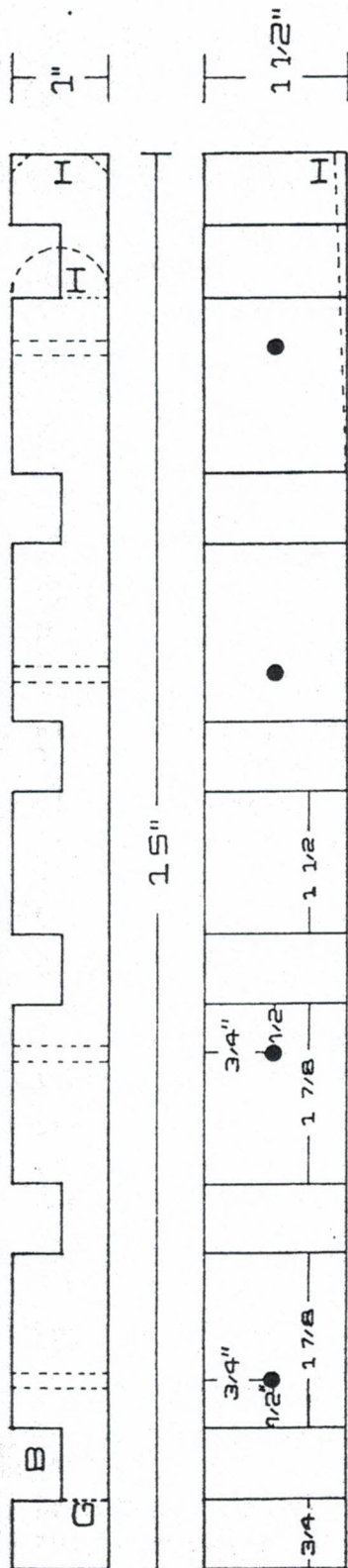
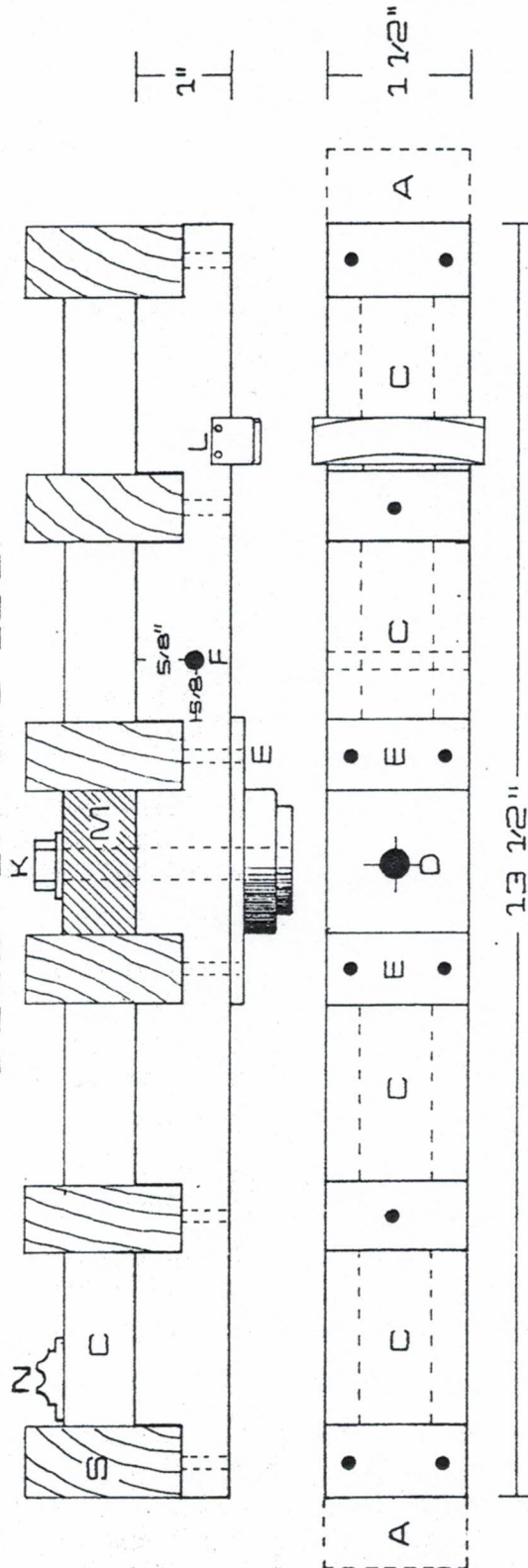


1 1/2" SCALE WOOD FRAME CAR PARTS

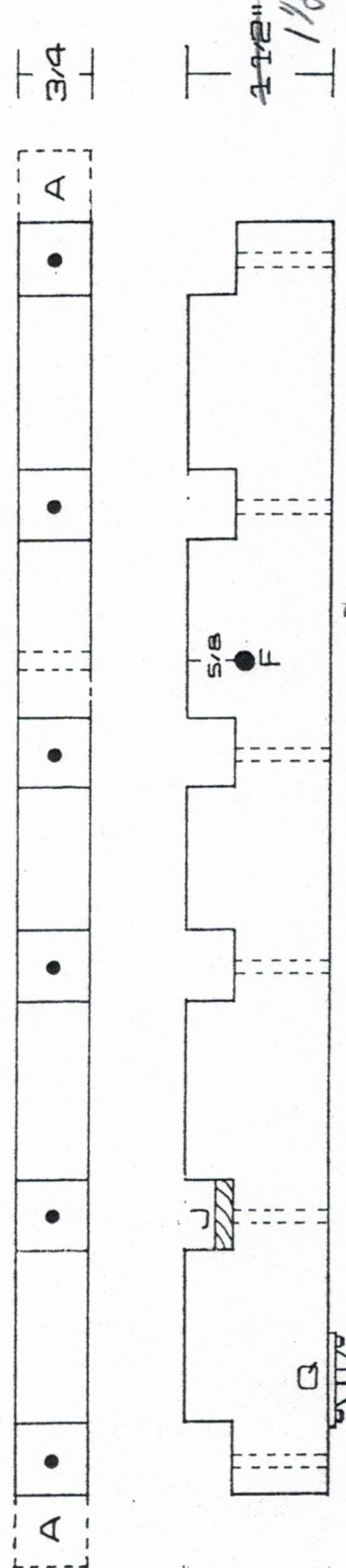
END SILL WS-110



BOLSTER WS-120



NEEDLE BEAM WS-130



Cut 3/8" from Bottom of Needle Beam

SEE NOTES REVERSE SIDE

NOTE: GRADE A POPLAR HARDWOOD

PART	NO	REQ
END SILL	WS-110	2
BOLSTER	WS-120	2
NEEDLE BEAM	WS-130	2

RAILWAY HARDWARE CO.

