



## HO Scale Structure Kit 933-2966

# HULETT UNLOADER

Thanks for purchasing this Cornerstone Series® kit. All parts are styrene, so use compatible glue and paint with your model. Please read these instructions and study the drawings before starting.

While iron ore was discovered in Michigan's upper peninsula in 1844, it took decades to develop efficient ways to deliver it to eastern furnaces by rail and water. In 1852, the first large shipment, roughly 2 tons (1.8 MT), arrived in Cleveland in barrels! But when the Sault St. Marie canal opened three years later, the stage was set for major advances.

First, a more efficient loading system was introduced at Marquette, Michigan, in 1858 with the construction of a large gravity-fed ore dock. Ore was delivered to the top, and dumped into large holding pockets, each fitted with a side discharge chute. Early on, ore was carried on deck as unloading was so difficult, but boats (regardless of size, such vessels are always "boats" on the Great Lakes) were soon modified with deck hatches that opened directly into their holds to increase carrying capacity.

Getting the ore out was another matter. Armed with shovels, wheelbarrows, and a series of ramps from the holds to the docks, every ounce was unloaded by hand. If all went well, the work could be completed in a week. But these long delays were becoming a problem for vessel owners who wanted to make as many revenue trips as possible during the shipping season, and for furnaces that needed ore right away. To speed the process, horse-powered block and tackle was sometimes used to raise and lower small tubs, but in 1867 a portable steam hoist was developed to handle the tubs.

With demand for Michigan ore soaring, bigger boats were introduced especially for the iron ore trade. In 1869, a new steam-powered vessel was constructed in Cleveland, Ohio, measuring a gigantic 225 feet (68.5m) and 32 feet (9.7m) wide. The R.J. Hackett was fitted with a pilothouse forward and its boilers astern, establishing the basic design for all future generations of bulk freighters on the lakes.

While the concept of the large bulk freighter proved successful, these larger vessels began to tax the ability of unloading machinery to keep pace. By the 1880s, a variety of new cableways and cranes with clamshell-type buckets appeared. Although these sped up the work, their buckets could only come straight down, and large numbers of workers still had to shovel ore to the center of each hold.

In 1888 over 5 million gross tons of iron ore shipped on the lakes, but volume began to skyrocket with the opening of Minnesota's

Missabe Range in the early 1890s. Vessels again grew, reaching 475' (144.7m) by 1897. Once again, the stage was set for a new generation of unloading machinery.

A radical new unloader appeared in 1899, the brainchild of engineer George Hulett, on the docks of the Carnegie Steel Company in Conneaut, Ohio. Steam powered and rated at 275 tons per hour, the unit was constructed as an experiment, but proved so successful that additional examples were soon in use, and in 1904, the 540' (164.5m) long Augustus P. Wolvin entered service, the first vessel designed especially for use with Hulett's.

By 1908, Hulett's had become the most common unloading machines on the lower lakes. Design changes produced a machine that was now electrically powered, and capable of handling 15 tons (13.6MT) with each bite, dramatically reducing handling costs for every ton of ore unloaded.

While each was custom designed and built, all shared common elements, producing a massive machine standing roughly 83' (25.2m) tall and 63' (19.2m) wide.

The base of each machine was a massive steel gantry. Mounted on heavy trucks and riding on its own rails, it could move from left to right and stop at any hatchway as needed.

On top of the gantry was a large mobile carriage carrying a pivoting walking beam, and this entire unit could move forward and backward. On the front of the beam was the digging arm with its enormous clamshell bucket grabbing from 10 to 20 tons (9 to 18.1 MT) with each bite. Directly above the bucket was the compact, glassed-in operator's cabin, allowing a clear view of the work below and above deck. To speed the work and reduce the need to move the large carriage, larry or transfer cars were installed between the main beams where each bite of ore could be unloaded into a weighing hopper, then dumped directly into waiting railroad cars below; some Hulett's were equipped to offload to a stockpile.

In operation, it took about one minute to lower, open, close, raise and empty the bucket. Even more amazing was that the machines only required a three-man crew (two operators and an oiler), and since the bucket could move forward, backward and rotate, roughly 97% of the ore could be unloaded before any hand shoveling was needed. To further improve efficiency, Hulett's were usually built in pairs and working side by side, a boat carrying 10,000 tons of ore could be emptied in as little as five hours.

While WWII pushed demand for iron ore to its highest levels ever, it also depleted many of the natural ore deposits that were easily worked.

Realizing that something had to be done the industry developed new methods to process taconite, introducing the first pellets in 1955.

Hulett's had no trouble handling the new marble-sized pellets — but neither did boats equipped with self-unloading machinery. First used on the lakes in 1902, belt unloaders had proven well suited to coal and limestone, and allowed vessels to unload quickly at virtually any desired location. Natural ore had proved troublesome with these units, and the general feeling was that they weren't really needed since the Hulett's were so efficient.

