special form of face joint. It is used for joining two boards end to end. It is always preferable to use a single board, but if necessary, you can use a lap joint to form a board longer

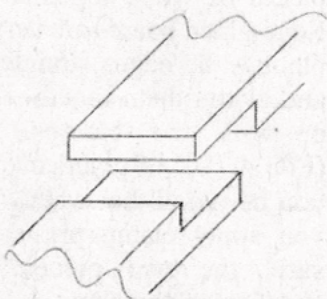
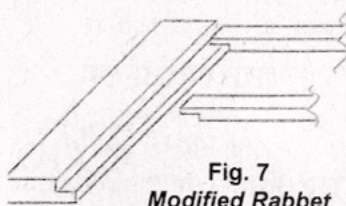


Fig. 6 Lap Joint

than one you have in stock. (FIG 6). It is a fairly strong joint, if you use a lot of overlap. Be sure the faces are smooth and parallel; then glue and clamp.

Rabbet Joint

In building a roof assembly on a closed car, the top ribs will need to be joined at their ends to the roof crown rail. The best way to do this is with a modified rabbet joint. (FIG 7). You essentially make a ledge in the crown rail and the ribs are glued



**Fig. 7
Modified Rabbet**

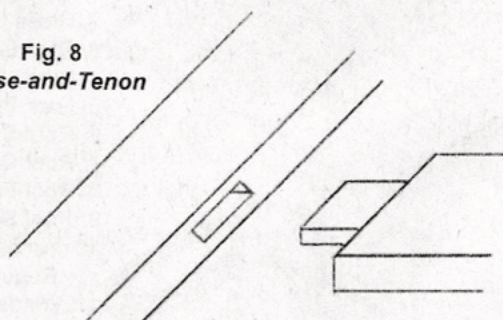
to this ledge. You can make the rabbet cut on your table saw or with a router. When gluing you need to clamp each joined surface until the glue sets.

This same style of joint is also often used in joining the cross sills to the main sill on a wooden auto body.

Mortise-and-tenon

A mortise-and-tenon joint is used where two boards meet at right angles. If you find that this joint was used in the original car, you will want to duplicate it. It may have been used in the door construction to join the rails to the stiles. It may also have been used to join the cross sills to the sill plate in the base of the body. (FIG 8)

**Fig. 8
Mortise-and-Tenon**



This joint is a bit more difficult to make than some of the other joints previously described. If it is not snugly fitted, it loses its main advantage of strength. Crisp shoulders on the tenon work with the glue in the mortise to prevent racking. There are many ways to cut a mortise-and-tenon joint. They can be made with power tools like a table saw, router, or mortising machine. Lacking the

required power tools, you can make them with hand tools. Start with the mortise by drilling out most of the material, then squaring it up and evening it out with chisels. Now measure the final dimensions of the mortise, and cut the tenon to fit using hand saws. Before cutting the tenon, pencil in the cut lines on the stock, paying careful attention to keeping your lines square. It is crucial to have the shoulders even. Now cut the tenon slightly oversize, and pare it to fit the mortise. Finally, cut off any extra length of the tenon so it does not bottom out in the mortise. Then glue and clamp.

Open half mortise

This joint is used where the pillars connect to the main sill on the body's base and on the roof side rails at the top. (FIG 9) There is not a lot of glue on this joint, so it should be reinforced. In some cars you will find a metal corner bracket that can be screwed to the sill and the pillar. If it has rusted away you may want to make one. Or, lacking this, it might be a good place to put a wood screw through the pillar and deep into the sill.