WOOD CAR FRAME PARTS

SCALE: 3/4"=1' DRWG SHT. 1 WS-010

RAILWAY HARDWARE COMPANY

1½" SCALE WOOD CAR FRAME PARTS FABRICATION NOTES TO DRAWING #WS-010

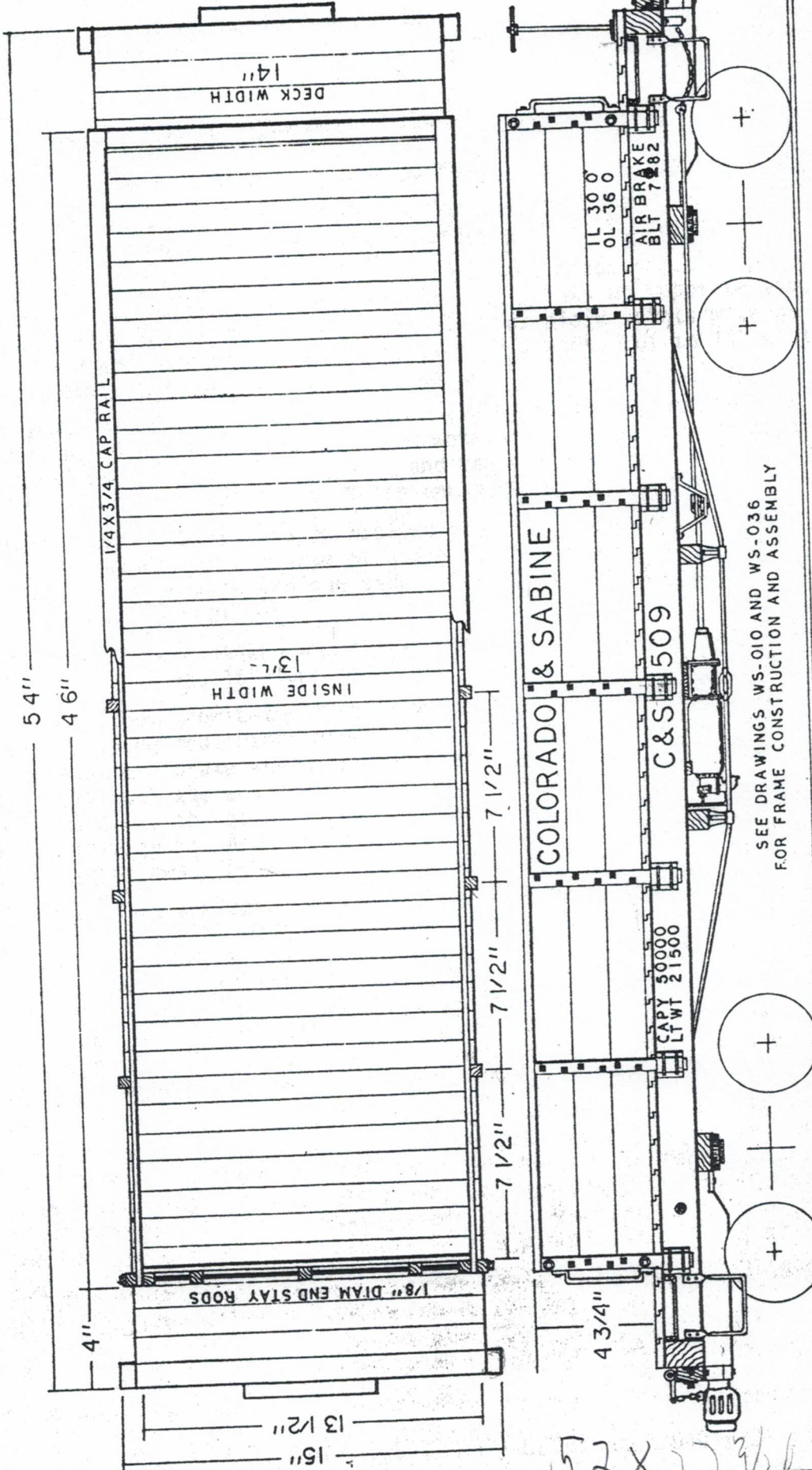
- A. ✓ Leave all parts 15" long until dado cuts in all parts are completed to assure parallel alignment of car sills when assembled. Cut Bolster and Needle Beam to 13½" Length after dado cuts are completed.
- B. ✓ Dado cuts are ½" deep and slightly over ¾" wide for a snug fit to standard 1" Lumber. Two dado cuts out of one saw set up can be made by swapping ends of the piece being cut. On a radial saw, the Bolster and End Sill will have to be placed on a ½" spacer board to match the cut depth of the Needle Beam.
- C. Add a ¾" sq. Block between the sills to support the Bolster Trussrod Saddle. This increases the trussrod angle which is needed to clear the truck wheel.
- D. ✓ Drill a 21/64" hole exactly in the Bolster center for the 5/16-18 Kingpin bolt.
- ** E. Match drill the Bolster center sill bolt holes to the Center Bearing Plate #BL-120. Drill all sill bolt holes #28 for 5-40 sill bolts. Extra long bolts can be made from 8d nails. Look for imported nails of around .126 diam. Square the nail head with a grinder, (so the bolt will not turn when countersunk in the sill) cut to length, and thread 5-40. Drill End Sills #28 to clear 1/8" diam. trussrods.
- F. ✓ Drill #1 holes in Bolster and Needle Beam at least ¾" away from the center sill (to avoid fouling with the adjacent trussrod path) for the 7/32" air brake pipe. Correctly orient these holes for the air pipe when installing these parts.
- G. ✓ Cut off End Sill ends here for a box, stock, or refrigerator car frame.
- H. ✓ Other End Sill modifications possible including addition of 1" half rounds for a caboose sill. Car sills over 1½" high will have to be taper cut at the ends.
- J. ✓ To accomodate smaller inboard sills, glue wood shims into dado cuts to suit. Keep tops across sills level to support car flooring or decking.
- K. Drill #F and tap Center Bearing 5/16-18 and thread Kingpin bolt through it.
- L. Side Bearing plate should not be installed until truck clearance dimension is determined. To increase clearance file down inside surface of the casting.
- M. For addition weight, add a steel bar between the center sills. The Kingpin thread length may have to be increased to clear through the Center Bearing Plate.
- N. Location of Trussrod Saddle. Use End Sill holes to locate exact position.
- Q. Location of Queenpost (3" Queenpost #TR-103 shown). Also locate from End Sill holes.
- S. ✓ Sills should be straight, knot free Yellow Pine, or better. Maximum recommended length is 56", for a maximum scale car length of 38 ft.
- T. Arch bar trucks in the 5 to 5½ Ft. wheelbase range, with either inside or outside hung brakes, are typical for wood frame cars of this size.

REFER TO DRAWING WS-036 FOR A TYPICAL ARRANGEMENT FOR A 36FT. WOOD CAR FRAME USING THESE PARTS AND RELATED CASTINGS.

To eliminate fabrication of special 5-40 sill bolts, substitute standard 6-32 round head machine screws with heads filed or ground down to a "tee head" shape. Use #27 drill for bolt holes.

36 FOOT LOW SIDE GONDOLA

DIMENSIONS FOR 1 1/2" SCALE



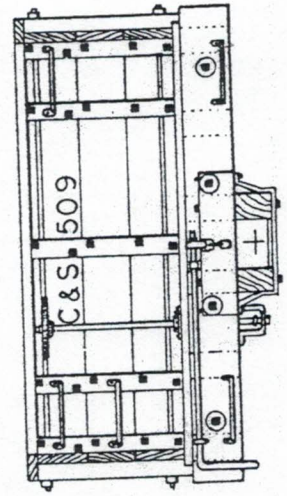
SEE DRAWING TK 052 FOR TRUCK FABRICATION

GRABIRON SCHEDULE

PART	DIMENSIONS	NO. REQ	REMARKS
DECKING	1/4" X 1/4" X 14"	48	CAT. NO. WS-362
STAKE POCKET		14	CAT. NO. FR-120
SIDE STAKES	1/2" SQ X 6"	14	CAT. NO. WS-365 SET
END STAKES	1/2" SQ X 4 1/2"	10	CAT. NO. WS-365 SET
END STAY RODS	1/8" dia X 14 1/2"	4	THREAD 5-40
END STAY RODS	1/4" X 1/2" X 9"	6	CAT NO WS 365 SET
END STAY RODS	1/4" X 1/2" X 46"	6	CAT NO WS 365 SET
STAKE BOLTS	H16X 1" ESCUTCHEON	124	THREAD 1-72
HEX NUTS/WSHRS	1-72 BRASS	124	USE SQ NUTS IF AVAIL.
U BOLTS	.072 STEEL WIRE	28	1-72 THREAD CAT#FR-129
U BOLT NUTS	1-72 STD HEX	56	

DESCRIPTION	REQ	CAT. NO.
16" DROP STYLE	8	GR-116
24" VERTICAL STYLE	4	GR-024
14 X 20 SILL STEP	4	SS 114

Added truck reference 1/31/86:
RAILWAY HARDWARE CO.
 36 FT LOW SIDE GONDOLA
 SCALE: 1/4" = 1'-0"
 1/12/83 JN WS-136



