

BUILDING THE COWBOY CHUCK WAGON CIRCA 1860



Design, plans, instructions, and prototype model by Bob Crane

Technical Characteristics:

Scale: 1" = 12" (1:12)

Overall length: 10"

Height: 9"

History

The chuck wagon is an iconic symbol of the American old West and familiar to folks around the world. Countless western films feature a chuck wagon. The first purpose built chuck wagon is usually accredited to Charles Goodnight, a famous Texas rancher. To quote "Wheels West" by Richard Dunlop...."He bought the gear of an army wagon. It had iron axles instead of wood. He hired a Parker County woodworker to rebuild the wagon box of seasoned bois d' arc and placed a chuck box at the rear end. Six oxen pulled the first chuck wagon."

The chuck wagon was used both on the trails, when driving cattle to the railheads for the Eastern market, and on the ranch during the round up. The "Cookie" drove the wagon, and had a status second only to the trail boss. As well as being a mobile kitchen the chuck wagon carried the bedrolls and belongings of the cowpunchers, branding irons and shoeing equipment, and sometimes a newborn calf.

On the trail the chuck wagon went on ahead of the herd, and would be laden high with bedrolls, coils of rope, feed for the horses and fuel for the fire. Buckets, pots and water drums would be hung all around

the rear, and a water barrel might be lashed to the side. Often a cowhide would be stretched across between the wheels under the wagon box and this "possum belly" was used to stow wood and/or cow chips, picked up on the trail for fuel.

Before you Begin

The model kit was designed to be as faithful to historical chuck wagon construction and detailing as reasonably possible. Research revealed a wealth of detail from reliable sources including plans drawn from an actual historical wagon. Nearly all wooden parts are laser cut in basswood leaving very few parts to be made from strip wood. There was a great deal of hand forged ironwork on these wagons which in a model might be beyond the ability of all but experienced modelers to create. We have reproduced this ironwork in the form of photo-etched brass requiring only some shaping to add these essential details to the model. While it is possible to build the model omitting many of these details, we encourage you to include them resulting in a model that is as close to an historical wagon as possible. The results will be rewarding. The comments that follow are addressed to model making practices in general and may not apply to this particular model.

1. The Plans

Six plan sheets are provided. Many drawings on the plans are done in an isometric format illustrating the construction sequence and identifying the parts and their placement. Note that sheet 6 is for parts identification only and is not to scale.

2. Making Allowances Along the Way

Try to be exact when following the plans and instructions, but use common sense. Adjustments may be necessary to compensate for small differences in how your model is shaping up. Perhaps a bit of shaving here, a little shim there, a little filler there, etc., will alleviate any annoyances. Use logic and do not fret over exactness. An old saying in the building craft is that "if it looks right, it is right."

3. Kit Lumber

Strips, laser cut sheets of basswood and plywood, are supplied in the kit. The laser cut boards are labeled CKW-1 through CKW-11. Sorting the wood in the kit by dimension will save time. After selecting and cutting what you need, return the remaining stock to the proper dimension pile. Don't worry about using a piece for one item intended for another. Model Trailways supplies enough extra wood to complete the model before running out.

4. Working with Brass

There are many photo-etched brass parts in the kit which represent the forged iron parts on the real wagon. Many of these parts require bending to shape. For your convenience the bend lines have been etched into the parts. The line is etched halfway through the brass making it easy to bend the part. Use a pair of needle nose pliers to make the bends. Study the plans and figures to understand which way the bend goes for each part. Some parts have left and right configurations which require bends in opposite fashion. An identifier sheet is included showing the part numbers of the photo-etched parts. Brass parts are given identifying numbers as B1, B2, B3,...etc. Brass kit parts represent the many forged ironwork parts that were used to build the original wagons. The iron parts were typically painted black. To blacken photo-etched brass there are products on the market formulated to chemically blacken the brass. One such product is BLACKEN-IT. It is available at hobby stores and can be ordered from Model Expo. The Model Expo part no. is AW2. It is important that the brass parts to be blackened are clean. It is best to wash the parts in a solvent such as Acetone or Lacquer Thinner and handle only with tweezers before immersing in the blackening solution. Follow the directions on the bottle. Brass can also be blackened with markers such as the Sharpie brand. Markers leave a slight sheen on the parts which can be removed with an overspray of Testors Dullcote.

