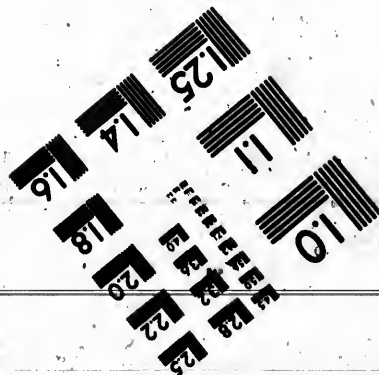
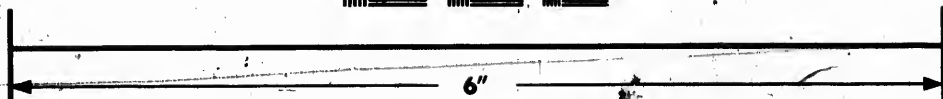
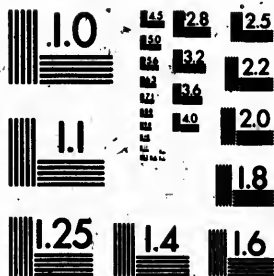


**IMAGE EVALUATION
TEST TARGET (MT-3)**



**Photographic
Sciences
Corporation**

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

128
132
125
122
120
118

**CIHM
Microfiche
Series
(Monographs)**

**ICMH
Collection de
microfiches
(monographies)**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

110
01

© 1991

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

Coloured covers/
Couverture de couleur

Covers damaged/
Couverture endommagée

Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée

Cover title missing/
Le titre de couverture manque

Coloured maps/
Cartes géographiques en couleur

Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)

Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur

Bound with other material/
Relié avec d'autres documents

Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

Coloured pages/
Pages de couleur

Pages damaged/
Pages endommagées

Pages restored and/or laminated/
Pages restaurées et/ou pelliculées

Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées

Pages detached/
Pages détachées

Showthrough/
Transparence

Quality of print varies/
Qualité inégale de l'impression

Continuous pagination/
Pagination continue

Includes index(es)/
Comprend un (des) index

Title on header taken from:/
Le titre de l'en-tête provient:

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments:/
Commentaires supplémentaires:

Docket title page is bound in as last page in book but filmed as first page on fiche.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
										✓	

The c
to the

The in
possib
of the
filmin

Origin
begin
the la
sion,
other
first p
sion,
or illu

The li
shall
TINU
which

Maps
differ
entire
begin
right
requi
meth

The copy filmed here has been reproduced thanks to the generosity of:

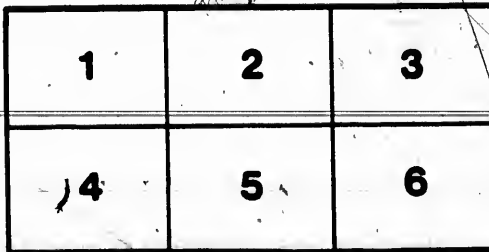
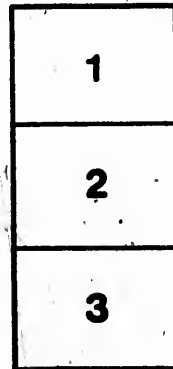
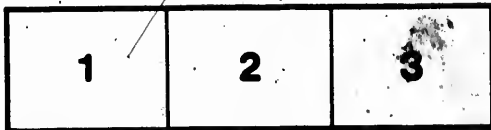
Library of the National Archives of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

La bibliothèque des Archives nationales du Canada

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

20
Great Western Railway.

—————
SPECIFICATION

OF A
FOUR-WHEELED

COMPOSITE CARRIAGE

WITH THREE COMPARTMENTS FOR SIX
PASSENGERS EACH.

—————
N. G.

—————
FOUR CARRIAGES ARE REQUIRED.

—————
September, 1865.

—————
George Horn, Patent, Myra's Road, W.

Great Western Railway.

SPECIFICATION

OF A

FOUR-WHEELED COMPOSITE CARRIAGE,

WITH ~~TWO~~ ^{Four} COMPARTMENTS, FOR SIX PASSENGERS EACH,

4 FEET 8½ INCH GAUGE.

FORTY CARRIAGES ARE REQUIRED.

	ft.	in.
Length over the panels	24	4½
Width over the panels	7	6
Width between the Timber side frames	6	1
Length over the Under-carriage frame	24	3
Height from floor to underside of roof boards in centre	6	6
Height from floor to underside of top side frame	5	9
Height from rails to the top of floor	4	1
Distance of wheels apart centres	13	0
Distance of side-chains apart centres	2	0
Height from rail to centre of buffers, draw-bar, and side-chains	3	3
Diameter of wheels... ..	3	6
Distance of Buffers apart centres	5	8½
Length of the 1st class compartments in the clear	6	9
Ditto, 2nd class ditt)	5	0

Framing.