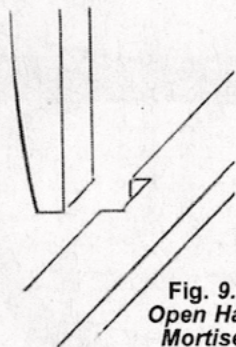


Fig. 9.
Open Half
Mortise

Bridle Joint

This joint is a special form of a mortise and tenon. (FIG 10) You may find this joint where the top rail of the door meets the stile. In woodworking parlance a stile is the vertical component of a frame and a rail is the horizontal component. To make this joint, cut the slot first in the stile. The side cuts on the stile can be made with a hand saw, and then the bottom is chiseled to finish the slot. After cleaning up the slot so that the sides are parallel, you can measure the width and then cut the end of the rail to fit the slot snugly. Finally, glue and clamp.

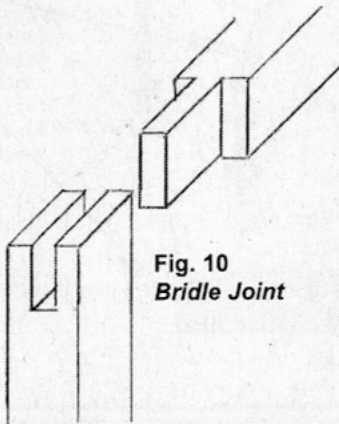


Fig. 10
Bridle Joint

Glues

Cabinet makers use a variety of glues. The most common are white glue, yellow glue, water-resistant yellow glue, polyurethane glue, and hide glue. Of these, only the white and yellow glues need to be used in the construction of wooden auto-bodies.

White and yellow glues are both known as polyvinyl acetate adhesives. Their differences are minor. The yellow glue has a shorter open time (time you have to get things clamped together before the glue starts to cure). Both are water soluble and even after curing can be weakened by long exposure to water. However, this is not an issue for auto-bodies since the wood is never exposed to water. Even in open cars it is protected by the metal skin body on the outside and the upholstery on the inside. Besides, who is going to restore a prewar antique car and then leave it out in the rain? I recommend using the yellow glue, which is available in brands like Elmer's and Titebond and is recognizable by its color.



As a final word of advice, none of the commonly used wood adhesives will give a dependable, strong bond, if the jointing method used does not result in a tight fit between the pieces. The only glue that will fill gaps is a polyurethane glue, but the joint will not be as strong as a tight-fitting joint using a white or yellow glue.

S.K.

In Future Issues:

JEWETT CONSTRUCTION

Tear Down

The Rebuild

CHRYSLER ROADSTER CONSTRUCTION

BUICK DOCTORS COUPE CONSTRUCTION

This entire series is copyrighted (©) and may not be reprinted in any form without written permission of the author and SK Publishing.