Glues

White or woodworker's glue in yellow or tan will suffice for most of the model. Five-minute epoxy provides extra strength for some cases. Super glues, such as Jet, Flash, or Zap, produce quick adhesion. For most applications, the medium viscosity, gap-filling variety is best. For some applications the gel type works best. The thin type is recommended for filling a narrow crack and wicking into laminate joints. The prototype model was built using tan woodworkers glue, gel type CA and an occasional use of epoxy and thin CA.

A word about gluing laser cut parts. Laser cutting burns through the wood and leaves a charred surface. This charred surface does not make good glue joints. It is recommended to lightly sand or scrape away the loose char before gluing. It is not necessary to remove all the char, just what comes off with light sanding or scraping. In most cases simply scraping with a no.11 blade is sufficient.

Clamps

Clamps are an essential part of the model building experience. In the full size building arena it is often said, "A builder cannot have too many clamps." This is true of model building also. There are so many situations in the course of building a model that require a particular type of clamp. The photo below shows a typical collection of clamps that are useful in model building. Fortunately very few clamps were necessary in the course of building the prototype model.



Painting the Model

Beginning this manual with directions on applying finishes may seem strange. Not so! Much time and effort can be saved and more professional results obtained if the finishing process is carried on throughout construction. Proper timing in applying finishes and using masking tape to define painted edges should eliminate unsightly glue marks and splotchy, stained surfaces. Many parts in the kit can and should be pre-finished before assembly. This is much easier to do before assembly than after.

If you are not in a hurry to begin construction, think through what kind of finish you like, what parts are going to be exposed, etc. Research revealed that a most common paint scheme for chuck wagons was red and green, red wheels and undercarriage and green wagon box. Iron work was painted black. The prototype model was finished in this manner. The paint was thinned to the consistency of a wash to give a weathered, faded, look to the finish.. Another possibility is to not paint at all but stain the wood as if weathered wood. The choice is yours. We will address the finishing of individual parts as we proceed through the construction sequence. Take advantage of these general suggestions:

Choosing paint: Glossy surfaces are not desirable on models. A flat finish or one with a slight sheen is best, because it doesn't reflect daylight or artificial lights. Consequently, details show up better. However, the undercoat or primer should be dead flat. A primer gives the surface a little tooth and helps top coats adhere better. A quick finish procedure for basswood parts is to spray them where possible with common aerosol primers, then steel wool with 0000 steel wool, this fills and smoothes the surface for painting.

Any of the hobby paints are satisfactory such as Model Shipways, Testors, Humbrol, and Tamiya. Jo Sonja artists' paints (used by bird carvers) are also acceptable. They are a combination acrylic-gouache and dry dead flat. Hobby paints have a variety of reflectance levels from flat to gloss. When using a mixed group of reflectance levels, finish the completed model with a flat, clear coat. It also provides durability and seals any decals or dry transfer lettering.

Brush painting: Painting with fine, soft bristle brushes is probably best for the beginner. Many skilled model makers prefer the brushed-on technique, because its subtle imperfections impart a more lifelike appearance to the model. Brushes must be soft and of the highest quality. Artist grade sable or synthetics are the best. Use wider brushes for painting broad surfaces. If too narrow, the bristles will cause excessive streaking. When applying paint or stain with a brush, lay down one thin coat in a single stroke, then move to an adjacent area and coat it with a single stroke. Never go back over fresh paint. That will tear up the surface. Wait until it has dried to a hard finish before applying a second coat.