BOTTOM FRAME.—The bottom side-frames to be 3 inches deep by 9 inches wide; rebates formed in them for the doors to be shut against, and for receiving the floor boards and grooves for the panels.

The bottom end-frames to be 3 inches deep by 7 inches wide, rebates to receive the floor boards, and grooved to receive the panels. The bottom sides and ends to be framed together, and secured by strong wrought-iron knees inside, and a wrought-iron angle plate sunk flush outside. The floor-teasers to be 3 inches by 1½ inches, mortised into the side-frames with bare-faced tenons, the shoulders cut level and let into the lips of the mortises.

FLOOR.—The flooring to be in two thicknesses of ½ in. red deal 9 inches wide, laid crossing each other at an angle of 45° with the sides, the top boards to be matched.

UNDERFRAMING.—The side-frames to be 11 inches by 4 inches, all the wood underframing to be of the same kind. The end frames to extend the full width of the body at the base, and out to the shape at the ends, as shown by the Drawing, to be secured to the side-frames by corner brackets and bolts. The transverse bearers to be as shown on Drawing. The diagonal bearers to be stump tenoned into the transverse bearers and end frames, and secured to the end frames by two wrought-iron knees, 11 inches deep by $\frac{1}{2}$ inch thick, with holes for the passage of the buffing-rods.

The end longitudinal bearers, the one over the draw-bar to be $4\frac{1}{2}$ inches by $3\frac{1}{2}$ inches, the other under the draw-bar to be $3\frac{1}{2}$ inches by 3 inches, stump tenoned into the end-frames and transverse bearers, to have a corner bracket $\frac{1}{2}$ inch thick, formed in one piece to lay hold of the longitudinal, diagonal, and transverse bearers.

The middle longitudinal bearers, four in number, to be stump tenoned into the transverse bearers, and secured thereto by corner brackets and bolts, the corner brackets to have holes for 6 tie-bolts, $\frac{1}{2}$ in. diameter, to pass through.

MATERIAL.—The bottom and top sides, bottom end frames, and floor bearers, to be of Quebec oak, each in one length.

A belting of Messrs. WARNE & Co.'s red india-rubber, $\frac{1}{2}$ -in. thick, must be laid on the upper surfaces of the sides, ends and other principals of the under frames, on which the body of the carriage shall rest. Care must be taken in bolting down the body that the india-rubber is not compressed beyond a very moderate extent, and the nuts must be secured by riveting over the ends of the bolts.

SCROLL BRACKETS FOR SPRINGS.—The spring-scroll brackets, six in number, (two being double) to be of the best scrap-iron, forged out of a single piece or use of the form and dimensions shown on the Drawing. The eye of the scroll to be bored out of the solid, perfectly true.

AXLE-GUARDS.—The Axle-Guards, four in number, to be of the best hammered scrap-iron, $\frac{1}{2}$ in. thick, free from cracks and flaws.

AXLE-BOXES.—The axle-boxes to be clean, sound, and well made castings, with brass bearings, in every respect according to the pattern box, which will be supplied.

The holes in the axle-boxes must be quite true, to receive the spring straps.

The spring straps to be clean and well made, the flat part 1 inch by $\frac{1}{2}$ inch, the bolt $\frac{3}{4}$ inch diameter, with a nut and check-nut underneath, and a split pin to prevent them from working off.

STEPS AND STEP-IRONS.—The step-irons, for bottom steps, 8 in number, to be of round iron, and made to the form shown on the Drawing, and bolted to the frame.

The bottom step to be of red deal, and extend to the whole length of the body, $1\frac{1}{2}$ -in. thick, with a back ledge-piece, 3 in by $\frac{1}{2}$, and a recess-out for the axle-box, the step to be strengthened at recess by a piece of iron, $1\frac{1}{2}$ in by $\frac{1}{2}$ in, the outer corners rounded off, as shown.

The top step to be of ribbed plate, $\frac{1}{2}$ -in. thick, of an approved pattern, riveted to a bracket fastened underneath the frame.

BUFFER RODS.—The buffer rods, 4 in number, to be of the best Staffordshire wrought iron, with solid wrought iron heads, made as shown on the Drawing, to pass through a cast-iron gland. The gland fixed to the end frames with four $\frac{1}{2}$ in. bolts, screwed outside as shown. The buffer rods to be $2\frac{1}{2}$ in. diameter in the socket.

DRAW BAR.—The draw bar to be of the best hammered scrap-iron. The hook to be forged out of the solid, and, if welded on to a bar, such weld to be at least 12 inches from the hook.

SIDE CHAINS.—The side chains, four in number, to be of the best lin. cable iron, 2ft. $3\frac{1}{2}$ in. long from centre of the eye-bolt to inside of hook and link respectively.

