

BUILDING UP MODEL PASSENGER CARRIAGES.

[Besides being of general interest, this article is intended to assist those readers who are building up the sets of parts which are now on the market.—EDITORS.]

How many railway enthusiasts, after devoting hours of trouble and toil to the designing and building of a model railway, and becoming possessors of an engine and tender (or perhaps two or three), only then realise that although the building of the line is a most engrossing and instructive task, yet the real sustaining interest of a model railway lies, not in running an engine alone, but in manipulating whole trains, both passenger and goods.

Of late years the goods department of the model railway has been well catered for, not only as regards finished rolling stock, but also the sets of machined parts, which enable the veriest beginner to make up really first-class model goods stock of the latest type. The same facilities are now being provided for in the building of passenger rolling stock, and the following article is written in the hope that it may induce many, who have hitherto considered that the building of passenger rolling stock was a very complex and difficult job for the amateur to tackle, to seriously turn their attention to this most entertaining section of model railway work.

Without passenger stock, a model railway cannot be seriously considered at all complete and the full enjoyment cannot be obtained from the hobby. With the assistance of these sets of parts it will be found that after all the coach-building is not actually a very difficult affair, and those readers who have already assembled some of the sets of parts of goods stock will find no difficulty at all in it. Indeed, to build an ordinary passenger coach, say an L. & N.W. or a G.N., will not be found much more difficult than the building of, say, a guards van or a cattle wagon, and with the new sets of parts an amateur who is not a skilled wood-worker, may turn out a coach of which he may well be proud, and from which he may obtain many hours of pleasurable enjoyment, of which the building is not the least. In these parts the "donkey work" is done, the hard sawing, the knotty points (no pun) such as the selection of the most suitable wood, the scheming necessary to enable the design to be adhered to externally, and at the same time to eliminate the finicking and troublesome details, which are not at all necessary to obtain the true effect in the finished coach, but at the same time require a great deal of skill and consideration in leaving out, as many of them at first sight seem essential, is all done. No attempt should be made to introduce inside fittings into any coach of, say, 2" or 2½" gauge, or indeed in even the larger sizes until about 1½" scale is reached, as no satisfaction is to be obtained with inside fittings under this scale. If this detail is attempted and completed, it will be so small that it will not show to anything like advantage behind the glass, and it will certainly be found much better to leave it all out as advised, and put all the pains and fine work on the outside, where the result

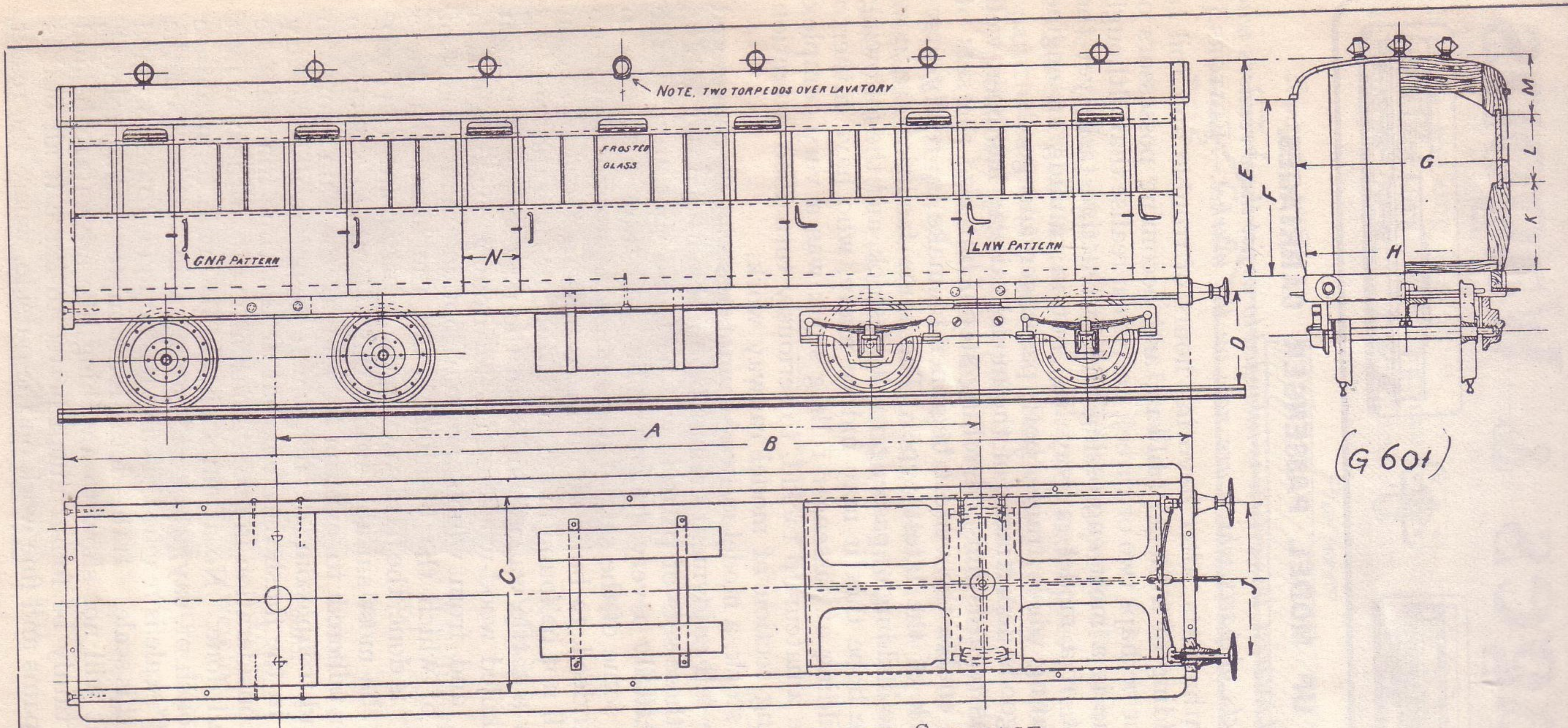


FIG. 3.—MODEL PASSENGER CARRIAGE.
(Built from standard parts No. G 601 C and G 601 B.)

DIMENSIONS.