Spray painting: Although slightly expensive, a Paasche, Badger, Testors, Revell-Monogram, or similar airbrush will produce a first-rate job and is worth the investment. Airbrushes are either single action (trigger controls only airflow) or double action (trigger controls air and paint) and easy to use. Spray patterns can vary from thin to about 1/2" wide by either adjusting the needle or installing a different, sealed nozzle. In some brands, paint travels through the airbrush body to the needle. These require disassembling to clean. Other designs bypass the body and bring paint directly to the nozzle. These clean by simply spraying solvent through them.

Paints are either water (acrylic) or solvent based. Solvent-based paints spray best. Acrylics are difficult to spray and must definitely be used with the manufacturer's special thinner.

Thinning water-based paints with water creates surface tension problems, resulting in poor coverage and spray atomization. If a manufacturer's thinner is not available, alcohol can be used as a substitute. Experiment when using acrylics as some modelers have success and others don't. When using solvent-based paints, work outdoors or equip your shop with a spray booth. These fumes are toxic.

Many brands of aerosol paints produce good results. However, test them on scrap wood before spraying the model. Aerosols put out a lot more paint than an airbrush, so be careful to avoid runs. Spray on several light coats. A tip from the automotive industry is to heat the spray cans a bit which increases the internal pressure and produces a finer spray. Heat only in hot water from your household sink; do NOT use a flame of any kind or boiling water.

Most paint manufacturers have special thinners for their various paint lines. Follow each manufacturer's recommendations. Mixing brands is not a good idea, because they may not be compatible. Sometimes, however, no other option exists. If so, apply each brand separately and allow to thoroughly dry before adding the next. Always test to make sure the final flat or gloss finish is compatible with the paint it will cover.

Masking surfaces: Masking can be a tricky process. Some brands of masking tape are worthless for model work, because they allow paint to seep underneath their edges. For masking fine stripes or straight and curved lines, use a graphic arts tape such as Chart Pak. It comes in widths as fine as 1/64". Chart Pak tapes have superb adhesion and won't bleed when firmly applied (burnishing is recommended). Scotch Removable Magic Tape is also excellent. Scotch tape has the same, low stick adhesive as its famous Post-It pads. In fact, Post-It tape flags can be used for masking.

Building the Undercarriage

IMPORTANT: Before beginning construction check the fit of the axle spindles with the wheel hubs. File off any casting flash first if the hubs do not fit freely on the spindles; work the spindles down with a file until the fit is satisfied. It is important to do this now as it would be very difficult to do after construction.

In the days of the chuck wagon era bolt heads and nuts were square. This was especially true in the coach; wagon, carriage, and farm implement industries. Square head bolts and nuts at our model scale are not available and are very expensive to manufacture in small quantities.

We have solved the problem for the kit by using rod material to simulate bolts and providing laser cut square nuts. The nuts are cut from a homogeneous tough material and can be readily glued in place. These are found on laser cut sheet CKW-11. Once painted this combination of rod and nut represent scale bolted connections very well. Four nut sizes are provided, Two scaled to fit a simulated bolt made from 1/32 diameter rod and 1/16 dia. rod, one scaled to fit the axle clips and one to represent the axle nuts which retain the wheels.

The undercarriage of a chuck wagon is a curious structure that was probably developed over hundreds of years of wagon building. The front wheels and rear wheels are attached to structures called respectively front hounds and rear hounds. Each of these structures resembles a two wheeled cart. They are connected together with a pole called the coupling pole. Each is pinned to the coupling pole with a heavy bolt. It is thought that this design evolved to be sturdy and flexible to take the punishment of travel over rough terrain. Study the plans to familiarize yourself as to how the parts of the undercarriage go together. Refer to Detail 1-1 and 1-2 and familiarize yourself with the names of the parts.

Building the Rear Carriage

NOTE: There are many laser cut holes in the wooden parts in this model. In some cases the center of the hole does not freely drop out of the part. It is a good idea before working with these parts to punch out the centers with an appropriate piece of rod. It is much easier to do so now rather than later.