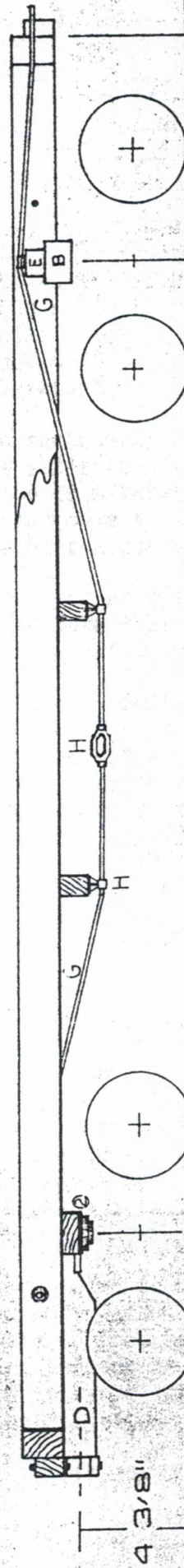
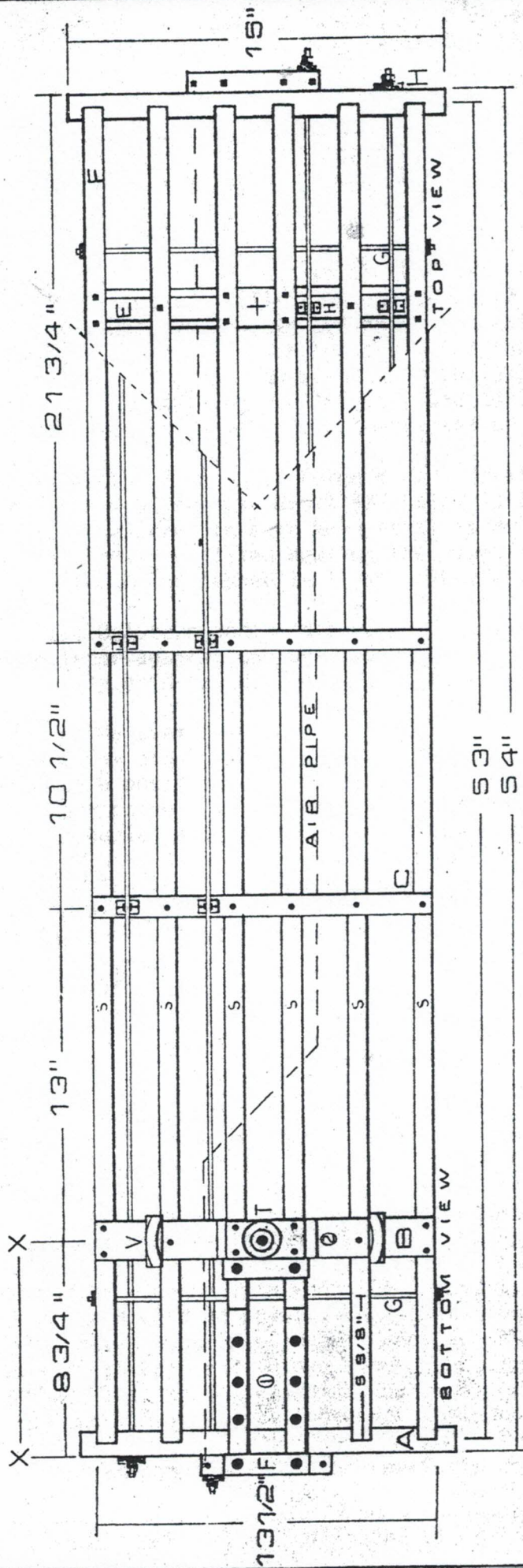
RAILWAY FLARE CAR CONSTRUCTION

36 FT. LOW SIDE GONDOLA NOTES TO DRAWING WS-136

1. Refer to drawings WS-010 and WS-036 for fabrication and assembly of frame.
2. Add trucks and couplers and adjust for correct height and side bearing clearance. Add all desired underframe detail before deck is installed.
3. For deck material, cut $\frac{1}{4}$ " strips from a good grade of clear pine or fir 2x4. Cut the strips to $1\frac{1}{4}$ " width, then cut $\frac{1}{8}$ " sq lap joints on opposite sides. Note that end planks have lap joint on one side only. For plain joints without lap, cut pieces to 1" width and make 54 pieces instead of 48 pieces. Cut to 14" width and glue in place with waterproof glue and #20 x $\frac{1}{2}$ " nails.
4. To space stakes and pockets, make a jig by cutting dados in a scrap 1x2 54" long, starting with the center stake and working out from the center to the ends. Make the stakes from $\frac{1}{2}$ " square stock, and temporarily install in the jig to mark side stake and pocket locations. Notch the decking to clear the side stakes.
5. Stake pocket U-bolts are fabricated from 12 gauge copper wire 4" long threaded 2-56 on ends. Bend over the edge of a $\frac{3}{4}$ " piece of wood to form the U. Drill #44 holes in the stake pockets and the side sills to install the U-bolts and secure with 2-56 brass nuts and Loctite.
6. Drill the 10 end stakes and the 4 corner side stakes #29 holes for the end stay rods, and make the rods 15" long from $\frac{1}{8}$ " welding rod threaded 5-40 at each end.
7. Add end steps fabricated from $\frac{1}{8}$ x $\frac{1}{4}$ " brass strips and add grab irons made from $\frac{3}{32}$ " welding rod. Fabricate a lower brake staff bracket from the same brass strip, and mount the brake wheel on a $\frac{1}{8}$ " shaft. Thread the shaft end 5-40 and install the staff through the end sill and bracket. Connect the staff to the brake system with a piece of 25 lb. monofilament fishing line with a piece of cosmetic jewelry chain woven through it. Add coupler lift bars made from $\frac{1}{8}$ " rod and attached with #8 wood eye screws. The car, thus completed, can serve as a flat car.
8. For the gondola sides, cut $\frac{1}{4}$ " thick strips from the same material used for the floor and trim it to $1\frac{1}{2}$ " width. With the side stake jig clamped in place, Glue the side boards in place. Thread the end stakes onto the end stay rods, and put the rods through the side stakes. Cut the end boards to length and glue in place, making sure that end stakes are square with the sides, and are correctly spaced for the end grab irons. Fabricate side board bolts from #16 x 1" brass escutcheon pins threaded for 1-72 nuts. If you are inclined, fabricate square nuts from $\frac{7}{64}$ " sq. stock. Otherwise, use model hex nuts.
9. Add the cap rail to each side and end, and add grab irons to the sides and ends. For passenger service build a box from $\frac{1}{2}$ " plywood to fit inside the gondola. Make the box with at least 5" high sides and ends to protect the car sides from passengers boarding and unboarding. For approximately 50 lbs. additional weight, pour 1" of concrete in the bottom of this box. Add handles to the inside ends so that the box can be easily lifted out of the gondola when it is not being used.
10. Add two coats of a good marine grade sealer then paint and letter to builders specifications

36 FT. WOOD CAR FRAME

DIMENSIONS FOR 1 1/2" SCALE



CAR FRAME FASTENER SET WS-199		REQ CAT. NO.	
PART	REQ	PART	REQ
A END SILL	2 WS-110	B CAR BOLSTER	2 WS-120
C NEEDLE BEAM	2 WS-130	D DRAFT GEAR, TIMBER	4 WS-150
E SADDLE BLOCK	8 WS-140	F BUFFER BLOCK	2 WS-161
G TRUSS ROD SET	2 TR-955	H TRUSS ROD HDW SET	2 TR-950
I CAR SILL	6 WS-360	J CENTER BEARING	2 BL 120
K SIDE BEARING	4 BL 121		

CHANGE X DIMENSION TO 8 1/2" FOR BOX TYPE CAR

2 ADD 1/8" SHIM UNDER CENTER BEARING PLATE TO MATCH ARCHBAR TRUCKS IN DRAWING TK-032, 12/14/85

RAILWAY HARDWARE CO.

36 FT. WOOD CAR FRAME

SCALE: 1/4" = 1'