As taconite rose to dominate the iron trade by the early 1970s, it led to the introduction of massive 1000' (304.8m) self-unloading boats. Coupled with a dramatic downturn in the economy in the 1980s, most of the Great Lakes fleet was converted to self-unloaders. As the need for the Hulett's dropped off quickly, most were scrapped, but they remained in use as late as 2001, with a pair offloading coal at South Chicago, Illinois. As this is written in early 2009 these are the last survivors still standing, but their fate is far from certain.

### ON YOUR LAYOUT

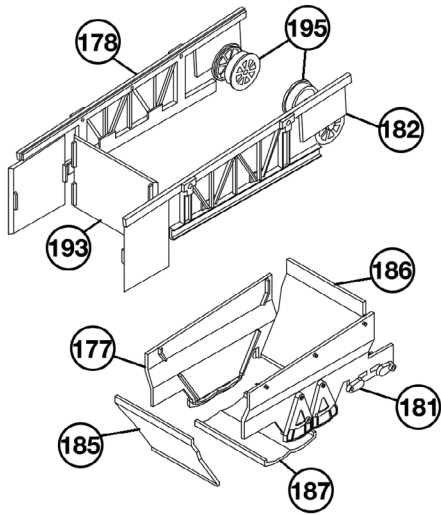
One of the most amazing machines ever created, your new Hulett is sure to be a focal point of any waterfront scene. Most were built in pairs, with as many as six machines working side-by-side. While they were mostly found on the lower lakes, Hulett's were constructed as far away as an Arizona copper mine where one was used to load tailings, and New York City, where a single machine unloaded garbage scows.

Many were also installed directly alongside steel works, usually near the blast furnaces, which can be modeled using the Ashland Iron & Steel Blast Furnace (#933-2973).

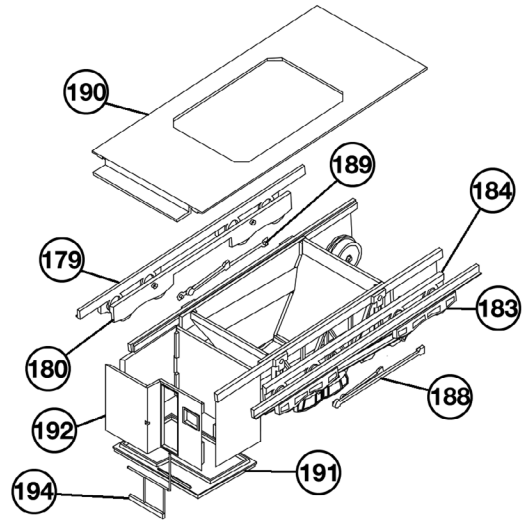
Some Hulett's had their own electric generators onsite, a detail easily modeled with the Northern Light & Power Powerhouse (#933-3021) or Tri-State Power Authority (#933-3055) and Substation (#933-3025).

Many Hulett's delivered cargo directly into ore storage yards, where it was moved as needed by a Bridge Crane (#933-2906).

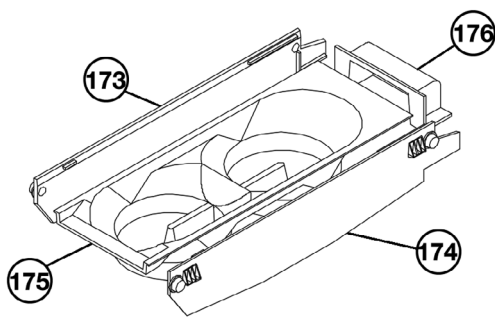
For additional ideas to expand your steel modeling, look for the complete series of Ashland Iron & Steel kits at your participating hobby shop, see the latest Walther's HO Scale Reference Book or visit us online at [walthers.com](http://walthers.com).



1. Glue larry car sides (177, 181), slope sides (185, 186) and bottom (187) together.
2. Glue the winding drum halves (195) on the insides of the outer sides (178, 182). Then glue the back wall (193) in between the outer sides. Glue this assembly to the outside of the larry car sides.