GAUGE.	A	B	C	D	E	F	G	H	J	K	L	M	N
2½ inches	13 ⁵ / ₃₂ "	21 ¹ / ₈ "	3 ⁵ / ₈ "	1 ³ / ₄ "	4"	3 ¹ / ₄ "	4"	3 ¹¹ / ₆₆ "	2 ¹³ / ₁₆ "	1 ⁵ / ₈ "	1 ¹ / ₄ "	1 ¹ / ₈ "	1 ³ / ₃₂ "
2 inches	11 ⁹ / ₁₆ "	18 ¹ / ₂ "	3 ³ / ₁₆ "	1 ⁷ / ₃₂ "	3 ¹ / ₂ "	2 ²⁷ / ₃₂ "	3 ¹ / ₂ "	3 ¹ / ₄ "	2 ¹ / ₂ "	1 ¹³ / ₃₂ "	1 ¹ / ₈ "	3 ¹ / ₃₂ "	15 ¹⁵ / ₁₆ "

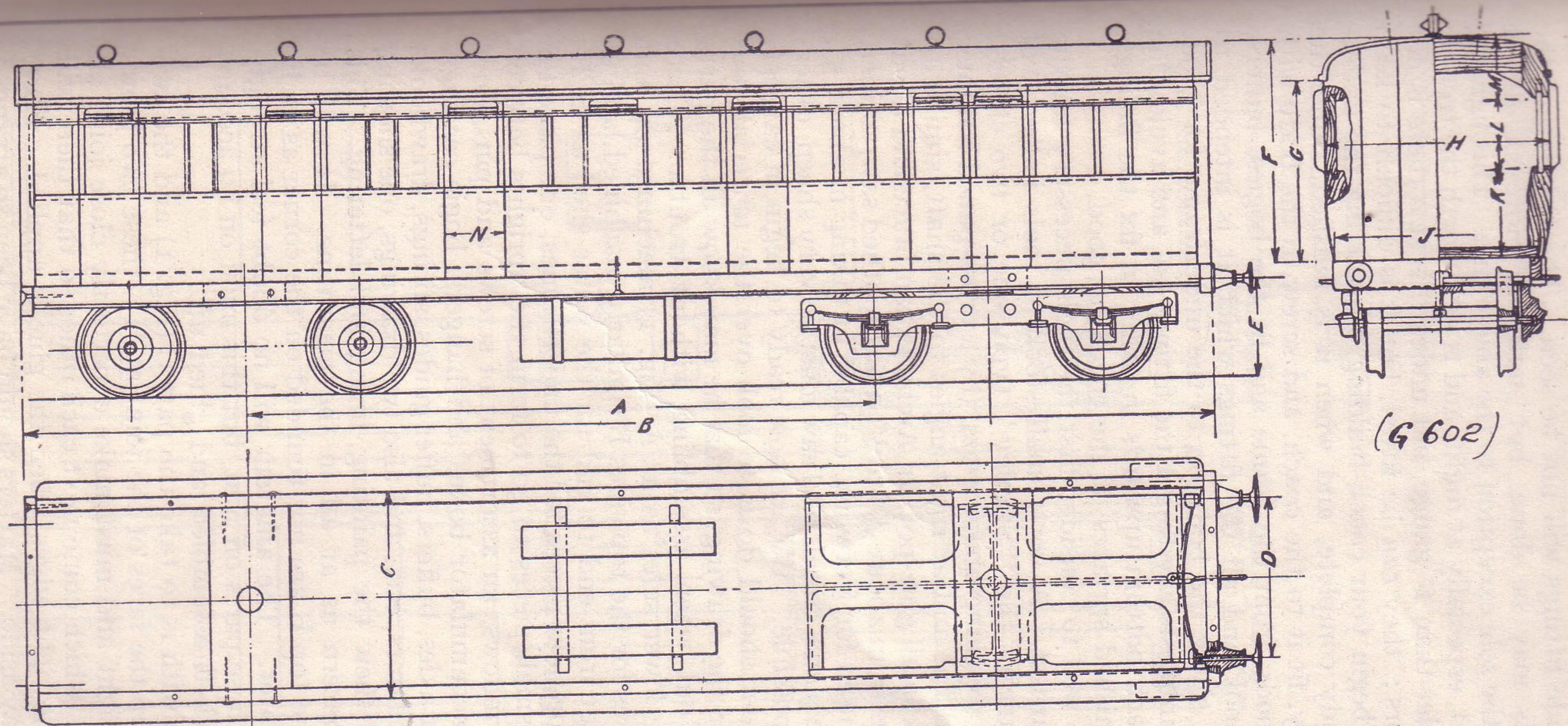


FIG. 4.—MODEL "BRAKE THIRD" (COMPOSITE THIRD-CLASS PASSENGER AND GUARD'S COMPARTMENT VEHICLE).

(Built in wood from standard parts No. G 602 C and B.)

DIMENSIONS.													
GAUGE	A	B	C	D	E	F	G	H	J	K	L	M	N
2½ inches	13 ⁵ / ₃₂ "	21 ¹ / ₈ "	3 ⁵ / ₈ "	2 ¹³ / ₁₆ "	1 ³ / ₄ "	4"	3 ¹ / ₄ "	4"	3 ¹¹ / ₁₆ "	1 ⁵ / ₈ "	1 ¹ / ₄ "	1 ¹ / ₈ "	1 ³ / ₂ "
2 inches	11 ⁹ / ₁₆ "	18 ¹ / ₂ "	3 ³ / ₁₆ "	2 ¹ / ₂ "	1 ¹⁷ / ₃₂ "	3 ¹ / ₂ "	2 ²⁷ / ₃₂ "	3 ¹ / ₂ "	3 ¹ / ₄ "	1 ¹³ / ₃₂ "	1 ¹ / ₈ "	3 ¹ / ₂ "	1 ¹⁵ / ₁₆ "

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MODEL RAILWAYS.

will be seen, and certainly more appreciated. If the glass is properly fitted, and the inside of the coach painted with a black paint drying with a flat surface, the absence of inside fittings will not be seen. The lighting of the interior with electric lights may be done, but nothing more should be attempted; this should be the sole exception to the above rule. This lighting produces a very pretty effect, especially at night, and is well worth the trouble when the coach is not smaller than 2" gauge, but under this size there is not much room for accumulators; they *can* be fitted, but it is difficult to keep them out of sight. Never begin your coach-building by starting the underframes first; build the body complete, and when it is finished, build the underframe quite separately, fit it to the coach, and screw to the body with screws; now remove the body from the frame and fit the bogies, buffers, accumulator boxes, draw-hook and all the fittings which it is intended to fit; when these are all on, screw the body on to the underframe for good. This is much the best and simplest way to get the fittings on, and avoids the necessity of turning the coach bottom upwards in order to fix the fittings, which certainly does the finished surfaces of the coach no good.