1/5/83 JFU

DRWG WS-036

DRAFT GEAR FASTENERS TRANSFERRED TO DRAFT GEAR HARDWARE/FASTENER SET DG-195. 6/11/85

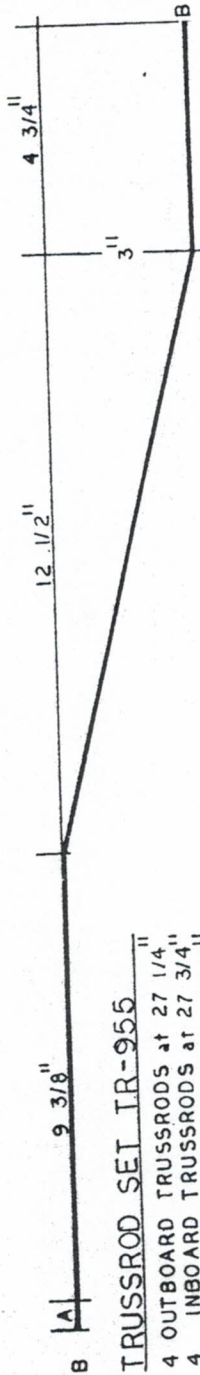
RAILWAY HARDWARE COMPANY

36 FOOT WOOD CAR FRAME NOTES TO DRAWING WS-036

1. Complete any modifications desired to the End Sill, Bolster, or Needle Beam parts per drawing WS-010. Cut car sills from standard 1x2 lumber to desired length (53" for a 36 ft. car), and cut down to 1½" height to match End Sills. Drill #29 holes for the lateral tie rods near each bolster. Glue the End sills to the car sills using a good waterproof glue, and clamp up with long pipe clamps. Install the tie rods made up from 1/8" welding rod 14" long and threaded 5-40 for end nuts. Check frame with a square, and let the glue joints set up overnight.
2. Thirty-two sill bolts are needed. Refer to the drawing fastener schedule for length and placement. For 6-32 screws, drill #27 holes in the sills to attach the car parts. Temporarily insert a screw in each hole as it is drilled to maintain alignment. The round screw head should be filed down on the sides to resemble a "tee head" so it will not turn after being tapped in flush with the top of the car sill.
3. Glue and bolt the Bolsters and Needle Beams to the sills one at a time. Check position of the bolster against the draft gear timber. Make sure that the air line holes are correctly oriented during installation, and check often with a square.
4. Drill and thread the center bearing plate for a 5/16" kingpin bolt, and attach to bolster. Temporarily attach the trucks to check for a correct coupler height of 4.38" and to locate position and clearance of side bearing plates. Shimming or filing down of the car castings or the truck side bearings may be necessary to achieve correct coupler height and correct side bearing clearance of 1/32".
5. Match drill #17 holes in the center sills for the Draft Gear Timbers, and erect the draft gear per drawing DG-010. Add the center sill steel bar weight by running the kingpin bolt through a 21/64" clearance hole in the bar. It may be necessary to die cut additional thread length on the kingpin bolt to have threads clear the center bearing plate.
6. Glue the trussrod saddle blocks in place on top of the bolster. Give all wood parts two coats of a good marine sealer, sanding between coats.
7. Drill the needle beams to install the queenposts. Drill size will depend upon the size of the queenpost sprue which varies by style of queenpost style. A string run through the End Sills will help locate the position of the queenposts and bolster saddles. The queenposts can be epoxied in place, or the sprue can be drilled and tapped to use a screw entering the top of the Needle Beam as a fastener. The bolster saddle may be epoxied or nailed in place.
8. The piece of string running from End Sill to End Sill can also be used to determine trussrod lengths and bending points. Note that inboard rods pass through the buffer block, and will have to be made longer. Rods are fabricated from 1/8" welding rod and threaded 5-40 at each end before bending. Left hand threads on one end of the rods for turnbuckle attachment is nice, but not necessary since end nuts can be used for adjustment. Avoid over-tightened rods upon installation.
9. Add the brake system components if the car is to be so equipped.

CAR FRAME TRUSSROD LAYOUTS DIMENSIONS FOR 1 1/2" SCALE

I. 36 FT CAR FRAME SHOWN IN DRAWING WS-036



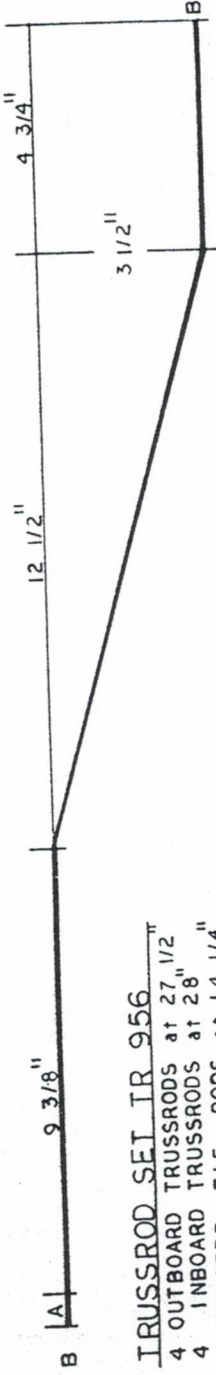
TRUSSROD SET IR-955

- 4 OUTBOARD TRUSSRODS at 27 1/4"
- 4 INBOARD TRUSSRODS at 27 3/4"
- 2 BOLSTER TIE RODS at 14 1/4"

TRUSS SYSTEM SPECIFICATIONS

DIAMETER OF ROD	1/8"
NEEDLE BEAM CLEAR HEIGHT	1"
BOLSTER SADDLE BLOCK HEIGHT	3/4"
BOLSTER ROD SADDLE HEIGHT	1/8"
QUEENPOST HEIGHT	5/8"

II. 36 FT CAR FRAME SHOWN IN DRAWING KT-036

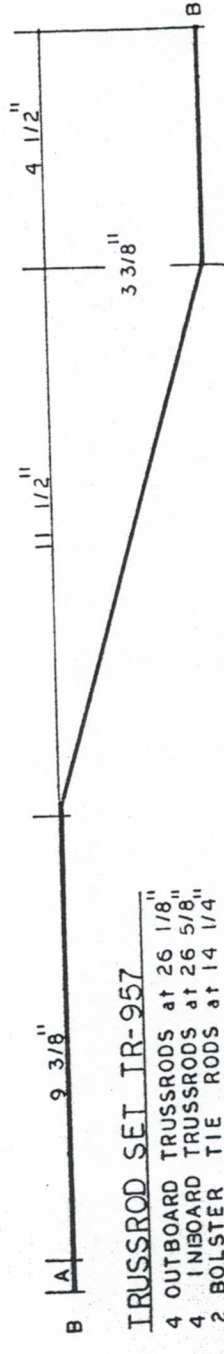


TRUSSROD SET IR 956

- 4 OUTBOARD TRUSSRODS at 27 1/2"
- 4 INBOARD TRUSSRODS at 28"
- 2 BOLSTER TIE RODS at 14 1/4"

SAME AS ABOVE, EXCEPT:
NEEDLE BEAM CLEAR HEIGHT 5/8"
QUEENPOST HEIGHT 1 1/2"

III. 34 FT CAR FRAME SHOWN IN DRAWING VT-034



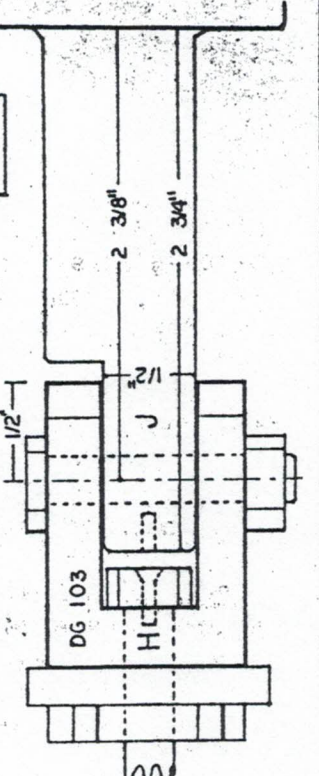
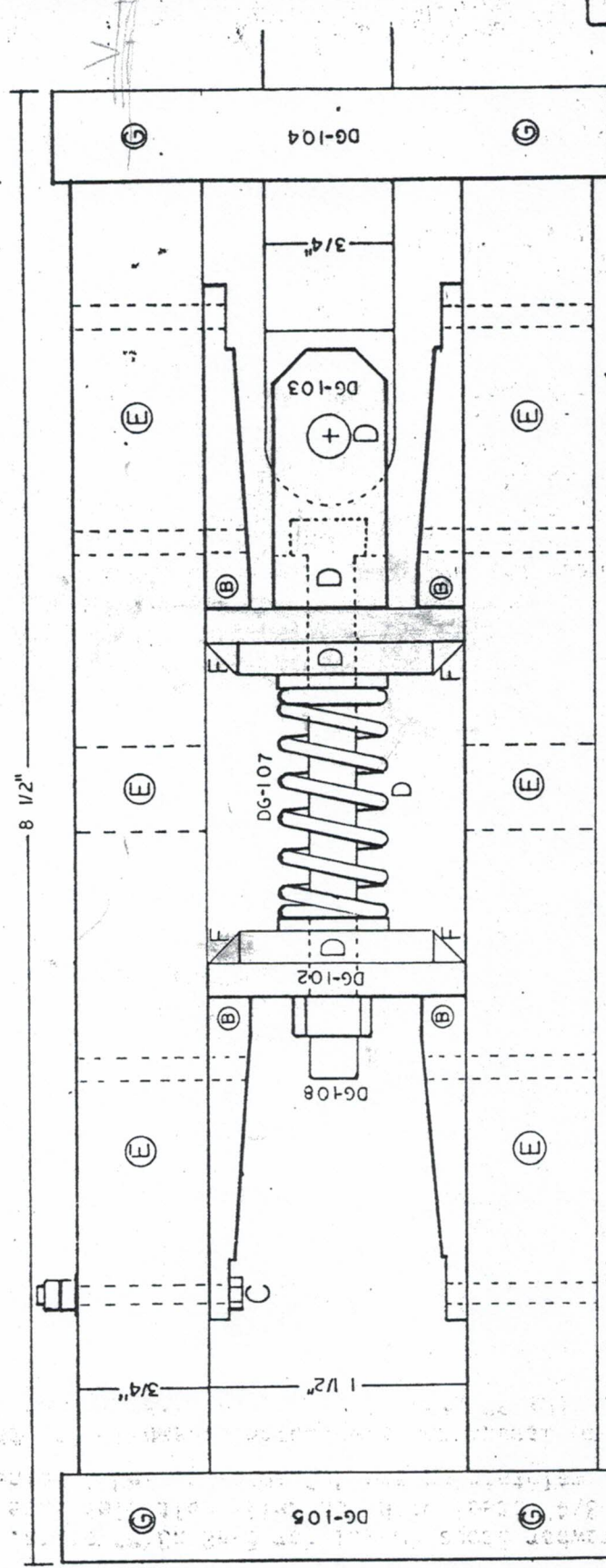
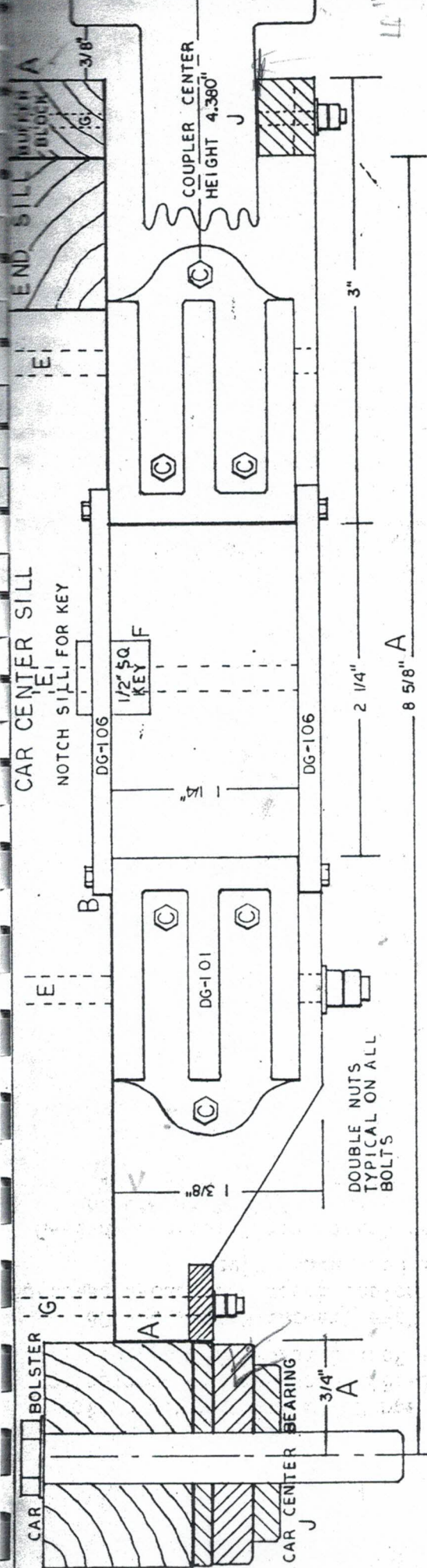
TRUSSROD SET IR-957