Rear axle and axle bed: Refer to Detail 1-3. Locate axle bed parts 1, 2, and 3. It is a good idea to lightly number these parts with a soft pencil as they are removed from the laser cut boards so as to avoid any confusion during assembly. Laminate these parts as shown. Sand away the laser char and lightly chamfer corners. Carve and clean up the slots as shown. Test fit part 17, rear hound in the slots. Adjust if necessary. The rear axle is a Britannia metal casting. Fit the axle bed to the axle and glue the axle to the bed as shown making sure the axle is properly centered on the axle bed. Epoxy glue is recommended for this.

Rear body bolster: Refer to Detail 1-4. Locate parts 4, 5 and 6. Laminate these parts as shown, clean up, chamfer, and carve the slots as before. Test fit part 17, rear hound in the slots. Adjust if necessary.

Front axle and axle bed: Refer to Detail 1-5. Locate parts 12, 13, and 14. Assemble as shown, clean up, chamfer, and carve the slots as before. Test fit part 24, front hounds in the slots. Adjust if necessary. The front axle is a Britannia metal casting. Fit the axle bed to the axle and glue the axle to the bed as shown making sure the axle is properly centered on the axle bed. Epoxy glue is recommended for this. Drill through the bed and metal axle as shown with a #51 bit. This hole is for the king pin, which is a 1/16 dia. rod. Test the fit of the rod and adjust if necessary.

Front sand bolster: Refer to Detail 1-6. Locate parts 9, 10, and 11. Assemble as shown, clean up, chamfer, and carve the slots as before. Test fit part 24, front hounds in the slots. Adjust if necessary. Brass part B5 fits to the top of the sand bolster as shown. This may be done now or later.

Front body bolster: Refer to Detail 1-7. Locate parts 7 and 8. Assemble as shown, clean up, and chamfer.

NOTE: With these carriage parts completed, you may want to consider painting or otherwise finishing these parts now. It is easier to finish them in the unassembled state. Do not paint gluing surfaces.

Rear hounds and coupling pole: Refer to Detail 1-8. Locate parts 16 and 17. Use the pattern sheet supplied to assemble and glue two parts 17 to part 16 as shown. Align parts 17 with the laser etched lines on part 16.

Rear axle and brake hanger beam: Refer to Detail 1-9. Fit the hounds and pole to the rear axle. Use parts B2 temporarily to position the hounds on the axle beam. When fitted, glue the assembly together.

Add two axle clips B1 and clip plates B8 as shown. These parts may be glued to the axle and beam, but do not add square nuts at this time. Locate part 18, brake hanger beam and glue in place. Secure with parts B3R and B3L. Square nuts may be applied to these. Parts B9 may be added at this time. Glue these parts to the assembly making sure the bolt holes line up.

Rear bolster: Refer to Detail 1-10. Dry fit the bolster and parts B2R and B2L. Mark the locations of the brass across the top of the bolster. Remove the brass and carve a slot for the brass as shown so the brass fits flush with the top of the bolster. Glue the rear bolster in place and secure with parts B2R and B2L. Add parts B8 but do not apply square nuts at this time.

Add the ironwork: Refer to Detail 1-11. Prepare the tie rods and hound braces, parts B6 and B7 by bending to shape. Apply as shown. Note that 1/32 dia. rod is required at six places All square nuts may be now added. Carve the tenon on parts 15 to a 1/8" width and install as shown. Shape and install part B23.

Brake mechanism: Study Detail 1-12 and 1-13. Make up the brake crank assembly, the brake beam hanger, and the brake lever assembly as shown. These parts are also shown on the pattern sheet. Anneal the brass rod before bending up the beam hanger. It is important to maintain the correct length of the hanger's legs. If you are not comfortable with soldering, use epoxy glue. Assemble the brake crank to the rear axle as shown with two parts B11. Glue up the brake beam parts 19 and 20 and B17. Drill an appropriate size hole in the center of the aft face of part 19 for part B17. Note that the brake shoes, parts 20 are not symmetric. Refer to the end view shown for the correct orientation. Attach the brake beam hanger to part 18 with two parts B10. Connect the brake crank to the brake beam with part B18 using 00-90 bolts. When working with these very small bolts, it is useful to make yourself a nut starter. Attach a small piece of double sided tape to the end of a small dowel, and then stick the nut to the tape. It is also a good idea to spread a soft cloth under your work area to catch any wayward nuts and bolts. One extra set of nut and bolt is included in your kit for just such a mishap. Connect the brake crank assembly to part B15 with 00-90 bolts. It is best to do this now as it would be difficult to connect these parts after the wagon box is installed. Do not attach the brake lever assembly at this time. It will be connected after the wagon box is installed and will attach to the underside of the wagon box later.