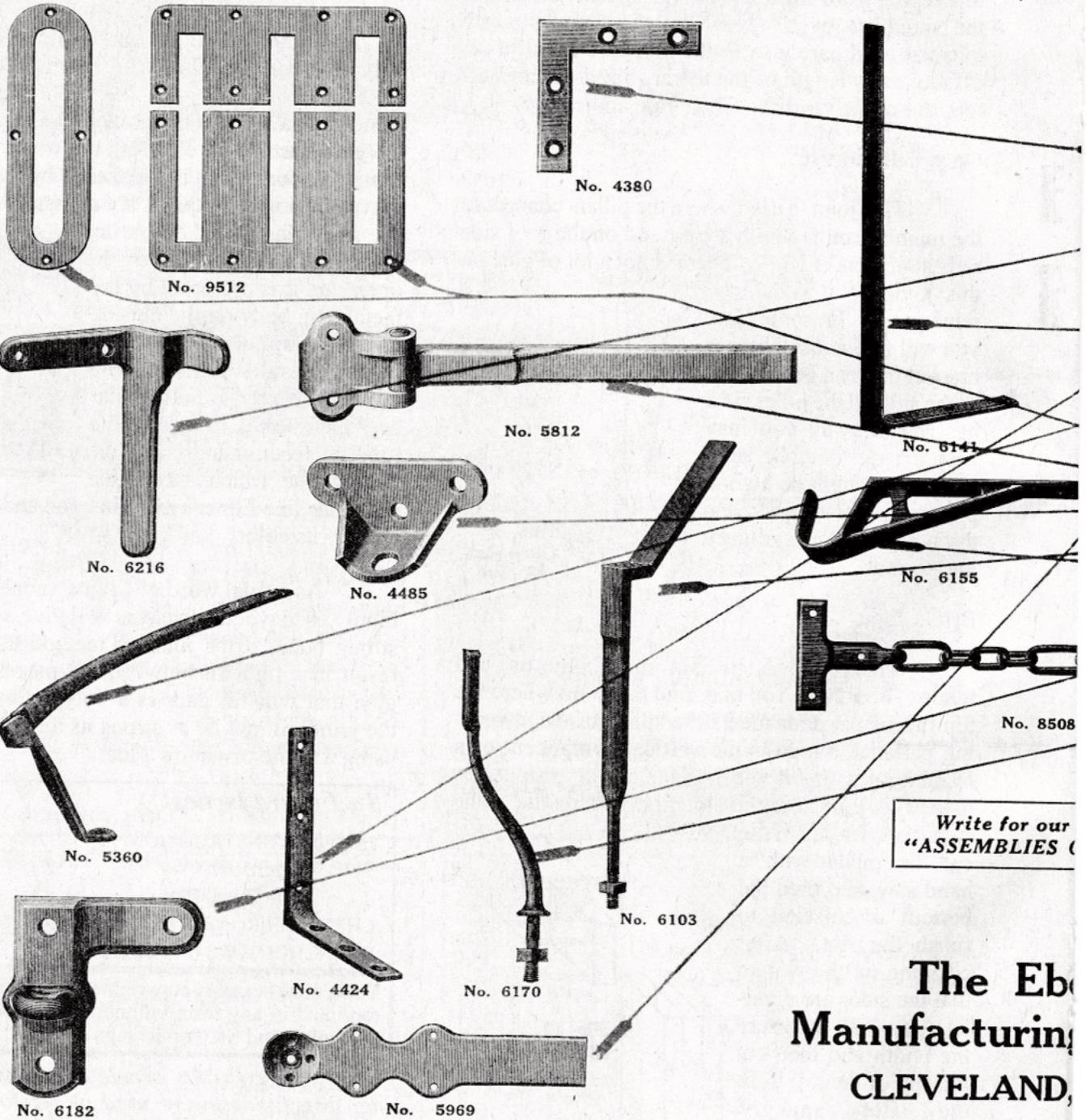
Although this article concerns woodworking, iron fittings were used as reinforcement and joints. The following ad, from a 1922 issue of Motor Vehicle Monthly, illustrates some of those parts.