- 4 OUTBOARD TRUSSRODS at 26 1/8"
- 4 INBOARD TRUSSRODS at 26 5/8"
- 2 BOLSTER TIE RODS at 14 1/4"

SAME AS I., EXCEPT:
NEEDLE BEAM CLEAR HEIGHT 1/2"
QUEENPOST HEIGHT 1 1/2"

NOTES:

- A. ADDED 1/2" LENGTH TO INBOARD RODS PASSING THROUGH DRAET GEAR DEAD BLOCK.
- B. THREAD ROD ENDS 5-40 FOR 1/2" LENGTH BEFORE BENDING.



RAILWAY HARDWARE CO.
1895 DRAFT GEAR
SCALE: 1/1
11/12/82 JFJ
DG-010

DIMENSIONS - FOR 1 1/2" SCALE

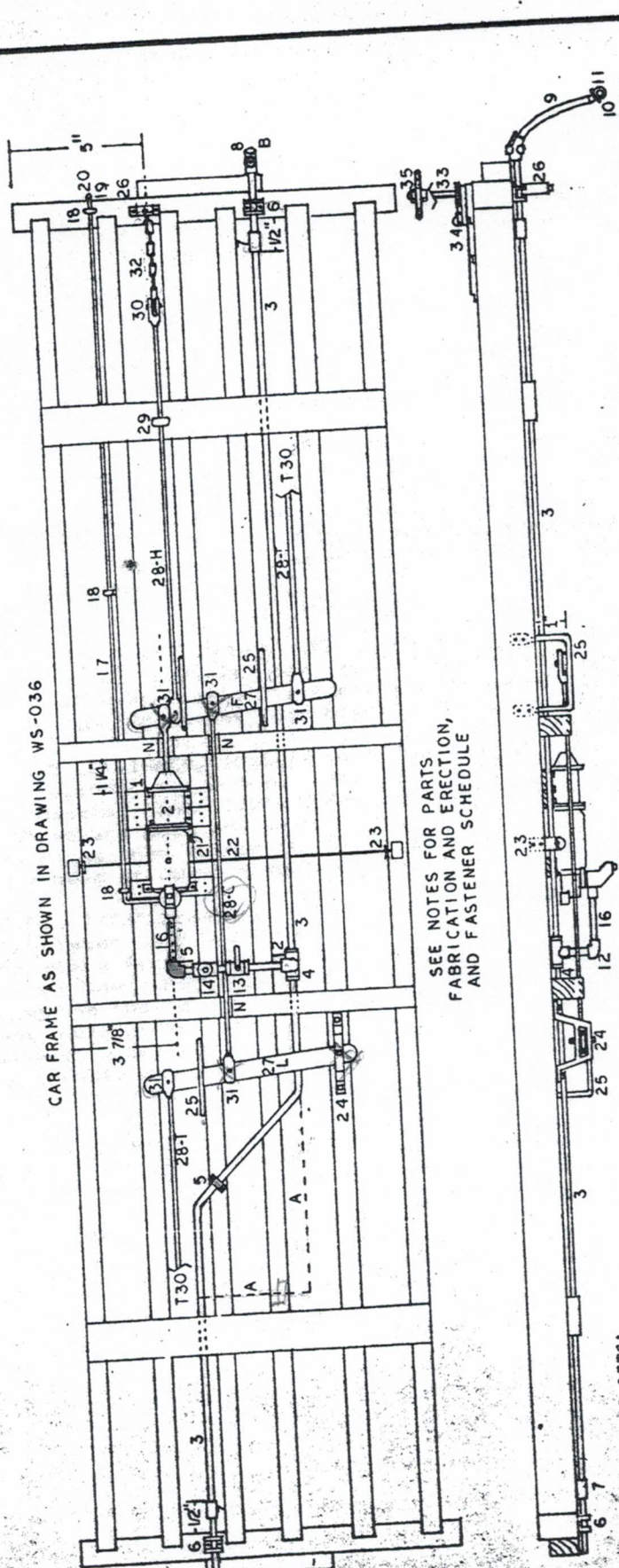
PARTS SCHEDULE		HARDWARE SCHEDULE	
CATNO.	DESCRIPTION	REQ	REQ
WS-160	DRAFT GEAR TIMBER	4	14-20 X 1 1/4" YOKE BOLT/NUT
WS-161	BUFFER BLOCK	2	5-40 X 3/8 HEX BOLTS
DG-101	DRAWBAR STOP	8	5-40 X 1 1/4" HEX BOLTS
DG-102	FOLLOWER PLATE	4	5 WASHERS
DG-103	SWIVEL YOKE	2	5-40 SQUARE NUTS
DG-104	CARRY IRON	2	5-40 X 3" RH MACH SCREWS
DG-105	REAR SPREADER BAR	2	8 WASHERS
DG-106	DRAWBAR GUIDE	8	8-32 SQUARE NUTS
DG-107	DRAWBAR SPRING	2	1/2 X 3/4 KEY STOCK
DG-108	DRAWBAR BOLT / NUT	2	5-40 X 2 3/4" BUFFER BLK STUDS
DG-109		2	5-40 X 2 1/4" RH MACH SCREWS
DG-110		4	

NOTE: F
SILL BOLT HEAD
ALTS.

- A. This gear fits car frames shown on drawings WS-010, 034, and 036 without modification. Many other frames can be fitted by adjusting Buffer Block WS-161 thickness, or shortening Draft Gear Timber WS-160 at rear end and re-notching for the Rear Spreader Bar DG-105.
- B. Drill and tap Drawbar Stops DG-101 for 5-40 x3/8" bolts. Make Drawbar Guides DG-106 from 1/8 x 3/8 x 2 3/4" steel with #28 drill bolt clearance holes. Erect four sub-assemblies of Stops and Guides maintaining the 2 1/4" spacing, and keeping back edges flush.
- C. Drill #28 holes to attach the Stop/Guide assemblies to the Draft Gear Timbers with 5-40 x 1 1/4" bolts. Lay out the 3" dimension line on both a right face and a left face of two timbers. With the tops of the timbers and Stops flush, and square on the 3" reference line, matchdrill and bolt the assemblies to the timbers. **
- D. Use #F drill for drawbar and coupler bolt holes in the Follower Plates DG-102, and the Swivel Yokes DG-103. The Drawbar Spring DG-107 is 5/8" O.D. x 1 7/8" x .072 wire. Assemble the drawbar unit with the 14-20 x 3" Drawbar Bolt DG-108 and locknut.
- E. Make sill bolts from 8-32 x 3" RH machine screws with heads ground down to a "Tee Head" shape as shown on the drawing. The Tee Head keeps the screw from turning when tapped down flush into the carsill top. Place the drawbar unit between two Stop/Guide/Timber units and position on the car sills. Use #18 drill to matchdrill for the sill bolts and bolt the unit in place.
- F. Mark the sill key notch location. Also check for any binding of the Follower Plates with the timber or Guide surfaces. Remove the unit to file down Follower Plate edges and to cut the sill key notch. Make keys from 1/2" square steel x 3/4" long with #18 bolt clearance holes. Re-assemble the unit to the car frame with keys in place.
- G. Make 5-40 threaded studs from 1/8" welding rod to attach the Rear Spreader Bars DG-105 and Carry Irons DG-104. Use #28 drill for clearance holes. The rear studs are countersunk into the car sill tops. The front studs pass through the Buffer block.
- H. An optional self-centering action can be added by drilling the drawbar bolt head and the coupler shank butt to fit a 1" length of 60 gauge spring steel wire. The hole in the coupler sholud be a snug fit 1/4" deep. The hole in the bolt should be a clearance size 3/4" deep and relieved with a 60 degree countersink. Secure the spring wire into the coupler shank with Loctite.
- I. With trucks mounted to the car, determine needed adjustments to achieve the 4.380" coupler height. Make a temporary tongue to fit the Swivel Yoke from 1/2" square wood 2 1/2" long to indicate centerline height and required adjustments. Several possible means to make adjustments are possible. Reductions in the coupler shank can be made from either the top or bottom side to raise or lower the coupler center line. Shims under the car bolster center bearing plate would raise coupler height; shims between the car sills and Draft Gear Timbers would lower coupler height. Once centerline adjustments are complete, adjust the height of the Carry Iron so that the coupler shank barely rides it in a level position. Deepen the timber notch, or add shims to adjust the position of the Carry Iron.