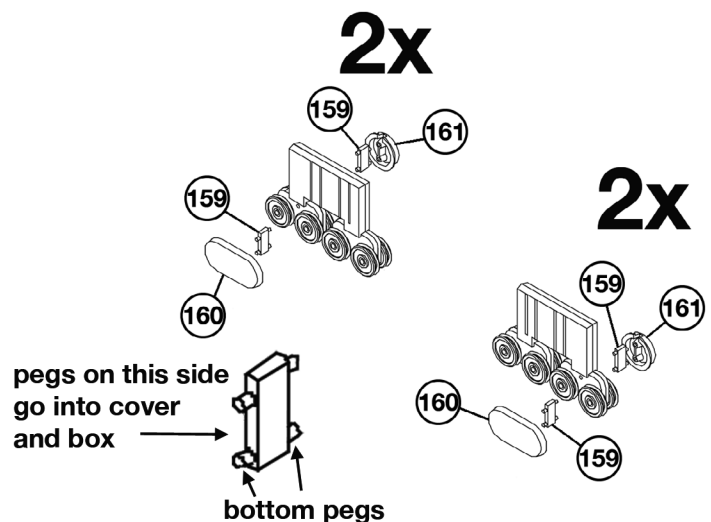
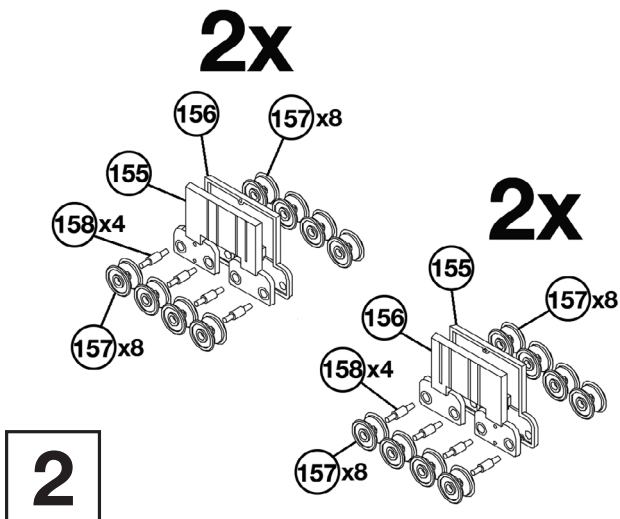
3. Glue on the front wall (192) and floor (191).
4. Glue the left side wheels/beam (183, 184) together and then glue this into the holes in the upper left side.
5. Glue the right side wheels/beam (179, 180) together and then into the holes in the upper right side.
6. Glue the right and left door rods (188, 189) in place.
7. Glue the railing (194) onto the floor as well as into the notch in the front wall. Then glue on the larry car roof (190). Set the larry car aside for now.



8. Glue the ore hopper (173, 174, 175, 176) together as shown. Set aside for later.

9. Glue the bogey halves (155, 156) together.
10. Glue two wheel halves (157) together and to one end of an axle (158). Then slide the axle through the hole in the bogey and glue on the remaining two wheel halves. Do this for the full complement of wheels. Note: Make sure not to get any glue on the bogey.

11. Glue the drive cover brackets (159) in place on the backs of the drive cover (160) and drive box (161). Note: Make sure bracket is oriented correctly when gluing into the holes. See detail illustration. Then glue these covers on the bogeys as shown.



12. Glue the bogeys to the insides of the tower front sides (136) and tower back sides (137). Note: Make sure that the bogeys are in the positions shown.

13. On leg A, Slide down the inner and outer sides (128,129, 130, 131) from the top, adding the larry car buffer (172) into the openings in part #'s 129 and 131. When in position, glue in place.

14. Glue the middle top (138) and outer top (139) plates on. Note: On part #139, make sure that the indented raised section on the backside is at the top when gluing in place. This will enable the piece to set flush with the ends of the sides.