Building the Fore Carriage

Fore hounds and drop tongue: Study Detail 2-1 and Detail 2-2. Glue up the drop tongue, parts 21, 22, and 23 using the full size plan view in Detail 2-3 or on the pattern sheet. Note: Part 21 is a stub tongue; a usual arrangement for models. If you wish a full length tongue this detail is included on plan sheet 2. Materials are not supplied for this. Assemble drill jig parts J1, and J2 as in Detail 2-4. Refer to Detail 2-5. Clamp the jig and the fore hounds to a surface and carefully drill through the hound with a #51 bit. Reverse the process and drill through the other side. Position the drop tongue in place, clamp and drill through as shown. If your drill is not long enough, drill through the other side. Cut 1/16 dia. brass rod to the correct length for the cross bolt and temporarily fit in place. Brass part B22 can be added to the drop tongue now or later.

Remove the cross bolt and drop tongue. Refer to Detail 2-6. Apply 4 axle clips, parts B1 and B8 as shown. Square nuts may be applied to the center two axle clips but do not apply square nuts to the outer two clips at this time. Glue the fore hounds to the front axle using parts B4 to locate the hounds with respect to the axle. Refer to Detail 2-7. Glue the sand bolster in place and secure with two parts B4. Refer to Detail 2-2 as well, form the ironwork parts B19L, B19R, B21L, and B21R to shape and fit to position. Prepare six simulated bolts from 1/32 dia. rod as shown. Assemble the iron work parts as shown. All square nuts may now be applied. The drop tongue and cross bolt may now be put in place permanently.

Double tree and single trees: Refer to Detail 2-8. Locate double tree part 27 and brass parts B24 and B26. Shape parts B26 as shown and glue in place. Use brass pins to align parts B26 to the double tree.

If desired, added realism can be had by permanently adding blackened brass pins to all holes. Glue in place and snip off on the bottom side. Add part B24 as shown. Assemble the single trees from parts 28, and parts B25 and B27. Connect the single trees to the double tree with split rings as shown. It was common practice with wagons of this type to have a double tree pin that also served as a hammer. Make up the double tree pin from part 29 and 1/16" dia. brass rod. Connect the double tree to the drop tongue. Connect the double tree to the axle with slack black chain and split rings as shown in Detail 2-9.

Finishing the undercarriage: Refer to Detail 1-10. Complete the body bolster as shown. Carve a 1/16" tenon on two parts 15 and glue in place. Cut a piece of 1/16" dia. rod to length for the kingbolt. The kingbolt true length is shown in Detail 1-11. Test fit the rear and fore carriages and connect with the king bolt. Make adjustments if necessary. Note that the front body bolster rotates relative to the fore carriage. The bolster will be glued to the wagon box later. Do not permanently install the king bolt or apply square nuts at this time, this will come later.