** If gear is being installed on a solid wood floor car, the stops will have to be flush with the bottoms of the Draft Gear Timbers, and top Guides will have to be assembled with flat head screws countersunk into the guides.

K BRAKE SYSTEM SCHEMATIC DIAGRAM FOR 1 1/2" SCALE WOOD FRAME CARS



CAR FRAME AS SHOWN IN DRAWING WS-036

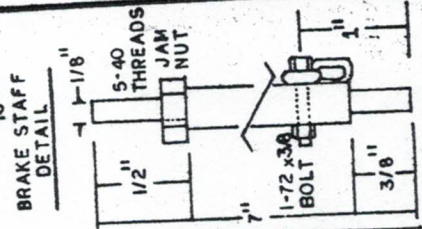
SEE NOTES FOR PARTS
FABRICATION AND ERECTION,
AND FASTENER SCHEDULE

PARTS INCLUDED IN CATALOG SETS:
X = PL-190 AIR LINE FITTING SET
Y = BK 903 CLEVIS & BRACKET SET

PARTS SCHEDULE

REF. CAT. NO.	REQ.	PART	MATERIAL
1 BK 101	3	CYLINDER MOUNTING BLOCK	1/4\" 3/4 x 3 3/8 W. PINE
2 BK 199	1	K BRAKE CYLINDER	ASSEMBLED UNIT
3 BK 214	60"	TRAIN AIR LINE	7/32\" 60\" BRASS TUBING
4 PL 144	1	PIPE BRANCH TEE	CASTING
5 PL 104	1	PIPE CLAMP	CASTING
6 PL 105	2	PIPE HANGER	CASTING
7 PL 140	2	PIPE COUPLING	CASTING
8 PL 102	2	ANGLE COCK	1/4\" 90\" BLACK BUNA
9 PL 101	2	AIR HOSE 22\" 1/4th	1/4\" 90\" FIBRE WASHER
10 PL 100	2	AIR SEAL	CASTING
11 PL 103	2	GLAD HAND	CASTING
12 PL 142	1	PIPE ELBOW	CASTING
13 PL 143	1	CUT OUT COCK	CASTING
14 PL 146	1	DIRT COLLECTOR	CASTING
15 PL 147	1	REDUCING ELBOW	CASTING
16 PL 210	2"	PIPE NIPPLE	5/32\" 60\" BRASS TUBING
17 PL 203	36"	AIR RETAINER LINE	1/16\" 41\" BRASS ROD
18 HO 122	3	RETAINER LINE HANGER	#2 WOOD EYE SCREW

SET CODE	REF.	CAT. NO.	REQ.	PART	MATERIAL
X	19	PL 182	1	RETAINER LINE ELBOW	1/8\" 56 MTP ELBOW
X	20	PL 121	1	AIR RETAINER VALVE	CASTING
X	21	BK 114	1	VARIABLE RELEASE VALVE	CASTING
X	22	BK 117	18"	RELEASE VALVE ROD	1/16\" 41\" BRASS ROD
X	23	BK 118	2	RELEASE ROD BRACKET	1/8\" x 1/4\" x 1\" BRASS
X	24	BK 501	1	LEVER FULCRUM BRACKET	CASTING
X	25	BK 502	3	LEVER CARRIER BRACKET	CASTING
X	26	BK 510	1	BRAKE STAFF BRACKET	FORMED BRASS STRIP
X	27	BK 450	2	5\" BRAKE LEVER	3/32\" x 3/8\" CR STEEL
X	28	BK 301	72"	BRAKE RODS (4)	1/8\" 41\" STEEL ROD
X	29	BK 302	1	HANDBRAKE ROD HANGER	#6 WOOD EYE SCREW
X	30	BK 308	3	8\" ADJUSTING CLEVIS	MACHINED BRASS
X	31	BK 305	6	5\" BRAKEROD CLEVIS	MACHINED BRASS
X	32	BK 336	4	BRAKE CHAIN 6 links/inch	SINGLE LINK STEEL
X	33	BK 337	7	BRAKE STAFF	5/32\" 41\" BRASS ROD
X	34	BK 620	1	RATCHET & PAWL SET	CASTING
X	35	BK 616	1	BRAKE WHEEL	LOST WAX BRASS



NOTES TO DRAWING BK-010 K BRAKE SYSTEM

Installation of a K brake system is a lot of fun because there are no critical measurements, parts are easy to make and install, and results are visually quite impressive. The drawing shows installation of a typical system on a 36 foot long car frame. Installation of the system should be made after the installation of the trussrods, draftgear and bolster hardware, but before decking is applied. The part reference numbers are shown in the suggested order of installation.

Installation uses studs made from roundhead machine screws by cutting off the head and turning down the end to a dull point like a wood screw. Run a square nut onto the other end and secure it with Loctite. When the Loctite sets, the stud can be driven like a squarehead lag screw into regular tap size holes. Add a drop of Loctite to the threads before it is driven completely home. This will hold the stud in place from now on. Also add Loctite to other pins and brads to avoid loosening. When pins and brads have to be driven into the sides of car sills difficult to reach with a hammer, a set of channel lock or battery pliers can be used as a driver. A couple of wraps of plastic tape around the backup jaw will keep the jaw teeth from marring the car sill. Air line fittings are also secured with Loctite when the fitting sprues are inserted into the tubing.

1. CYLINDER MOUNTING BLOCKS. Using wood glue and 4 14 gauge 1/2" long escutcheon pins, install the front block 1 1/4" away from the Needle Beam. Make sure that installation is correctly oriented to the Air Pipe path. Use the Cylinder to locate the rear block under the reservoir mounting plate.

2. K BRAKE CYLINDER. Install with the centerline 3 7/8" in from the outside sill. The cylinder is secured with a 5/8" 5-40 screw through the front mounting blocks, and 1/2" 2-56 screws through the rear block and mounting plate with square nuts and washers applied. Make sure that the pushrod is free of obstructions when either in closed or extended position. If required, notch the needle beam at point N on the drawing to clear the pushrod.

3. AIR PIPE. 7/32" brass tubing is used for the pipe, and the predrilled holes in the Bolster and Needle Beams controls its location. Begin by bending the crossover piece first. The tubing must be annealed to assist bending, and because of the thin wall, bending should be done very slowly to avoid collapsing the tubing. Run the tube through the bolster first, make the bend, and then push it through the needle beam for a 1/2" length clearance. If you are squeamish about the bend, get a couple more Pipe Elbows and run the pipe along alternate route A shown on the drawing. Run the other pipe end straight through the other Bolster and Needle Beam.

4. BRANCH TEE. Connect the two pieces of tubing by inserting the Tee sprues into the tubing and securing with Loctite. Keep the branch sprue vertical to the main pipe. Cut tubing ends off flush with the coupler Dead Blocks.

5. PIPE BRACKET. Use 1/4" 0-80 hex screws to join the two pieces together and then drill out to 7/32" size. Place the base beneath the pipe as shown on the drawing and epoxy in place. Once set, drill #55 holes through the base ears and drive in 1/4" 18 gauge roundhead escutcheon pins. Screw the cover piece back on and secure all fasteners with Loctite. If pipe alternate route A is used, locate the clamp on the other center sill.

6. PIPE HANGER. (Before installing this item, refer to item 7. The Pipe Coupling may have to be slipped onto the tube first.) Drill out the hanger castings for the pipe and #43 holes for 1/2" 2-56 studs. Slide onto the pipe and into place on the End Sill. Drill #50 holes into the sill to secure the casting with studs.