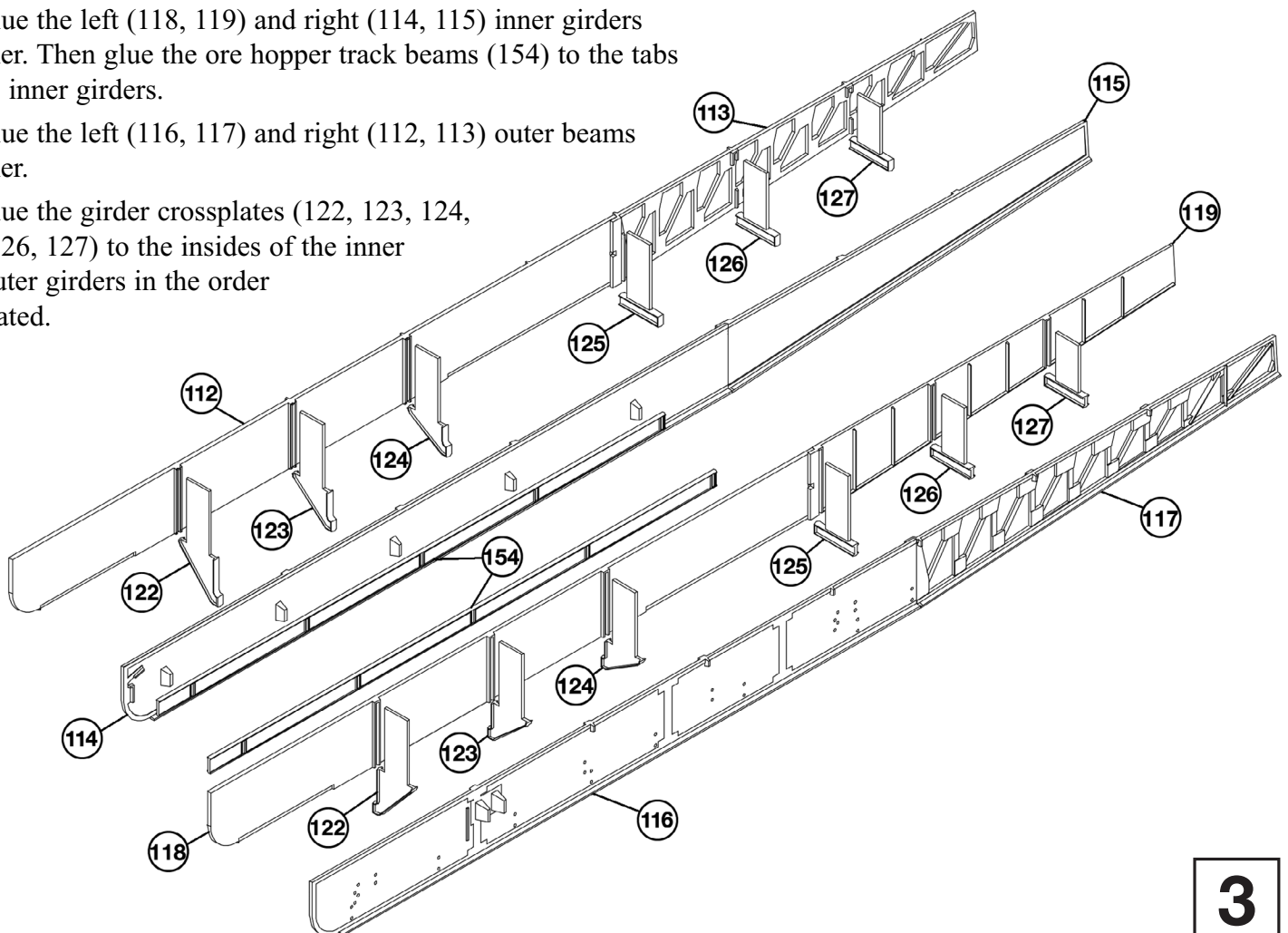
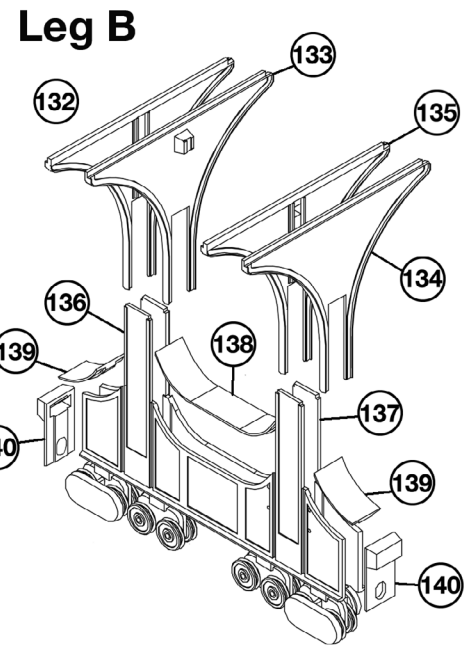
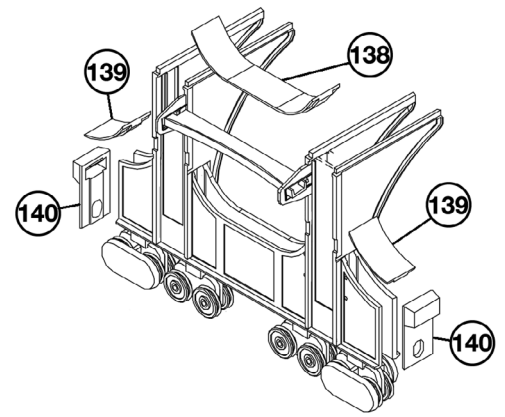
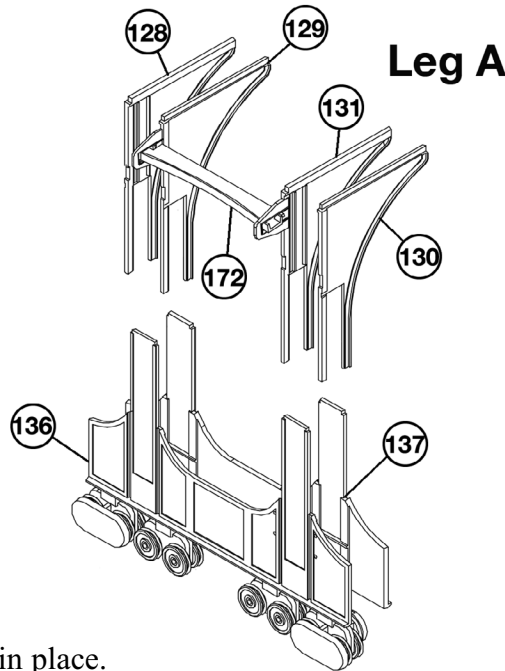
15. Glue the end plates (140) in position, flush with top and bottom. Set leg A aside.