Perhaps it would be as well to consider first the tools necessary for the work before we begin in earnest. A very small stock of tools indeed will suffice:—A small metal plane of the "Stanley" type, one or two chisels, a small cross-paned hammer weighing about 4-ozs. (by a cross-paned hammer is meant one with upper end flat and at right-angles to the shaft, similar to that used for track laying), a small glue-pot, an Archimedian brace and about six small drills of various sizes from about $\frac{1}{32}$ " to $\frac{1}{8}$ ", a fine toothed saw, scriber, and two or three cramps as used for fretwork, capable of taking in about 5", will complete the outfit. The plane, chisels and saw must be very sharp, otherwise good work will be impossible. We are now ready to begin in earnest.

The first thing the builder should do is to look over the material, and lay the parts out according to the drawing, so that he may know all the parts and be able to pick them out when assembling without trouble. There should be two pieces for the lower sides as at A (Fig. 1) machined up and slotted for the glass, two pieces for the top sides B similarly machined, and in addition having a channel cut from end to end for the water shed as at E. A piece of soft pine for the top, four pieces for the underframes, one piece for the floor, a large number of small pieces to go to form the uprights between the windows, glass for the windows, an assortment of screws and pins, door handles, commode handles, accumulator boxes and hangers, bogie castings, bogie wheels and materials for axles, buffers, buffer guides, springs, drawhooks and drawplates, torpedo ventilators, etc.; and also two drawings, one shewing the construction and one to shew the painting, lining and lettering. This second drawing does not concern us at all in the meantime. It will be noticed that the pieces for the top B are not rounded on the corner as at E, and the reason will be seen later. The amateur will no doubt feel strongly inclined to begin by planing these parts off first, but this must on no account be done until the whole coach is assembled and glued up.

The proper way to begin with is to take the part C (Fig. 1) and the two parts B, and carefully plane up the faces of the joint at H; these two joints must be planed up quite straight and must make a perfectly close joint all the way along, mark the faces which come next each other so that there will be no difficulty in jointing the right edges when the glue is applied. Have both joints quite perfect and lay aside. Matters should have been so arranged that the glue is now quite ready to use. Only the very best quality should

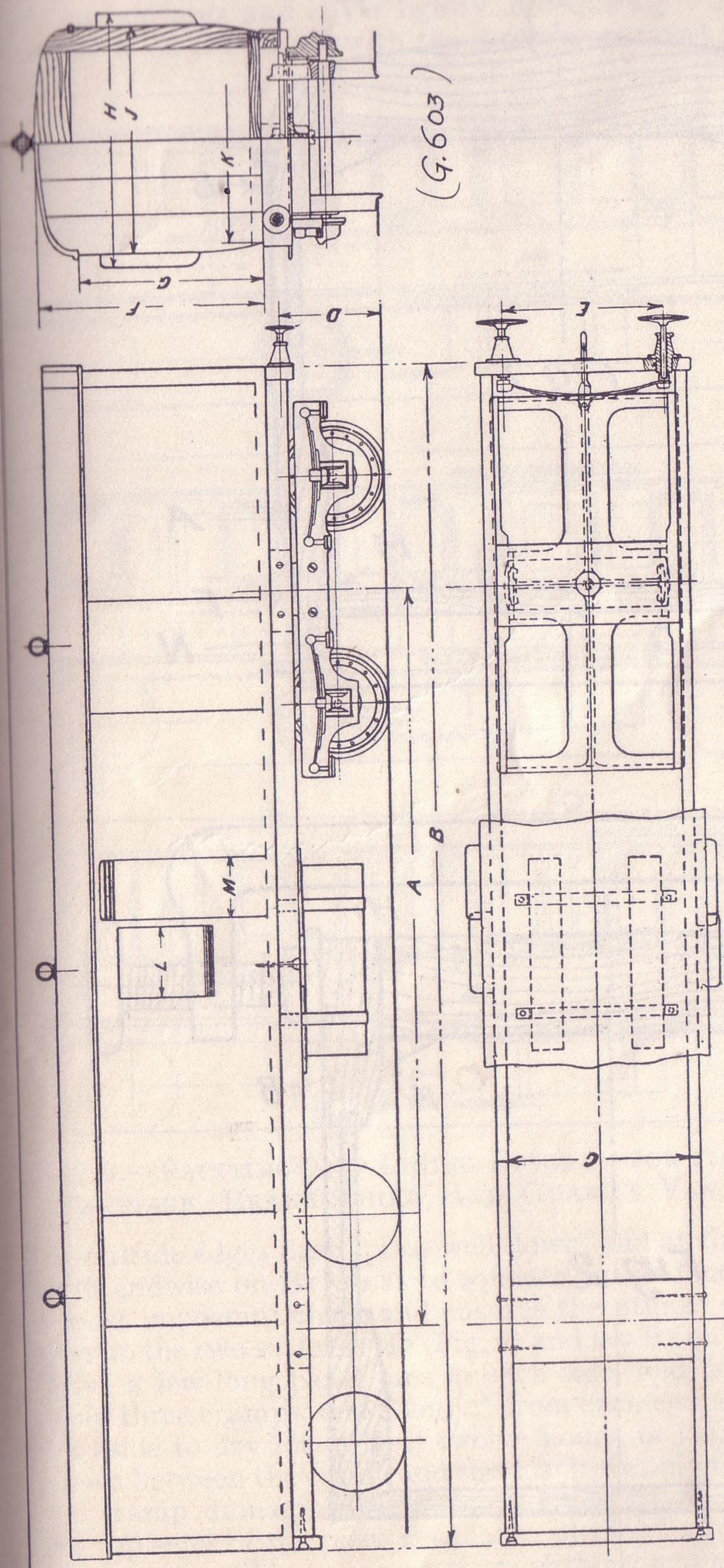


FIG. 5.—SCALE MODEL LUGGAGE BRAKE-VAN.
(Built from wood parts Nos. G 603 B and G-603 C.)

DIMENSIONS.