7. PIPE COUPLING. If you have access to a lathe, drill out the casting and slip it onto the pipe 10 scale inches from the end. If you don't have a lathe, it will be necessary to section the pipe, making one piece a 10" nipple for the Angle cock. Insert the coupling sprues to connect the pipe and nipple.

8. **ANGLE COCK.** Insert casting sprue into the tubing end and rotate the cock inward to the car centerline to an approximate 30 degree angle. Secure with Loctite. NOTE B. A more durable installation can be made if you have access to a drill press. Lightly chuck the casting by the sprue and lower the casting into a drill press vice. Clamp the casting in place and release the chuck. This will locate the casting to drill and tap a 3/8" deep 10-32 hole once the sprue is cut off. Make a 1" 10-32 stud and screw the casting onto one end. The other end is then inserted into the pipe at the 30 degree angle.

9. **AIR HOSE.** Cut the hose into 22" scale lengths. It is best to wait until the car is finished before installing over the Angle Cock sprue. A drop of oil will help in slipping it onto the casting sprues. Do not paint the hose. Leave it black.

10. **GLADHAND AIR SEAL.** Epoxy the fibre washer onto the face of the gladhand casting.

11. **GLADHAND.** After painting the casting, slip it into one end of the black Air Hose. The gladhand face should be vertical to the track when the Hose is slipped onto the Angle Cock.

12. **PIPE ELBOW.** Cut a 9/16" long nipple from the tubing stock and slip it onto the Branch Tee sprue. Insert an Elbow sprue into the other end. From this point, the remaining pieces of tubing between the fittings will have to be measured and cut to fit in place. Study the perspective drawing to help in erection of these parts. Wait until all remaining pieces that tie the line into the Triple Valve are in place before securing with Loctite.

13. **CUTOUT COCK.** The handle should be on the car centerline, and can be directed towards or away from the needle beam, or downwards, the choice is yours. It is better protected above the pipe.

14. **DIRT COLLECTOR.** The bowl goes below the pipe and the ridge on the casting top should point in the direction of flow to the Triple Valve.

15. **REDUCING ELBOW.** Install this item so that the smaller, 1/8" sprue is pointed towards the Triple Valve port.

16. **TRIPLE VALVE NIPPLE.** This part is cut to length from 5/32" tubing, and it can be at a slight angle from the reducing Elbow down to the Triple Valve port. If the angle is too great, go back and adjust the length of the Branch Tee Nipple accordingly. Once the connection is made, secure all pieces of the branch line with Loctite. Make sure the Cutout Cock and Dirt Collector are in the vertical plane and not skewed any.

17. **AIR RETAINER LINE.** The line is bent from 1/16" diameter welding rod running from the drilled port on the side of the Triple Valve to the Retainer valve mounted on the End Sill. Its exact location is not critical except that it goes over the Needle Beam and Bolster and back down below the End Sill. Cut it off flush with the End Sill.

18. **RETAINER LINE HANGER.** Install eye screws in convenient spots to hold the line in place. Instead of eye screws, staples made from 16 gauge Brass wire can be used. Cut the wire in 1/2" lengths, sharpen the points, and bend into a "U". Apply Loctite after driving them in.

19. **RETAINER LINE ELBOW.** Prepare the Elbow by inserting a 1/2" long nipple of 3/32" tubing in one end.

20. **AIR RETAINER VALVE.** The valve should be installed so that the top of the valve is at least 1/4" below the End Sill top to give clearance for coupler cutting levers. Prepare by cutting the casting sprue to 7/16" length and gently threading the Elbow onto it. Slip the Elbow on the Retainer line, and epoxy the valve casting to the End Sill. When set, drill #55 holes through the casting ears and drive in two 1/4" 18 gauge escutcheon pins. Secure the line connection with Loctite.

21. **VARIABLE RELEASE VALVE.** This casting is not available yet, but can be simulated out of a piece of 3/16" cubed brass with a #42 hole drilled through it to support the reach rods. Contour the bottom to fit the Air Reservoir and epoxy it in place on top of the reservoir.

22. RELEASE VALVE ROD. Cut the 1/16" rod to a 15" length and run the rod through the simulated valve piece to locate the brackets. Don't bend the handles until the brackets are installed.

23. RELEASE VALVE ROD BRACKETS. These are made from 1/8" X 1/4" X 1 1/4" long brass strip. Drill two #50 holes in the top half for 1/2" 16 gauge escutcheon pins and a #42 hole 1/4" from the bottom for the rod. Install with the rod in place approximately 1/2" below the Car Sill. Once installed bend the rod handles to shape. The handle can be any shape from a simple 90 degree bend to an enclosed loop. Cut off excess rod material when finished.

24. LEVER FULCRUM BRACKET. Drill #42 holes and install with 1/2" 2-56 studs. If a shorter live lever is desired, install the bracket on the adjacent center sill rather than on the intermediate sill as shown in the drawing. Drill a #42 hole for a 2-56 X 1/2" screw lever pin. Apply two square nuts to the screw upon installation of the lever.

25. LEVER CARRIER BRACKETS. Drill two #47 holes in each casting ear and install with 1/2" 16 gauge escutcheon pins. Use a 1" thick piece of wood and set it across the center sills to gauge the required 1" height dimension during installation.

26. BRAKE STAFF BRACKET. Drill a 5/32" hole vertically through the End Sill 5" from the end for the brakestaff and locate the bracket from it. Drill #29 holes in the bracket for the staff and two 1" 5-40 studs. Drill #38 holes in the End Sill for the studs.

27. BRAKE LEVERS. Lever 27F is the Floating lever and can be any length from 36" to 60" scale length. Lever 27L is the Live lever and can be from 30" to 48". Drill #42 holes for the clevis pins. Locating these holes requires laying out all rods and checking for clearances.

28. BRAKE RODS. Fabricate from 1/8" welding rod with a 3/8" long 5-40 threads for the clevis. The handbrake rod #28H is 16 1/2" long, and may have to be bent towards the car center some to avoid truck swing. The lever connecting rod is 14" long, and Needle Beams may have to be notched for clearance. Length of truck rods depends upon the type of trucks and truck brake system being used.

29. 5" BRAKEROD CLEVIS. Screw onto rods, as shown on the drawing.

30. 8" BRAKEROD CLEVIS. Drill three #42 holes through each clevis where spotted. One clevis goes on the hand brake rod; the other two go on the truck rods. Use 2-56 X 3/8" screws and nuts as clevis pins on all clevis.

31. HAND BRAKE ROD GUIDE. Install this eye screw on the car bolster once the exact location of this rod is determined by truck swing.

32. BRAKE CHAIN. Spread out the end links with a pointed awl or ice pick to clear the 2-26 screw on the brakero end and the 1-72 screw on the brake staff end.

33. BRAKE STAFF. If a lathe is not available to turn the staff shown on the drawing, Use a 1/8" rod and "sleeve" it with a piece of 5/32" OD brass tubing. Secure the sleeve with Loctite.

34. RATCHET, PAWL, and PLATE. Drill a 5/32" hole in the Ratchet, press onto the Brake Staff, and secure with Loctite. Drill a #22 hole in the Plate to clear the staff and four #47 holes in the corners to install with 1/2" 16 gauge escutcheon pins. Drill and tap the pawl base 1-72 for the 3/8" Pawl retaining screw. If a working pawl is desired, fabricate one from 3/16" square brass using the cast Pawl as a pattern. Install the Brake Staff using two 5-40 square nuts below the Bracket. Use a 1-72 X 3/8" bolt and nut to connect the chain.

35. BRAKE WHEEL. Run a square 5-40 nut onto the staff first. Add the Brake Wheel and then another nut as retainer. Tighten the two nuts together and secure with Loctite.

FASTENER SCHEDULE

DESCRIPTION	USE REF.	NO. REQ.
1/2" 16 gauge brass escutcheon pins	1, 23, 25, 33	32
1/4" 18 gauge brass escutcheon pins	5, 20	4
2-56 X 1/2" RH screws	2, 6, 24	9
2-56 X 3/8" RH screws	30	9
2-56 square nuts, washers	2, 6, 24, 30	19
5-40 X 5/8" RH screw	2	1
5-40 X 1" RH screw	26	2
5-40 square nuts	26, 34, 35	6
0-80 X 1/4" hexhead bolt	5	2
1-72 X 3/8" hexhead bolt, nut	34	2
10-32 X 1" RH screw	8	3
#2 eye screw	18	1
#6 eye screw	28H	

16 x 2 3/4
8 x 2 1/2

11 x 2 1/4

The following drawing is a reprint from TRAINSHED CYCLOPEDIA NO. 77, Newton Gregg, Publisher, and reflects a typical piping diagram of the K brake system.