16. On leg B, slide down the inner and outer sides (132, 133, 134, 135) in position as shown and glue in place. Glue the middle top (138) and outer top (139) plates on. Again, note positioning of part #139. Glue the end plates (140) on. Set leg B aside.

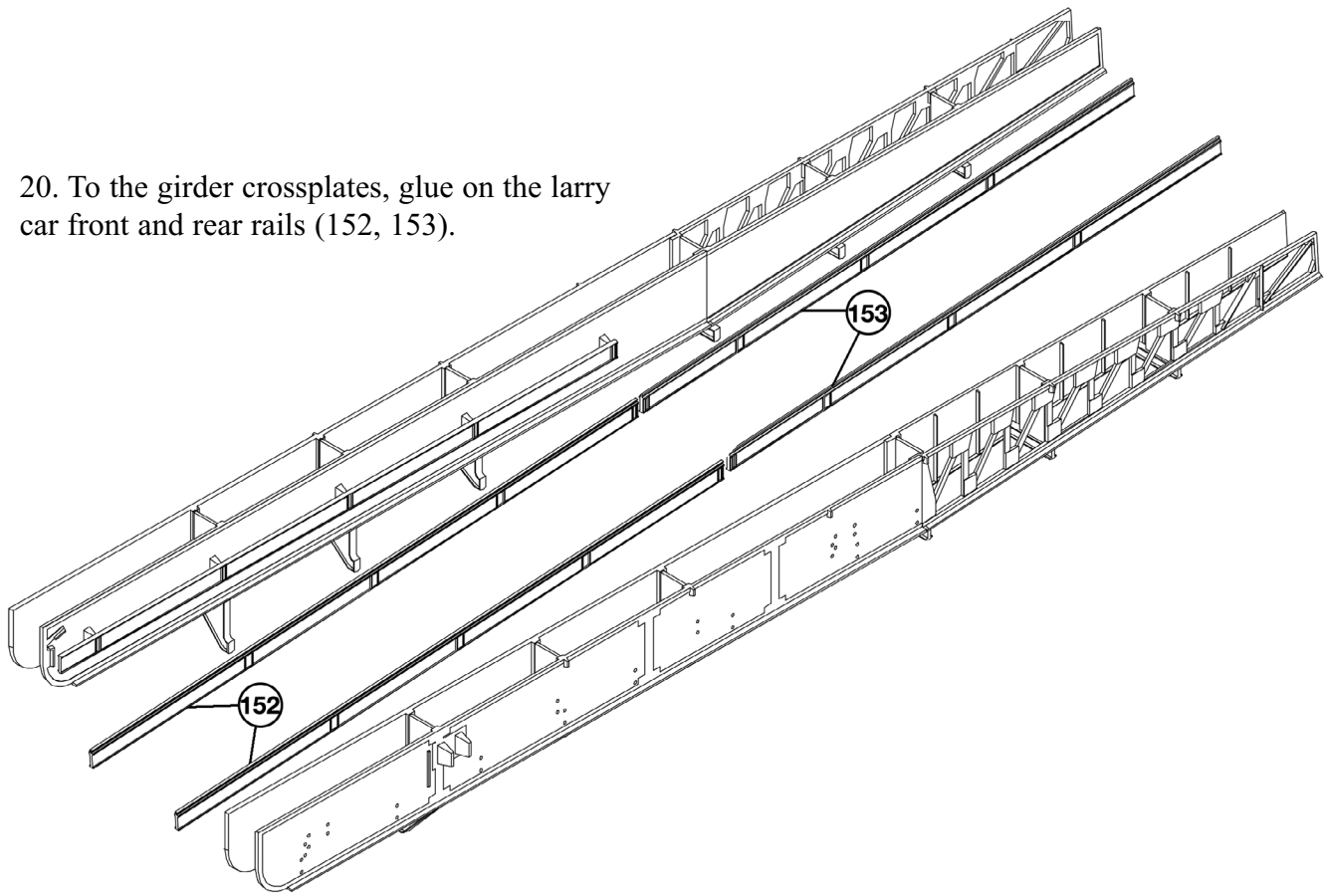
17. Glue the left (118, 119) and right (114, 115) inner girders together. Then glue the ore hopper track beams (154) to the tabs on the inner girders.