Two to have hooks, the other two to have links, 6 inches long at their extremities, and fixed to the end frames by eye-bolts, with square necks passing through them, and a $\frac{1}{2}$ in. washer plate outside with nuts to be screwed inside against a $\frac{1}{2}$ in. iron, and $\frac{1}{2}$ in. Warne's mineralized india-rubber ripps. When fixed to be equidistant from the centre line of frame, and in a right line with each other.

Body.

SIDES.—The four corner pillars to be $4\frac{1}{2}$ in. square, rebated on the outside for the panels, and on the inside for the lining boards, tenoned into the bottom frames, and strengthened by a strong wrought-iron knee, firmly bolted on each side at the bottom.

The standing pillars to be bevelled and rebated for the door to shut against, the tenons to have screws through the shoulders to strengthen them, and wrought-iron knees bolted to them, and to the bottom sides, and rebated to receive the side lights and panels.

The middle pillars to have grooves to receive the ends of the horizontal partition boards, into which they are to be screwed. The lips of the grooves to have screws through them, 6 inches apart, to strengthen them; thin wrought-iron angle plates to be screwed to these boards, and to the pillars, at intervals of 9 in. centres, and wrought-iron knees bolted to them and to the bottom sides.

The intermediate standing pillars and side-light rails to be rebated to receive the glass and panels.

The top side-frames to have rebates for the tops of the doors, middle, and intermediate standing pillars, notches for the roof principals, and grooves for the panels, also a groove to form a water drip.

SIDE LIGHTS.—The side lights to be of the height and width shown on the Drawing, the glass well bedded and kept in place by a bevelled bead outside, firmly screwed in with brass screws.

GLASS.—The glass to be of the best plate, free from stains and air bubbles, and not less than $\frac{1}{8}$ in. thick.

DOORS.—The doors to have sliding lights, to be on a spring balanced, a pattern of which will be supplied. The doors to have brass plating of proper size, and to be made to fit accurately. The under rebates in the side frames to be faced with iron, $\frac{1}{2}$ inch thick, by the width of the rebates.

VENTILATORS.—Sliding ventilators to be placed over the doors, with louvre outside. To be made with slot openings with a sliding cover inside. The space between the ventilator rails in the doors to be covered with vulcanized india-rubber underneath, so fixed as to press against the top of the glass frame when shut up and prevent draft.

PANELS.—The panels for the sides and ends to be of papier maché $5/16$ -inch thick, (manufactured by J. S. Isaac, of Maidstone, Kent), in one piece, from the top side to the middle rail, and in one piece from the middle rail to the bottom of the groove in the bottom side-frames.

The panels to be of even and sound surface and regular thickness, well oiled and hard baked.

All papier maché panels to be left with the joints about $\frac{1}{8}$ -inch open where covered with beading to allow of their expanding.

BEADING.—Oak beading, 1 inch wide and $5/16$ in. thick, to be fixed over the joints, and up the standing pillars. All the panels and beading to be fixed with round brass or copper pins.

MATERIALS.—The four corner pillars, the door styles and standing pillars, to be of well-seasoned English oak. The roof and partition boards to be of American yellow pine (the roof boards to be in one length, matched).

4

ROOF.—The roof principals to be of ash, 2½ in. by 2 in., cut to the proper sweep, and strongly screwed to the top side-frames, as before described. The boarding to be 1 in. thick, grooved and tongued in single lengths; to be covered with three thick coats of white-lead paint outside before being covered with the roof cloth, which must be put on while the last coat is wet. The roof cloth to be equal in quality to the sample supplied, in one piece, well stretched in laying, and fastened under the eaves, and secured by filleting.

Each Carriage to have a roof lamp, to pattern, let through the roof in the centre of each compartment.

PARTITIONS.—The partition between the compartments to be in two thicknesses of ½ inch boards, grooved and tongued, crossing each other at right-angles vertically and horizontally. The horizontal boards to be fitted and screwed into the grooves in the middle standing pillars, and fastened in addition with thin wrought-iron angle-plates, as before described. The vertical boards to be fitted and screwed into the grooves in the roof principals, secured to the floor by fillets. The boards to be well and closely screwed together.

SEATS.—The seats to be framed and supported as shown upon Drawing.

Trimming.

The lining to be of an approved shade of the best blue West of England woollen cloth, to sample. Carpets and other furnishing to sample or design.

The backs of the first-class compartments to be stuffed with the best curled horse-hair, with springs, and padded to the height shewn, full at the bottom (according to an approved template,) above the division and along the roof to be lined with patent glazed linen of straw-coloured ground, and not inferior to sample.

The backs of the second-class compartments to be padded and cushioned with curled horse-hair and American-leather cloth, as per Drawing.