GAUGE	A	B	C	D	E	F	G	H	J	K	L	M
2½ inches	13 5/16"	21 1/8"	3 5/8"	1 3/4"	2 13/16"	4"	3 1/4"	4 1/2"	4"	3 1/16"	1 5/16"	1 3/32"
2 inches	11 9/16"	18 1/2"	3 3/16"	1 17/32"	2 1/2"	3 1/2"	2 7/32"	3 15/16"	3 1/2"	3 1/4"	1 1/8"	1 5/16"

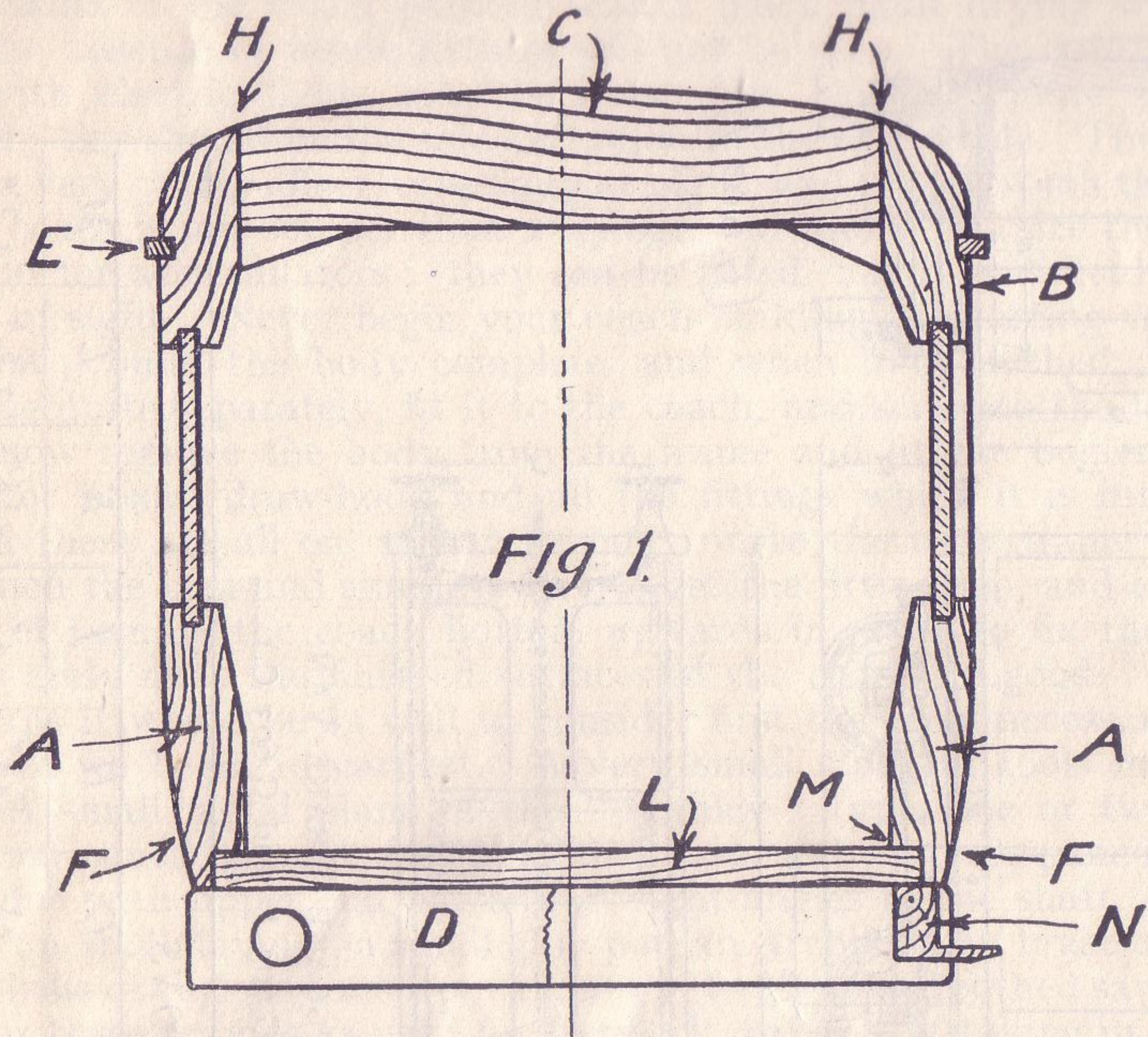


Fig 1.