18. Glue the left (116, 117) and right (112, 113) outer beams together.

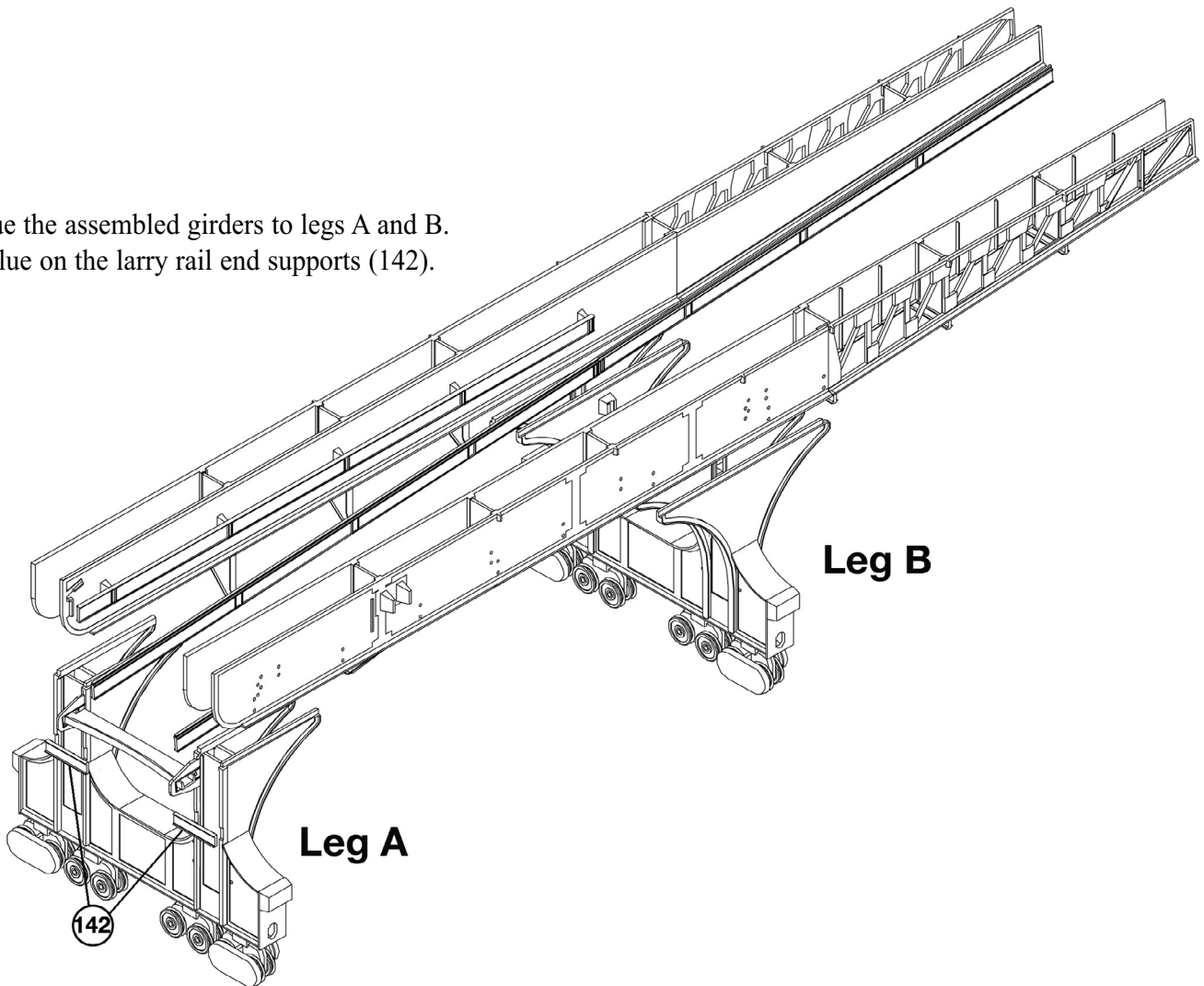
19. Glue the girder crossplates (122, 123, 124, 125, 126, 127) to the insides of the inner and outer girders in the order illustrated.