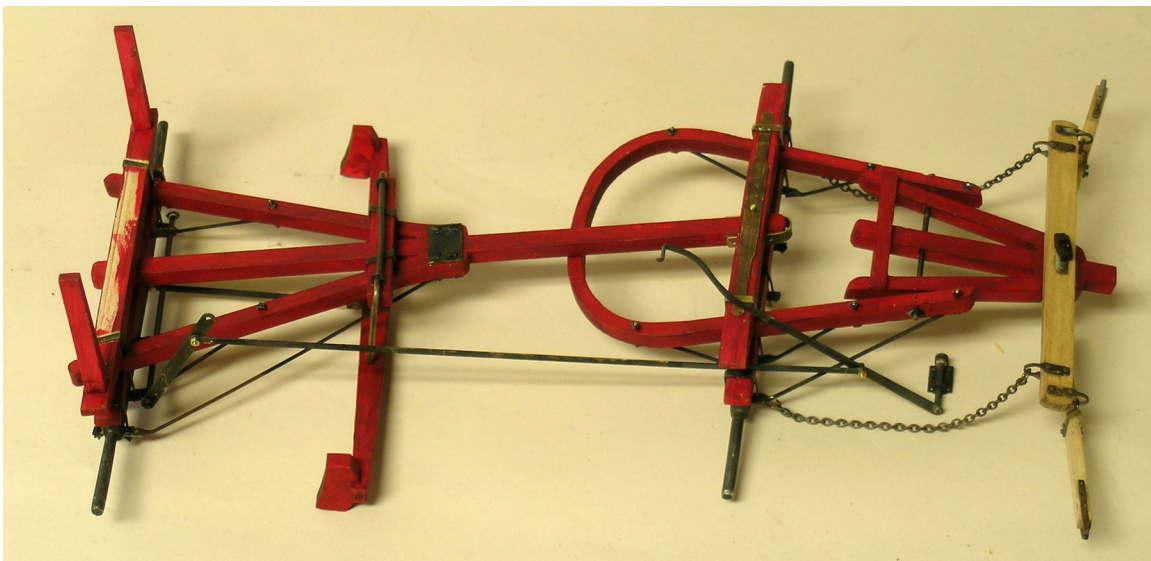


Photo 1: the completed undercarriage

Building the Wagon Box

Wagon box bottom: Study Detail 3-4 and 3-5. Locate the bottom parts as shown in Detail 3-5, parts 33, 34, 35, 36, 41, and 42. Layout the floor boards as shown and glue the sills, 41 and 42 to the boards. Ensure that the hole in part 41 lines up with the hole in part 37. The crossbeams, middle and rear require a 3/64 dia. hole as shown. It is best to drill these now before assembly. Glue the beams to the floor boards.

Wagon box sides: Layout the wagon side parts 38 and 39 as shown in Detail 3-6. Use brass pins to align parts 40 and glue parts 40 to the sides, both part 38 and 39. Parts 40, called "straps", were bolted or riveted to the top side board and the straps inserted into the staples on the lower side board. Thus the top side board was removable. For model purposes it is best to glue the straps to both side boards.

Note: There are many places on the Chuck Wagon where holes are provided where bolts, rivets or nails would have been. Added realism can be gained by using blackened brass pins at these locations. For example the straps can be pinned as in Detail 3-5. Push the pins through the strap and side. On the inside snip off the pins a bit proud of the surface and use an ultra fine marker to draw a line around the nail protrusion. This resembles a washer and rivet.

Add the 8 parts B33 as shown. These staples are designed to push through the sides and then the protrusion be bent over to secure it in place. Install 8 parts B32 temporarily using a bow end for proper

spacing as shown in Detail 3-6. The bows are found on laser cut sheet CKW 10. Drill and install the two ringbolts in the locations shown in Detail 3-1.

On the inside of the box side glue on the 1/16" square strips using the laser etched guide lines. Use Detail 3-2 to mark the locations of the 4 parts B34 and install.

Front boards and foot rest: Refer to Detail 3-8. Layout parts 30 and 31 and glue together with two 1/16" x 3/16" strips as shown. Position these strips about 3/8" from the edge as shown. Bend part B34 to the approximate angle shown in Detail 3-2 or on the pattern sheet and apply in the approximate position shown. Fit and glue part 32, foot rest to parts B34. Bend and fit parts B35 as shown.

Assembling the wagon box: Refer to Details 3-9 and 3-10. Glue the front board and backstop, part 44, in place as shown. Glue to the other side and ensure the structure is square while the glue dries. Prepare two tie rods of 1/32" dia. rod and install as shown. Refer to Detail 3-11. Glue the bottom to the sides. Glue the front bolster to the fore sill as shown. Ensure that the king pin holes are aligned and the bolster is squared. Glue parts 43 in place on the cross beams, aligning the holes. Shape part B30 and install as shown with square nuts. Shape parts B31 and install.