In first-class compartments, a line of broad lace of approved size, colour, and pattern, to be fixed all round, above the stuffing, and over the side lights, covering the nailing of the linen, and a decorating moulding, according to pattern, round the angle of the roof and up the corners. The linen to be kept up against the roof boards between the principals over the space between the seats to give additional head room, and the decorated moulding to continue round the curve of the roof principals.

The roof boards to have a moulding round the holes for the lamps.

The inside of the doors of the first-class compartments to be lined with American leather cloth of the same colour as the other trimming.

The cushions to be single, and stuffed with best curled horse-hair and not more than 3 inches thick on the edge, according to sample cushion, and bound round the top and bottom edges with seaming lace. One side and edges to be covered with cloth and the other with American leather cloth.

The cushions of first-class compartments shall rest on canvas covering the springs in the wells, as shewn on Drawing.

The elbow division of first-class compartments to be of mahogany, French-polished under the elbow rests.

The elbows to be stuffed with horse-hair, and covered with the best American leather cloth to match the lining.

The front rail of the seats to be padded and covered with broad lace of approved pattern and colour.

The inside of the windows to be lined with blue American cloth.

The pasting, seaming, and other lace, to be of the appropriate width and colours, and of approved Great Western Railway Pattern.

Cloth welts to be nailed round the door pillars, on the inside face, for the door to shut against.

Strong brown leather stop straps to be screwed to all the doors, with approved fastening, to prevent the doors opening too far.

The carpet to be of best quality, to pattern or design, kept from shifting by leather straps and brass buttons.

A piece of 5in. rope covered with carpet to be tacked across the doors to prevent draft.

Umbrella nets of first-class compartments to be of worsted cords, to match the trimmings, and of second class to be Manila, to be fixed over the seats of each compartment. The rods to be of bird's-eye maple in first class, French-polished; and of mahogany in the second-class, the brackets of approved design.

All the windows to have blue alpaca curtains on bird's-eye maple rods in first-class, and mahogany and alpaca (of inferior quality) in second-class, with rings and brackets. Each curtain to be sufficiently large to shut in one side and half the door light, and to have loops or button holes at the corners, and buttons on the doors, for fastening the bottom of them. G. W. R. to be worked in all.

Mountings.

Brass plating to be put on all the doors, gun-metal commode and door handles; private locks with brass escutcheons to the key-holes; side lamps; iron staples to be fixed on the side of the Carriage for attaching "Station" and "Ladies' Carriage" label boards; ivory knobs and silk cords for blinds.

Painting and Varnishing.

The whole of the woodwork outside to be painted with three coats of white lead, and five of filling up after dressing down; four coats of white to the upper parts and two to the lower; then three coats of brown to the lower parts of body, and one coat of brown to the under frame; three coats of varnish over the body, and one on underframe; the steps, step-irons, side-chains, wheels, axle-boxes and springs to be black; the side springs brown.

The whole of the axle bars to be stopped, filled up, rubbed down and painted to pattern.

The outside of the roof to have three coats of white-lead, the edges black. "G. W. R." to be written in gold in a monogram on the panel of the doors, and the Company's arms and crests on the lower panels between the lights, as may be directed.

"First Class" or "Second Class" to be written on each door over the window. The number to be written on each Carriage as may be directed.

General Observations.

The Company will supply the wheels and axles, the bearing and buffing springs, to the Contractors.

The whole of the materials to be of the best description of their respective kinds.

The wood to be sound, dry, and free from knots and sap.

The framing to be clean and well made, and strongly put together, accurately square and straight, and the whole of the detail parts fixed equidistant from the centre line.

All mortises and tenons to be painted with white-lead and oil before being put together. The whole to be put together, and finished in the most substantial and workmanlike manner, to the satisfaction of the Company's Superintendent or Inspector; who shall have full power to reject all, or any such Carriage, or parts that are not in full accordance with the spirit and intention of this Specification, as respects materials and workmanship; and to be delivered complete and ready for use (free of charge,) on the rails at Station,

and if not so delivered complete within the above periods respectively, the Contractor shall forfeit to the Company, as ascertained damages, the sum of per Carriage.

The colours, and style of painting, and lettering, the mode of trimming, and the quality of the trimmings to correspond and match with the First Class Carriages of the Great Western Railway.

No advantage to be taken of any omissions of detail in the Drawings, or in this Specification, as full explanation will be given, should any part not be sufficiently shown or understood.

Conditions of Contract.

The Contract is to include the supply of all materials and parts (exclusive of those to be supplied by the G. W. R. Co.) for, and the building and finishing complete the Carriages according to this Specification and Drawings herein referred to. The Contractor to pay all patent rights and royalties—fitting the springs to the axle boxes, mounting the Carriages on the wheels; painting all the parts and the delivery of the whole complete, free of charge, on the rails at the Station of the Great Western Railway.

quality
Western

in this
own or

ge sup-
ording
rights
heels ;
at the
ilway.