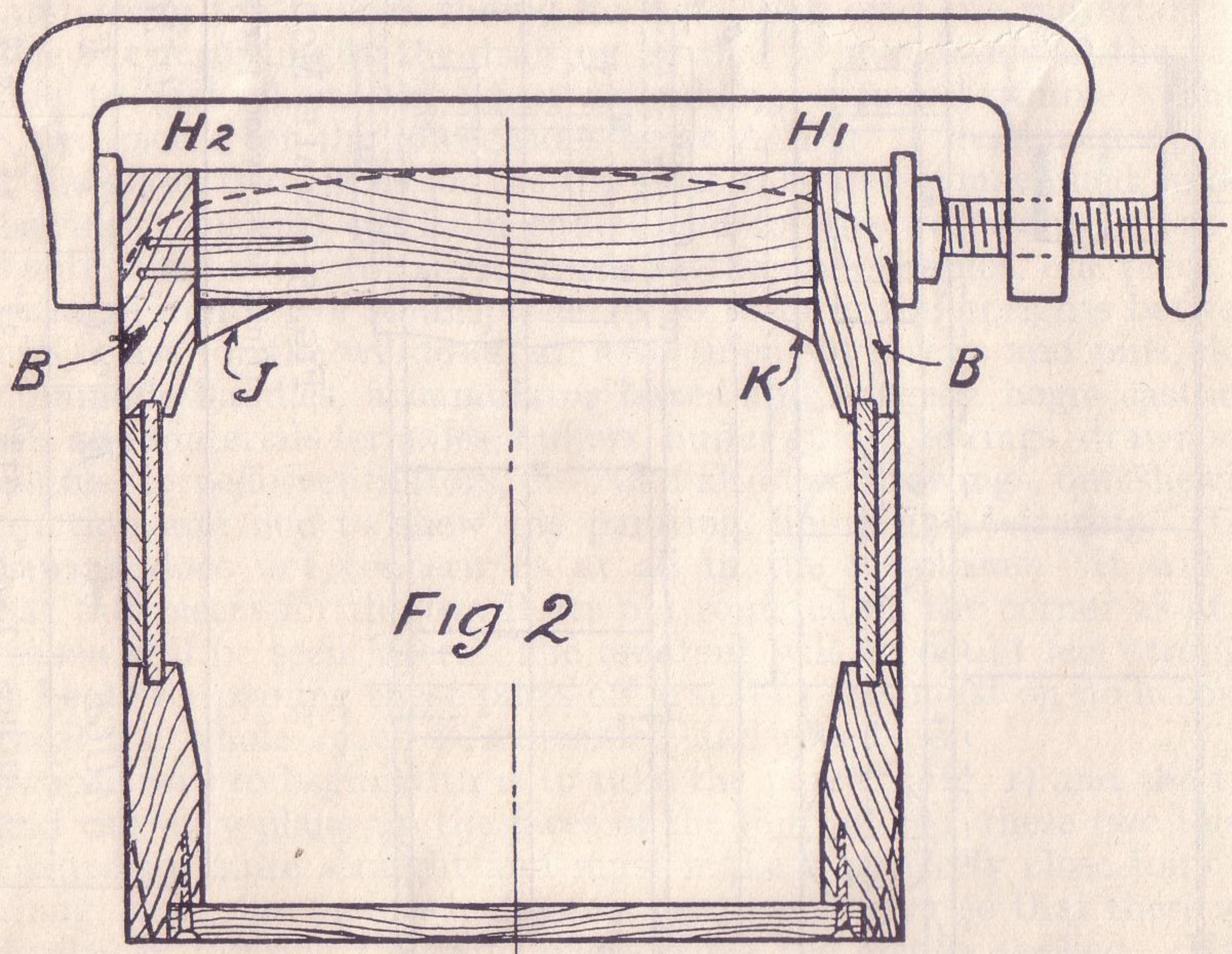


Fig 2

CONSTRUCTIONAL DETAILS OF SCALE MODEL COACHES

be used for this class of work, a medium quality or "a good" quality should be refused when offered—the best is hardly good enough. We will now glue up the two joints which we have just prepared, H (Fig. 2), slightly warm the four surfaces and cover lightly and quickly with the glue the two H₁; now lay B on the bench with the inside uppermost, and lay C on it, keeping

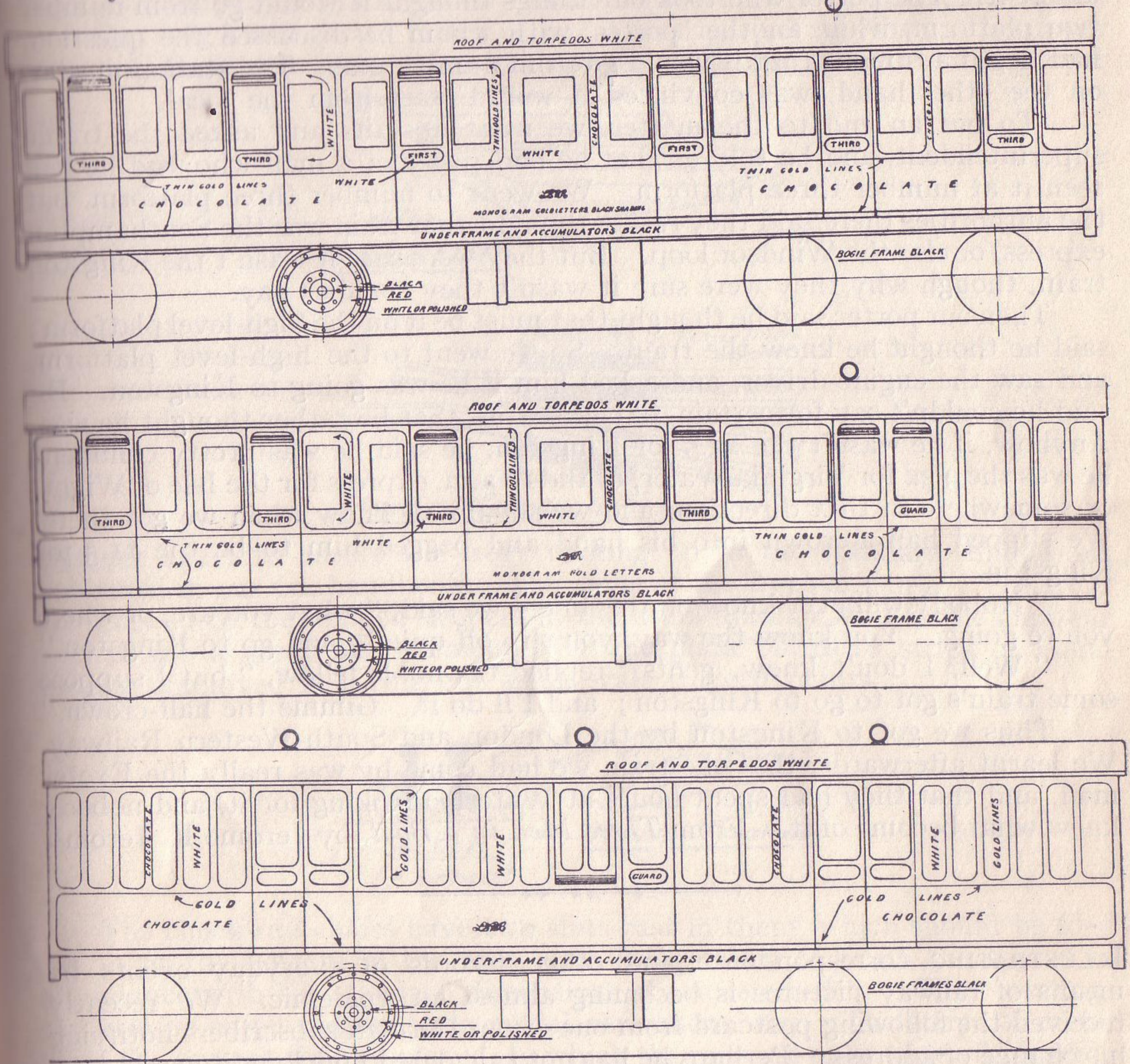


FIG. 6.—PAINTING AND LINING DIAGRAM FOR FINISHING MODEL PASSENGER CARRIAGE, BRAKE THIRD, AND GUARD'S VAN, IN L.N.W.R. COLOURS.

the outside edges flush, press well down, and at the same time rub C back and forth endwise on B₁, so as to squeeze out as much glue as possible. This is a most important thing and ensures the utmost strength in the joint. Now glue up the two surfaces H₂ (Fig. 2) and lay B₂ on C and rub endwise as before. Drive a few long panel pins in each side, and cramp up as shewn in Fig. 2, using three cramps, one about 2" from each end and one in the middle. Now lay aside to dry for at least twelve hours, or longer. The two shaded pieces shewn between the cramp and the coach are only thin pieces of wood to prevent the cramp damaging the coach. Now will be seen the reason for leaving the top sides of the piece B square; if they had been rounded off it would be almost impossible to cramp them without a specially shaped cramp.