Seat assembly: Refer to Detail 3-12. Assemble the seat parts as shown. Locate parts 45 approximately 15/16" from the front edge of the sides and glue. This is also shown in Detail 3-10. Glue the parts 46 to the seat spring castings. Use the side view on the pattern sheet to center these parts on the springs. Glue the seat assembly to parts 46. The seat spring castings are somewhat fragile as they were mastered to scale and the Britannia metal is a bit soft. Treat them gently. It is best to leave the final installation of the seat and springs as a final step to avoid distorting them as you work on the model.

Assembling the pan box: Refer to Detail 3-13. Assemble part 50, bottom, to part 51 back. Note that the back sits on top of the bottom. Ensure the parts are square. Add the ends, parts 52 as shown. Shape parts B37 and apply. Apply the 1/16 x 3/16 verticals to the pan box flap, part 53. Prepare the small pads and glue to the top of the verticals. Parts B38 may now be applied.

Make up the hinges as shown in Detail 3-14. Begin by starting the bend in the tangs using a piece of 1/32 dia. rod as shown. Note the orientation of the half etched areas on parts B29 and B28. Remove the rod and assemble part B28 to B29 and complete the bend of the tangs. Apply the hinges to the flap and the flap to the pan box as shown. The pan box may now be glued to the wagon box. Drill through the slot in part B38 and into the rear cross beam for the eye bolts. Install the eye bolts. Make up two L pins to secure the flap. Your Wagon box should now look like Detail 3-15 but without the seat and springs as in photo 2.

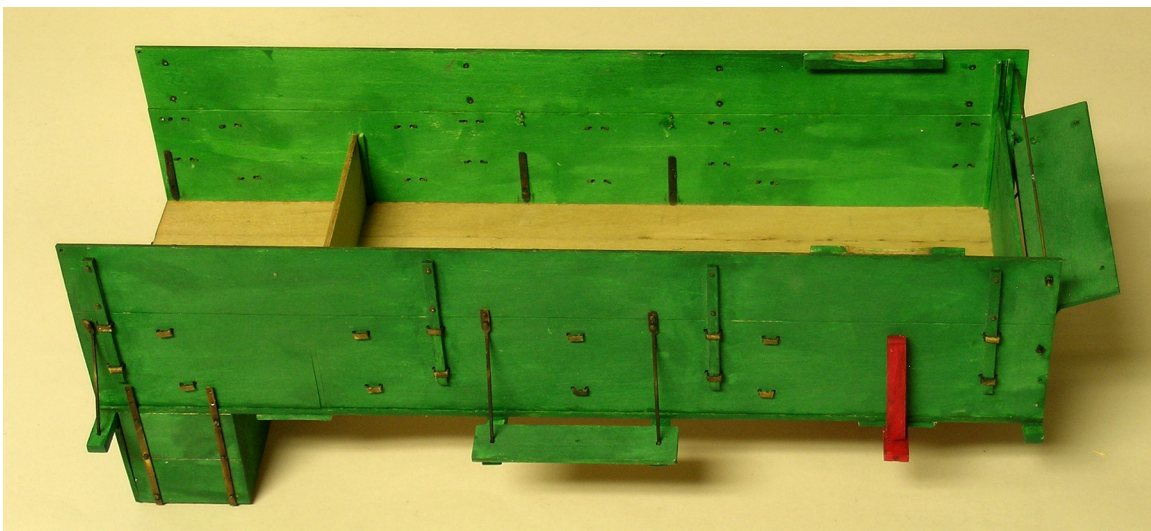


Photo 2: the completed wagon box

Building the Chuck Box

Refer to Detail 4-1. Assemble bottom part 55, and back part 56 assuring the assembly is square. Note that the back locates on top of the bottom. Add the two sides, parts 57. Locate the bottom partition, part 58 using the laser etched lines and glue in place. Add the middle shelf and middle partition, parts 59 and 60. Add the top shelf, part 61 and the partitions, parts 62. Assemble the four drawers as shown in Detail 4-1 and check for proper fit in the chuck box. Add the 1/16" x 1/4" strips and then the top. Center the top on the structure.