Sec. 11

AIR BRAKES: Freight Cars; Westinghouse

941

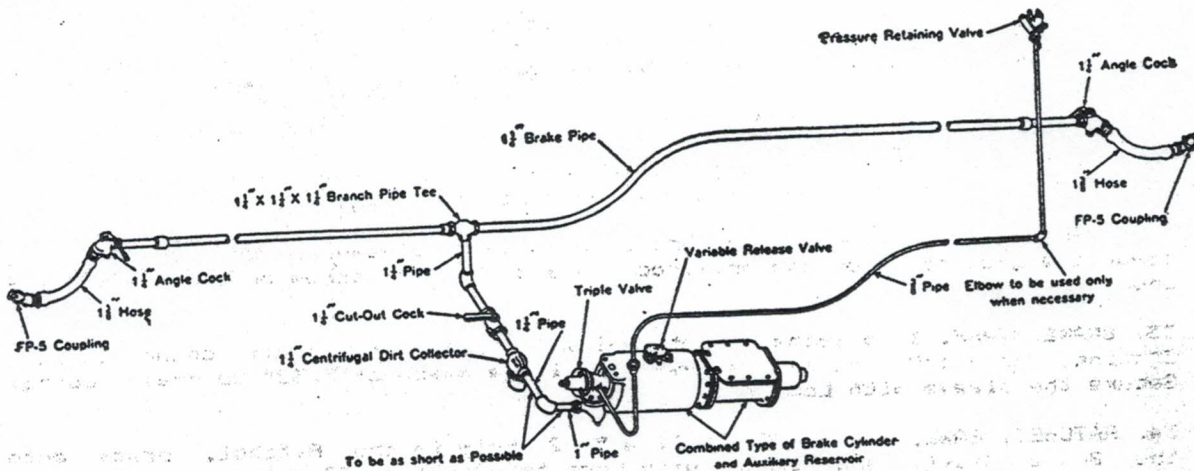
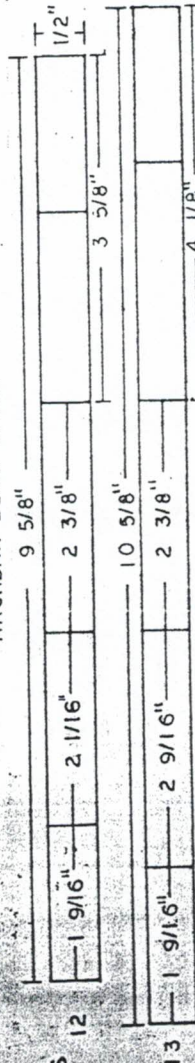


Fig. 11.08—Piping diagram of Westinghouse "KC" freight car brake equipment.

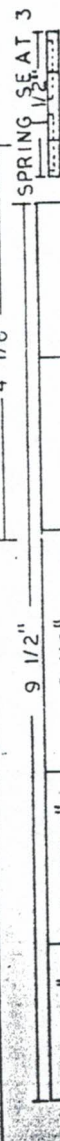
... DIMENSIONS FOR 1 1/2" SCALE, 7 1/2" GAUGE



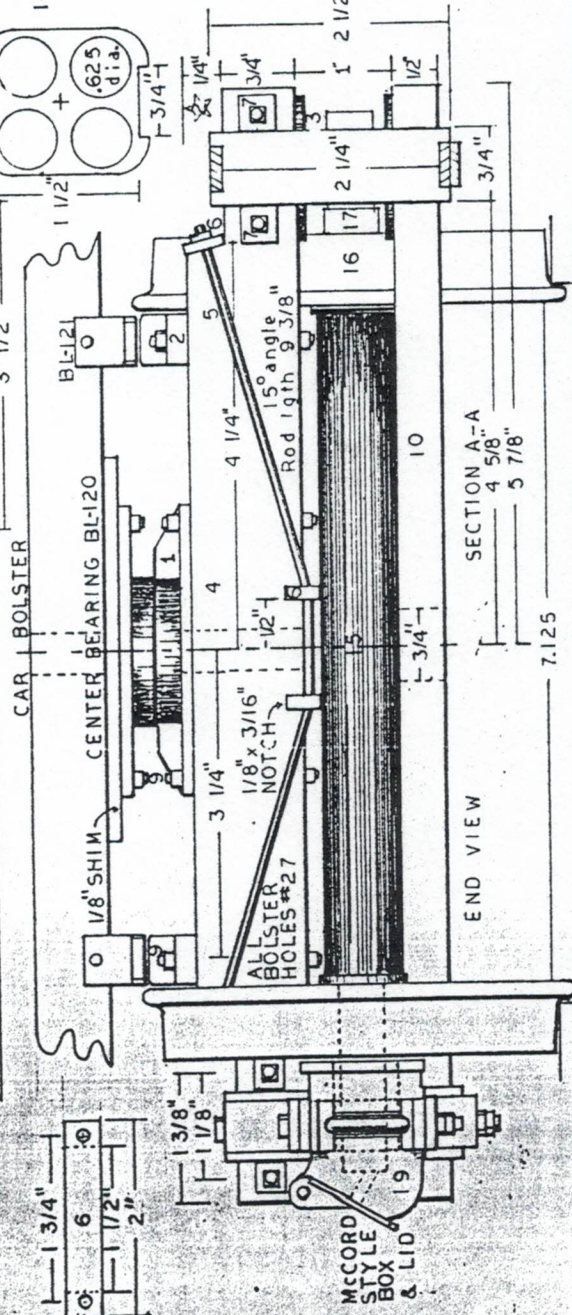
ALL BARS
1/8" thick



SPRING SEAT 3



CAR - ROISTER



END VIEW

SECTION A-A

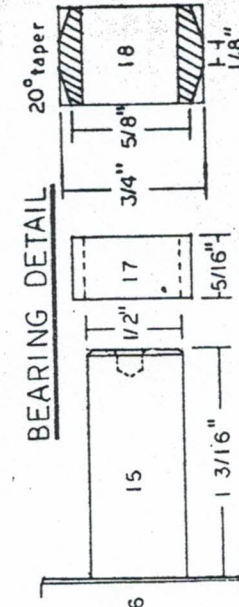
7.125

REF.	CAT.	NO.	REQ.	PART	MATERIAL
1	TK-101	2		CTR BEARING PLATE	CASTING
2	TK-102	4		SIDE BEARING BLOCK	CASTING
3	TK-104	8		SPRING SEAT	CASTING
4	TK-112	2		BOLSTER T _x 1 1/2" ²⁷	6061 ALUM. BAR
5	TK-114	4		BOLSTER TRUSS ROD	1/8" dia STEEL 5-40 thrd
6	TK-115	8		TRUSS ROD BRACKET	1/8" x 3/8" CR. STEEL
7	TK-116	16		BOLSTER GUIDE BLK	3/8" sq. STEEL
8	TK-117	8		GUIDE BLOCK STUD	6-32 STEEL SCREW
9	TK-118	16		BOLSTER STUD	6-32 STEEL SCREW
10	TK-121	2		SPRING PLANK	6061 ALUM. BAR
11	TK-125	8		ARCHBAR COLUMN	6061 ALUM. BAR
12	TK-126	4		ARCHBAR	6061 ALUM. BAR
13	TK-127	4		INVERTED ARCHBAR	6061 ALUM. BAR
14	TK-128	4		LOWER TIE BAR	6061 ALUM. BAR
15	TK-130	4		A XLE, 1 1/2" l ^{gth}	3/4" dia CR STEEL
16	TK-133	8		WHEEL, TBL'S STD'S.	CAST IRON
17	TK-139	8		BEARING KEEPER	5/8" od TUBE
18	TK-140	8		OILITE BEARING	1/2" id x 3/4" o.d x 1/2" l ^{gth}
19	TK-148	8		JOURNAL BOX	CASTING
20	TK-149	16		JOURNAL BOX STUD	1/8" dia STEEL 5-40 thrd
21	TK-150	8		JOURNAL BOX LID	CASTING
22	TK-151	8		LID -HINGE PIN	.072 dia STEEL WIRE
23	TK-210	16		TRUCK SPRING 1 st ht.	5/8 od. STAINLESS
	FA 1540	56		SQUARE NUT 5-40	BRASS
	FA 1632	32		SQUARE NUT 6-32	BRASS
	FA 1632	16		SQUARE NUT 8-32	BRASS

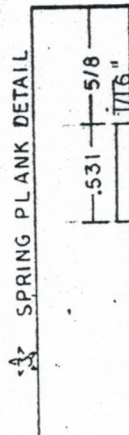
24 TK-124 8 COLUMN STUD

8-32 STEEL SCREW

BEARING DETAIL



SPRING PLANK DETAIL



- ✚ ADD SPRING PLANK INTERLOCK. 12/1/85
- ✚ CHGD FROM 3/8" TO REDUCE HEIGHT OF BOLSTER MATERIAL TO 1". 12/1/85
- ✚ ADDED TO SCHEDULE. 6/30/85

DAI I WAY HARDWARE CO.

SCALE: 3/4" = 1 FT
5/12/85 JFJ

TK-052