Carriages & Wagons



BUILDING MODEL PASSENGER CARRIAGES.

By JAS. MACKENZIE.

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AFTER this part has dried, the blocks J and K may be glued in place—about four or five to each side will be quite sufficient; they must be cut to a true right-angle on the surface which adjoins the coach roof and sides. When fitted, cover each one with hot glue, and, pressing well into place, move slightly back and forth until the glue is squeezed out; drive two panel pins into each, and lay the whole aside again to dry.

We will now take the lower portion in hand. Pick out the two ends, the two lower sides and the bottom; cut these two lower sides to the exact length as shewn on the constructional drawing—this is the length of the coach minus the thickness of the two ends. Be sure that they are quite

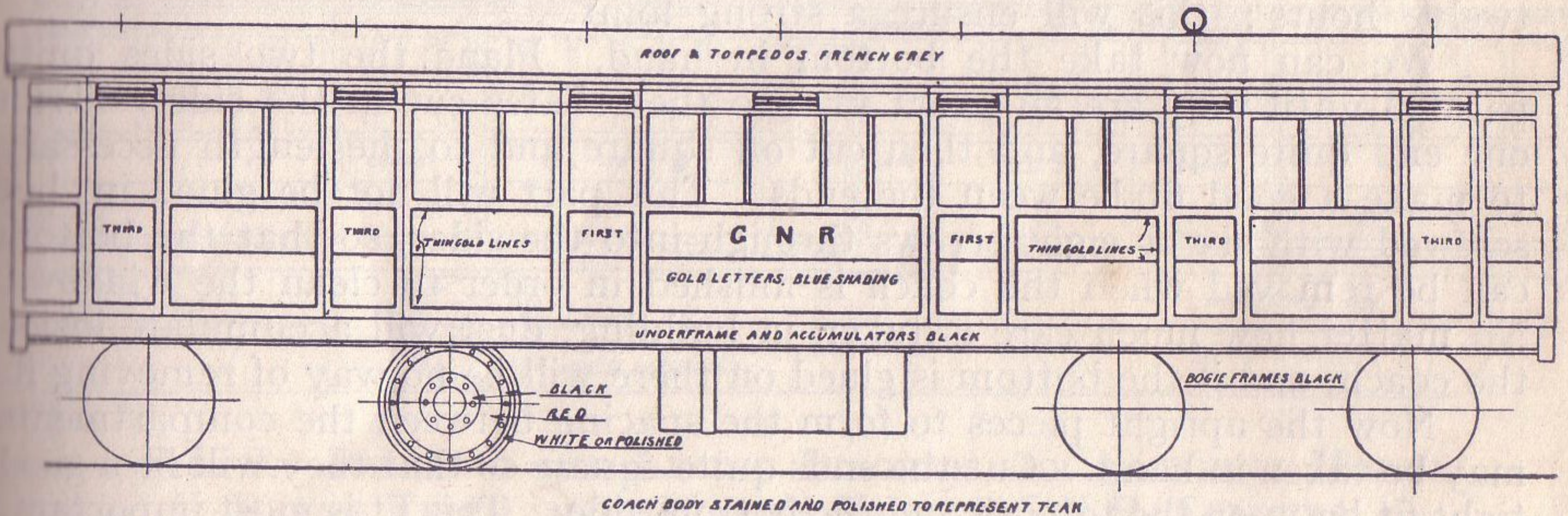


FIG. 7.—PAINTING, LINING AND LETTERING DIAGRAM, MODEL G.N.R. PASSENGER CARRIAGE.

square with the top and bottom edges; this is most important, and is quite worth taking the time and trouble to ensure accuracy. Before doing this, take a shaving off the top and bottom to ensure smooth edges and parallelism. Now glue one end and the corresponding edge of the end piece and rub well together as before; repeat on the other side of the same end and the side piece, and rub well together. When gluing up, be careful that the rebate for the glass in the side and the end correspond, otherwise you will not be able to get the glass in place when the time comes to try this part of the work. Now repeat all through with the other end piece and drive a few panel pins in each joint, Cut four blocks similar to those in the roof, glue them one in each corner, see that the whole is square, and if so, lay aside to dry.

Now let us turn again to the roof, which will now be dry; cut the ends until the top is exactly the right length to fit in between the ends of the

lower portion of the coach, and see that they are cut quite square with the sides. It may be as well to point out here that too much stress cannot be laid on the importance of getting every part square as the builder goes along; every piece must be square and true before being glued up, for if this is not done the builder will most likely find himself with a coach body which, when finished, will be only fit to be covered with paraffin and used as a fire-lighter.

Having cut the top to fit, now take the glass and fit it into the rebates in the lower portion of the coach; if it goes properly home into the rebates, try the top on and see that it comes down to its right position, that is, so that the top of the roof comes flush with the top of the ends as shewn on the constructional drawing, fit the glass in both sides, make sure that the window spaces are the same width at both ends and both sides; also be careful that the glass is not too tight a fit in the channels, or disaster will be sure and certain—the glass will crack when the coach is laid aside during the painting, if not before.

Having made the top a perfect fit between the ends and fitted it properly to the glass, it can now be marked, taken to pieces, and the joints at the end glued up—of course after being warmed up as with the first joints. No glue should be put into the rebates for the glass. Put the whole together and clamp endwise. If the builder possesses no clamp large enough to take the coach endwise, he may simply tie it up firmly with strong twine wrapped round from end to end. A few long fine pins may now be driven in round the ends into the roof, top rails and sides. Lay aside to dry for at least twelve hours: this will ensure a strong joint.

We can now take the bottom in hand. Plane the two sides quite parallel until they are an exact fit into the rebates cut in the sides. Trim one end quite square, and then cut off square and to the length necessary to make a good fit between the ends. This part will not be glued in, but screwed with six or eight screws through into the sides, so that the bottom can be removed when the coach is finished in order to clean the windows. No matter how much care is taken in building, dust will accumulate inside the coach, and if the bottom is glued on there will be no way of removing it.