MOTOR VEHICLE MONTHLY

February, 1922

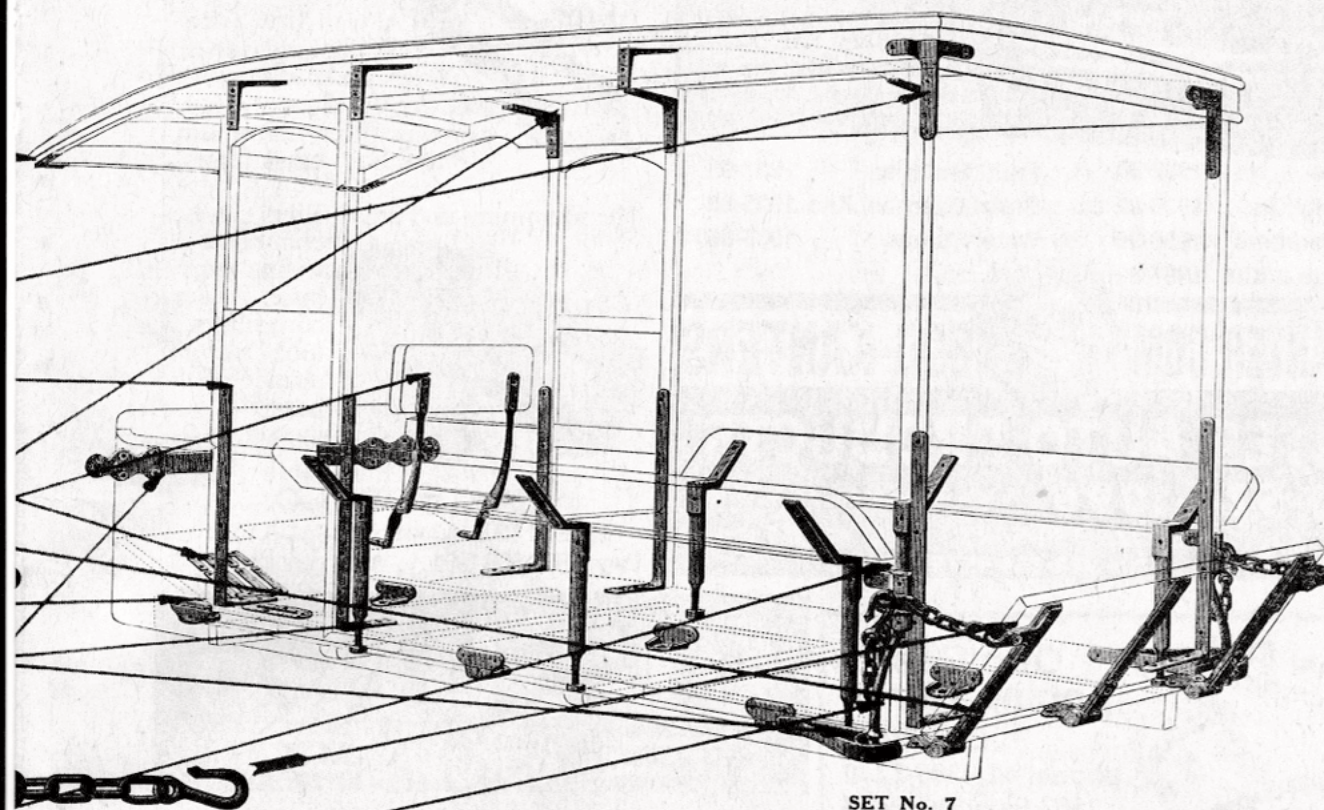
EMCO MALLE



Mention MOTOR VEHICLE MONTHLY when writing to advertisers.



EABLE IRONS



SET No. 7

Six Post Body with Flare Boards

IRONS NEEDED IN THE CONSTRUCTION OF THIS BODY

Bulletin OF IRONS"

Size A, 10" Side Panel			Size B, 12" Side Panel		
6 pieces	No. 6103-C	Body Brace and Flare Board Irons	6 pieces	No. 6103-N	
6 pieces	6141-F	Post Corner Irons	6 pieces	6141-F	
3 pieces	5812-B	Endgate Hinges	3 pieces	5812-D	
2 pieces	6170-G	Body Braces	2 pieces	6170-F	
1 pair	8508-A	Endgate Chains	1 pair	8508-B	
2 pieces	6182-A	Body Chain Eyes	2 pieces	6182-B	
1 pair	6216-C	Rear Post, Top Rail Corner Irons	1 pair	6216-C	
6 pieces	4424-C	Roof Rail Corner Irons	6 pieces	4424-C	
2 pieces	4380-B	Top Rail Corner Plates, front	2 pieces	4380-B	
1 set	9512	Footboard Plates	1 set	9512	
2 pieces	9569	Dash Lamp Brackets	2 pieces	9569	
6 pieces	4485	Body and Chassis Connections	6 pieces	4485	
1 pair	6155-A	Sill Braces	1 pair	6155-A	
1 pair	5360	Jointed Lazy Back Irons	1 pair	5360	

**erhard
g Company
O., U. S. A.**

Mention MOTOR VEHICLE MONTHLY when writing to advertisers.