20. To the girder crossplates, glue on the larry car front and rear rails (152, 153).



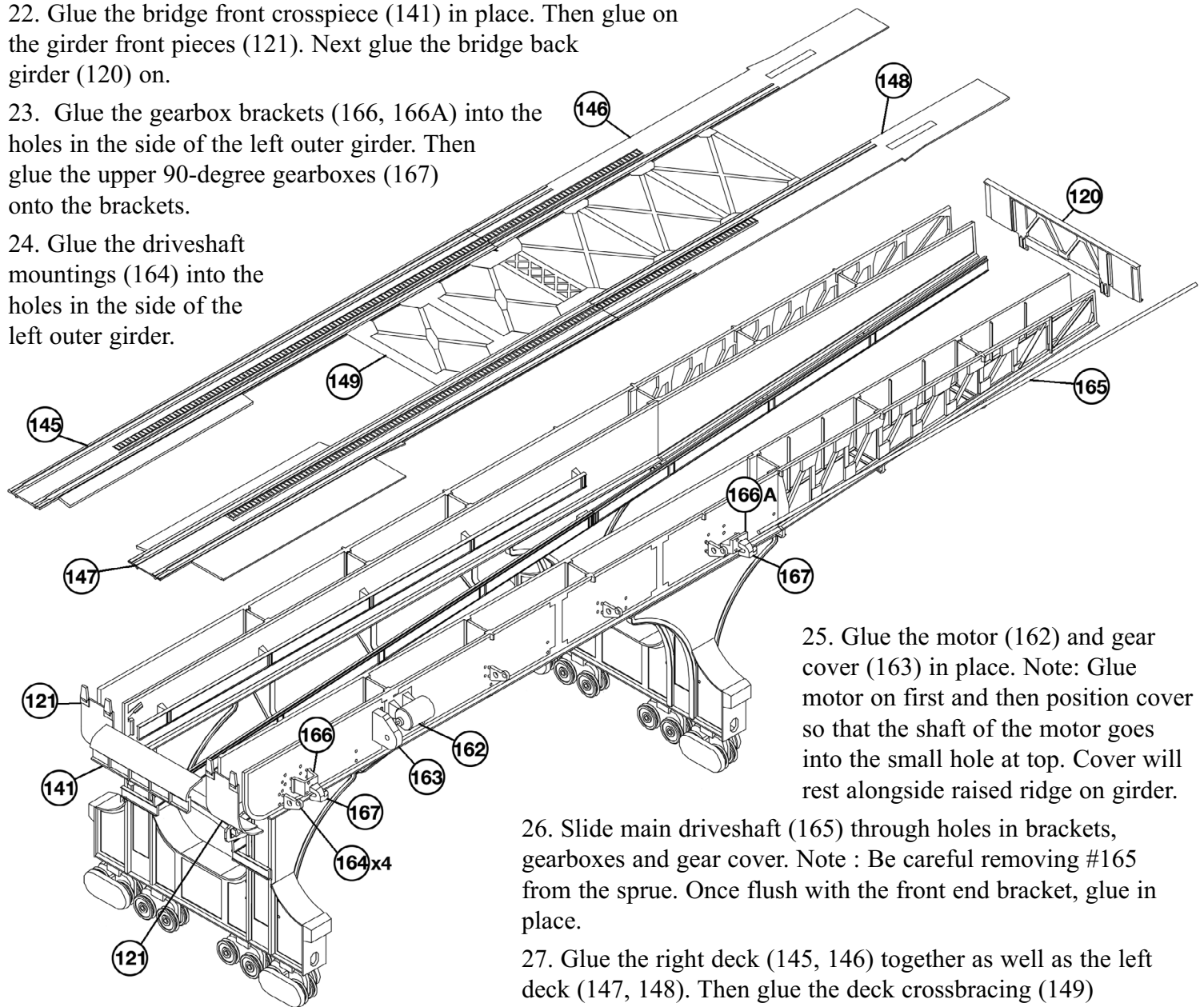
21. Glue the assembled girders to legs A and B. Then glue on the larry rail end supports (142).



22. Glue the bridge front crosspiece (141) in place. Then glue on the girder front pieces (121). Next glue the bridge back girder (120) on.

23. Glue the gearbox brackets (166, 166A) into the holes in the side of the left outer girder. Then glue the upper 90-degree gearboxes (167) onto the brackets.

24. Glue the driveshaft mountings (164) into the holes in the side of the left outer girder.

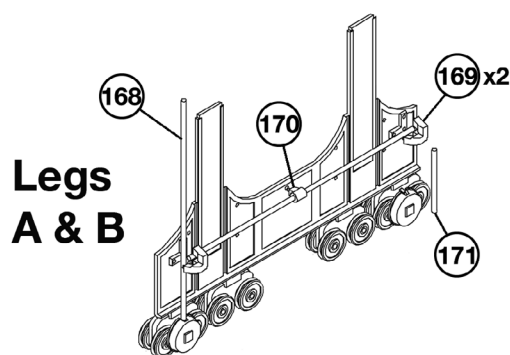


25. Glue the motor (162) and gear cover (163) in place. Note: Glue motor on first and then position cover so that the shaft of the motor goes into the small hole at top. Cover will rest alongside raised ridge on girder.

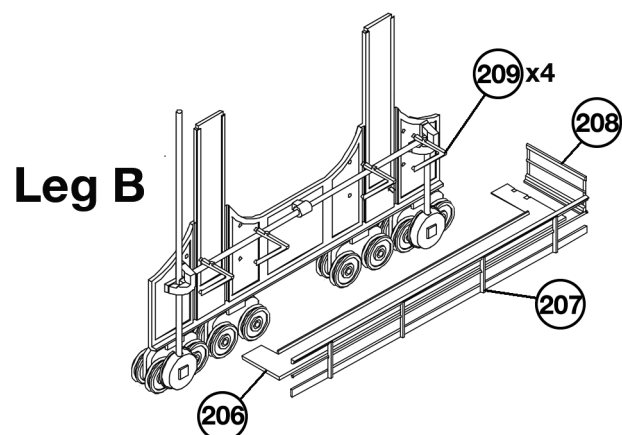
26. Slide main driveshaft (165) through holes in brackets, gearboxes and gear cover. Note : Be careful removing #165 from the sprue. Once flush with the front end bracket, glue in place.