Now the upright pieces to form the spacing between the compartments may be taken in hand. Cut the ends quite square so that they will be a good tight fit between the top rail and the bottom side. This fit is most important, as if they are too easy they will at a later period fall away from the coach altogether. It is on the fit on the ends that form the glued joints that their security depends; when they are correctly fitted glue them in and give time to dry. When all these are quite dry, we may proceed to get the coach down to the proper shape externally. Mark off the roof curves, and the curves in the lower sides, very carefully and accurately on each end, and then pare the greater part of the surplus off with a sharp chisel, finish with the plane, and then sand-paper all over with a sheet of No. 1 sand-paper wrapped round a cork pad about 4" × 6". After this, go all over it again with No. 0 or 00 sand-paper. Be careful that the sand-paper is wrapped tightly round the cork pad; if not the edges will be found to round off, a thing which will effectively spoil the appearance of the coach. It is essential in finishing that the sides be smooth and flat and the corners and edges sharp and distinct. The strip on the end to represent the weather strip as shewn on the constructional drawing, may now be fitted and glued on, and secured by a few very fine brads. The overhang of the roof at the ends

will be found a little more difficult. These pieces may be about $\frac{1}{8}$ " \times $\frac{1}{8}$ ", and where bent to a very small radius may have saw cuts on the inside about three-parts through, which will simplify matters considerably. These will be fixed with glue and fine pins as beforementioned, and when dry they must be sand-papered to the final shape and finish. The ventilators over the door may now be trimmed up to shape and fixed in place with glue and a few fine pins.

The only thing now to be done to the body is to mark the doors, that is, the joint on each side of the door. These lines should be cut in with a very sharp knife pretty deep and wide, so that they will not become filled

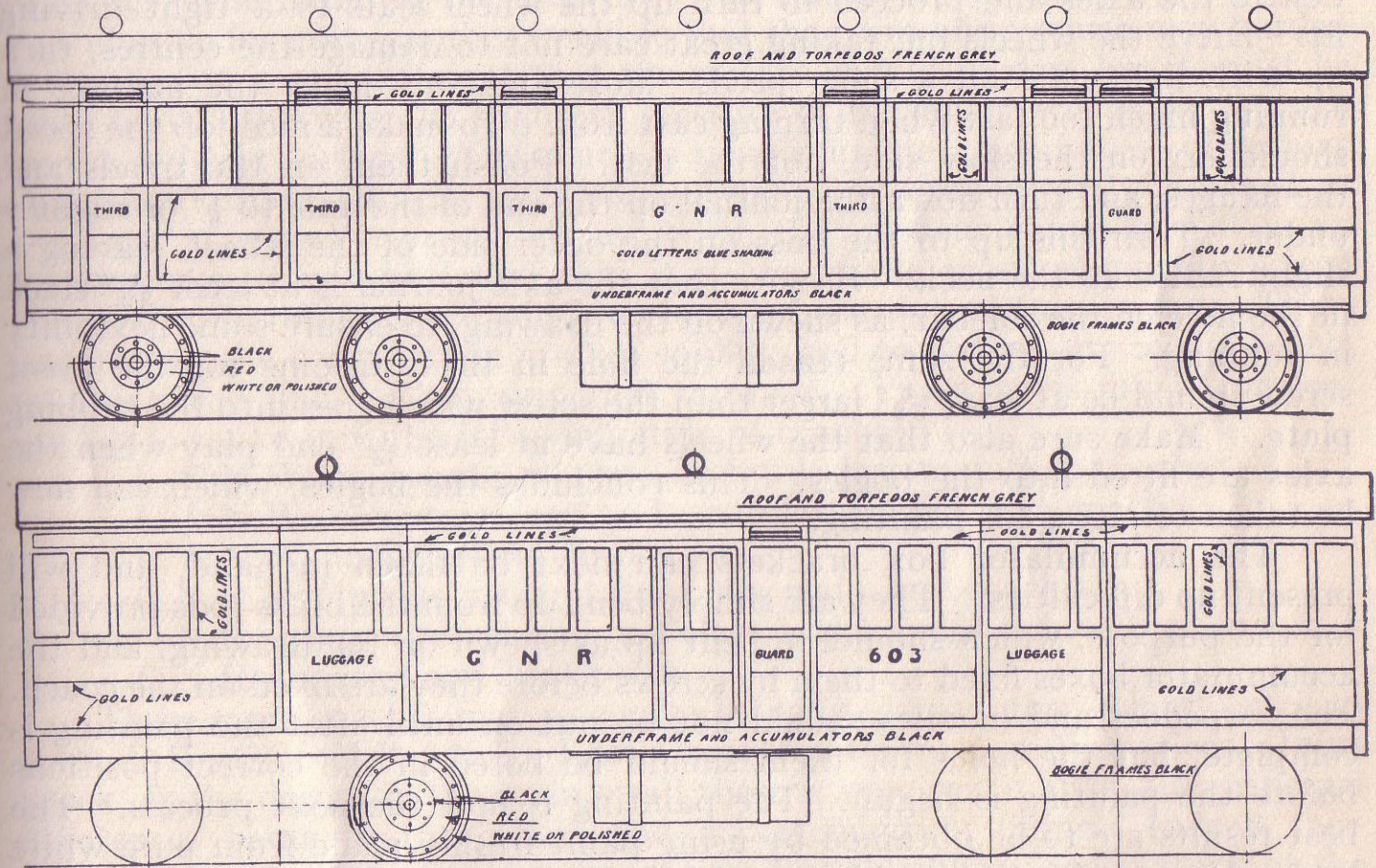


FIG. 8.—PAINTING AND LINING DIAGRAM FOR FINISHING MODEL BRAKE THIRD, AND GUARD'S VAN, IN G.N.R. COLOURS.

up when painting. With a fine nail punch drive all the pins below the surface, and touch the holes with a drop of paint of a suitable colour, or boiled oil, and putty up; this will absolutely prevent the paint falling out later when the coach is dry.

The underframes should now be taken in hand. These are very simple, the chief thing to look to is that they are put together square. The headstocks are glued and fixed with some of the long pins, about two to each solebar, and the transomes for carrying the bogies will also be fixed with glue and screws in each end through the solebar, as shewn on the constructional drawing. See that the top is quiet flat, and lay on the bottom of the coach, fix on with long screws about two to each headstock and three in each solebar.