Make up the box flap as shown, parts 64 and 65. Add the 1/16" x 1/4" strips. Use the full size prop drawing to size the flap prop. Make up the three hinges and attach as shown. Place the chuck box in the wagon box. The chuck box flap was secured in the closed position by an iron rod as shown. Make the rod from 1/32" dia. brass and square nuts. If you want your flap to open apply a square nut to one end only.

Assemble the Wagon

Insert the king bolt in the undercarriage connecting the rear undercarriage to the fore undercarriage. Carefully pass the brake pushrod, part B15 behind the two water barrel braces, part B30. Lower the wagon box onto the king bolt and seat the wagon box in place. You may want to glue the wagon box to the rear undercarriage although this was not done on real wagons. Apply square nuts to the king pin.

Connect the brake lever to the pushrod, part B15 with a 00-90 bolt and nut. Turn the assembly over and glue the brake lever assembly in place. Part B39 may now be installed.

Building the Wheels

Refer to the wheel building sequence on the plan sheet titled Chuck Wagon wheel construction. Get out the wheels and wheel assembly jig from the plywood sheet CKW1. As before noted do not try to punch these parts out of the sheet but cut where necessary from the back side until the wheels are easily removed. First it is necessary to add spacer blocks to both sides of the jig as shown.

Cut out the paper wheel and spoke patterns from the pattern sheet. Carefully cut out the center holes. Glue one pattern to each side of the jig using a wheel hub to center and align the pattern with the center hole. Note that the outboard end of the hub goes down. The outboard end is the end with the recess. Use only a few spots of carpenters glue or similar to avoid wrinkling and distorting the pattern.

Locate a wheel on the pattern. You may clamp the wheel in place or better, drill for small brass nails to hold the wheel to the pattern. These holes may be filled later. Carve and sand the spokes to shape. Begin fitting spokes into the hub and securing them to hub and wheel with CA gel. Work across the wheel rather than inserting adjacent spokes. Constantly check to be sure the hub is squarely seated in the center hole lest you end up with a wobbly wheel. Note the scrap 1/64" plywood or similar spacers of approximately 1/64" thickness. These center the spokes to the wheel. When all spokes have been installed and the glue has set, remove the wheel from the jig.

Finish paint each wheel and apply the tires. The tires are the laser cut strips found on CKW11. If you wish to have your tires exhibit a metallic hue, they can be pre-painted silver before removing them from the laser cut sheet. To apply the tires spot glue them using CA gel working around the wheel a few inches at a time. Trim the end to meet the starting point.

The wheels are secured to the axles with square nuts. The axle nuts are the larger ones on sheet CKW11. In order to achieve a scale thickness two nuts are glued together. Secure the nuts to the axle with a bit of CA glue taking care not to glue the nut to the hub with excess glue.

Finishing Touches

Refer to Detail 5-1. Soak a bow in water and bend around the provided bending jig. Clamp in place and let dry, preferably overnight. Repeat for each of the bows. Install the bows into the wagon box staples as shown. Ballooner cloth is supplied for the canvas top. A half pattern is on one of the pattern sheets supplied or you can cut out the full pattern from plan sheet 5. Lay out the cloth and iron if necessary. Mark the outline of the top on the cloth with a soft pencil. Apply a fray check solution to the drawn lines. Fray check and fabric glues are available at the sewing sections of most stores. Cut out the top to the lines. Refer to Detail 5-2 and hem in the draw lines using fabric glue. Be careful not to glue the line to the fabric.

For the prototype model it was decided to show the top in a furled position at the front bow. This is realistic as the cowboys and cookie were constantly loading and unloading gear into the wagon box. It is believed the top was fully deployed only in case of inclement weather. Draw lines are not necessary if you choose this way to show your model. As the last step glue the seat assembly in place.

That's it, you are finished. Step back and admire your work and be prepared for compliments from your family and friends.