The bogies may now be put in hand. These are quite simple to make up, but are very effective in appearance indeed when finished. The transome should be filed up on the sides where the solebars are fitted, so that the latter lie quite upright when the bogie is laid bottom up on a surface plate

or slab. Two $\frac{1}{8}$ " countersunk screws are fitted in each side and into the centre of the transome. The ends have no fixing, but lie quite close to the transome. Screw these screws up quite tight, and lay the bogie on the surface plate, or, failing this, the face plate of the lathe. Rub chalk on the inside of the solebars, and with a surface gauge the horizontal centre line of the axleboxes should be marked on the inside of the solebars. Now take the bogie to pieces, and with a pair of dividers mark the vertical centre line across those lines already drawn. Make quite sure that the centre line is exactly similar on both sides. Centre punch where the lines cross, and drill to within $\frac{1}{16}$ " of going through with a $\frac{5}{32}$ " drill, file off any irregularities, and screw together again. Now bore and face the wheels and reamer out $\frac{3}{16}$ ". Centre the axles and proceed to turn up the wheel seats to a tight driving fit. Drive the wheels on, taking great care not to damage the centres, turn up with light cuts on a slow speed. Most amateurs make the mistake of running much too fast when turning cast iron. To make a nice job the speed should err on the slow side, not the fast. Polish them on the treads and the flanges, and turn down the journal on the end of the axle to $\frac{1}{8}$ " or slightly under. Turn this up to the boss on the outer side of the wheel, leaving a slight radius at the neck. Be sure that the axle journal is at least $\frac{1}{32}$ " slack in the hole on the solebar, as shewn on the drawing, to ensure some flexibility in running. For the same reason the hole in the transome for the pivot screw should be at least $\frac{1}{32}$ " larger than the screw which goes into the rubbing plate. Make sure also that the wheels have at least $\frac{1}{16}$ " end play when the axles are fitted into the bogies. This concludes the bogies, which can now be taken to pieces for painting.

The accumulator box brackets can next be taken in hand, and will present no difficulties. They are simply bent up from the brass rods provided for the purpose, which should be bent up as shewn on the drawing, and the accumulator boxes fixed to them by screws before they are fixed on the coach. The torpedoes and handles should not be put on until after the painting is complete, but the holes for them should be bored in the correct positions before the painting is begun. The painting is now the next process. The best results are to be obtained by using paint freshly made from pure white lead. On no account should enamel be used, as it is much too thick. The paint must be mixed up thinly and the correct depth of colour obtained by using successive coats, always taking care that the previous coat is dry before applying the next one. Never omit to rub the coach down with very fine sand-paper between every coat; this is most important if an absolutely smooth surface is desired. From four to six coats should be put on, but as already mentioned the paint must be very thin. In mixing up the paint only the best genuine English white lead should be used, with turpentine, and just the very smallest suspicion of patent driers. This is for the white. To obtain any colour, purchase from any first-class paint stores a small quantity of the required colour ground in turpentine, and mix with the white paint until the required tint is obtained.

When the last coat has dried quite hard, rub carefully all over with smooth sand-paper, and we are now quite ready for the lining and letters. The lines should be drawn on with the aid of a chalk line, as this can easily be rubbed off after all is dry. For the lines the gold paint sold in shilling bottles by most respectable paint stores will do very well indeed. This should be put on with a fine soft pen. Half-an-hour's practice on a piece of prepared and painted wood will give one surprising dexterity in the

production of straight lines. All round corners will have to be put in with a very fine sable or camel hair brush, and here again the amateur should practice on the piece of painted board aforementioned. After all the lines are put on according to the painting drawing, stand the coach in a dry place absolutely free from dust until thoroughly hard, and varnish with the very finest coach or carriage varnish. One coat should be sufficient; this should be allowed a week to harden before attempting to put the fittings on. These of course will go in the holes already bored when they were fitted, and will give no trouble. Fit the bogie on the underframes as explained earlier, also buffers, draw-hooks, springs, etc., then fix the underframe on the coach. Now fit the door and commode handles in the exact position shewn on the drawing. The fixing of the torpedoes will complete the vehicle. It should be laid aside for quite another week, so that the paint and varnish may harden perfectly: it is not sufficient that the surface should be dry, but it must be quite hard, otherwise the slightest pressure of the finger will make a mark on the finished surface. The coach is now complete, and if these directions have been adhered to, is, as far as outward appearances are concerned at any rate, a perfect *scale* model, and when the amateur comes to reckon up his expenses, it will be found that it is one of the most reasonably priced pieces of scale rolling stock which so far has been put on the market. These remarks on the construction applies equally well to almost any model coach, following the lines of our principal railways. These parts are at present put up to make into the following style of coaches:—

- L. & N.W. composite 1st, 2nd and 3rd class main line coaches.
- L. & N.W. composite 1st and 3rd class brake end coach.
- L. & N.W. luggage and brake van.
- G.N.R. composite 1st and 3rd class main line coaches.
- G.N.R. composite 1st and 3rd class brake end coach.
- G.N.R. luggage and brake-van.

These same coaches may of course be painted any other colours, such as C.R., N.B., C.C., M.R., N.E., East Coast Joint Stock or West Coast Joint Stock, as the design in the main of all these is very much alike, the principal differences being in the colour and arrangement of lining. Indeed they could be painted to represent almost any British railway coach stock of the same type, and when finished they would be quite correct.

A very nice model train can be made up with the coaches arranged as follows:—First a luggage and brake van next the engine, then two composite 1st, 2nd and 3rd coaches, next a composite 3rd and guard's brake end, will finish a train which will be short enough to get round any curves, not too heavy or unwieldy to pull, and yet look complete and effective. These coaches are quite unlike any of the other scale coaches that have been put on the market for amateurs to build up from time to time, some of them made up from metal parts or metal and wood. There is no other material which will give quite the same result when finished as wood. A coach made from proper hard-wood parts has a good appearance—a correct scale appearance as it were—which it is quite impossible to obtain in metal of any kind. In fact nothing but wood can possibly be used for a good class coach; no castings, however fine, can possibly have the same look or feel, nor can they be finished up with the same smooth glossy finish, not even with the aid of enamel. It is an indisputable fact that enamel is quite unsuitable for a coach finish; it is too thick, and tends to destroy the sharp edges and corners too much to present the correct appearance.