27. Glue the right deck (145, 146) together as well as the left deck (147, 148). Then glue the deck crossbracing (149) underneath the inside edges of both decks. Note: The notches on part #149 fit over the tabs on the undersides of the decks. This will provide the proper spacing. Now glue this in place on the top of the girders.

28. On the backside of both legs, glue the long vertical driveshafts (168) in place. Then glue the cross shafts (170) on. Note: The shorter length from the mounting peg touches #168. Next glue the lower 90-degree gearboxes (169) into the holes over the vertical driveshafts. Now glue the short vertical driveshafts (171) in place.



29. Glue the back walkway supports (209) into the holes in the back of leg B. Glue the handrails (207, 208) to the walkway (206). Note: Start with #208. Then glue the walkway onto the supports.



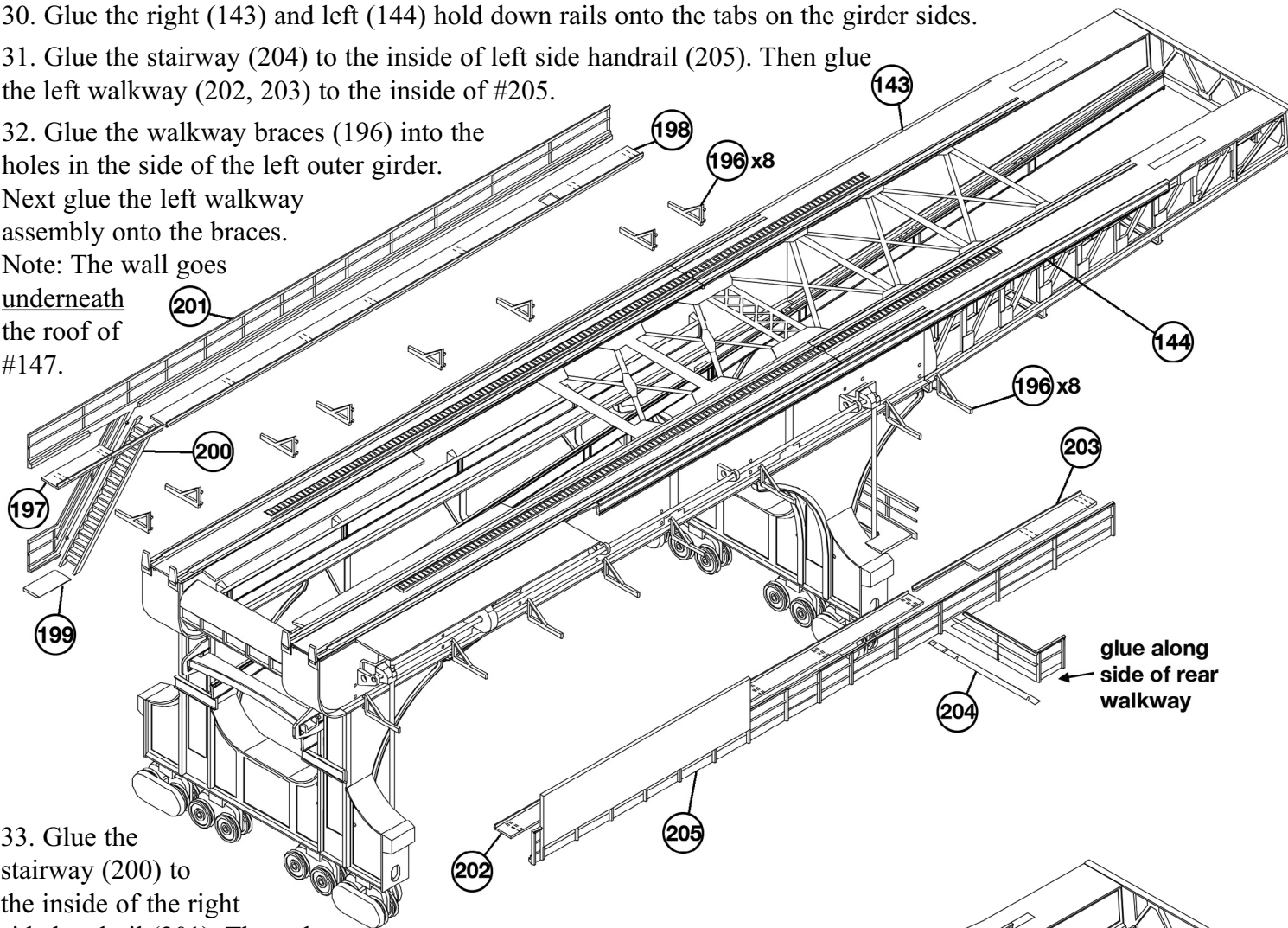
30. Glue the right (143) and left (144) hold down rails onto the tabs on the girder sides.

31. Glue the stairway (204) to the inside of left side handrail (205). Then glue the left walkway (202, 203) to the inside of #205.

32. Glue the walkway braces (196) into the holes in the side of the left outer girder.

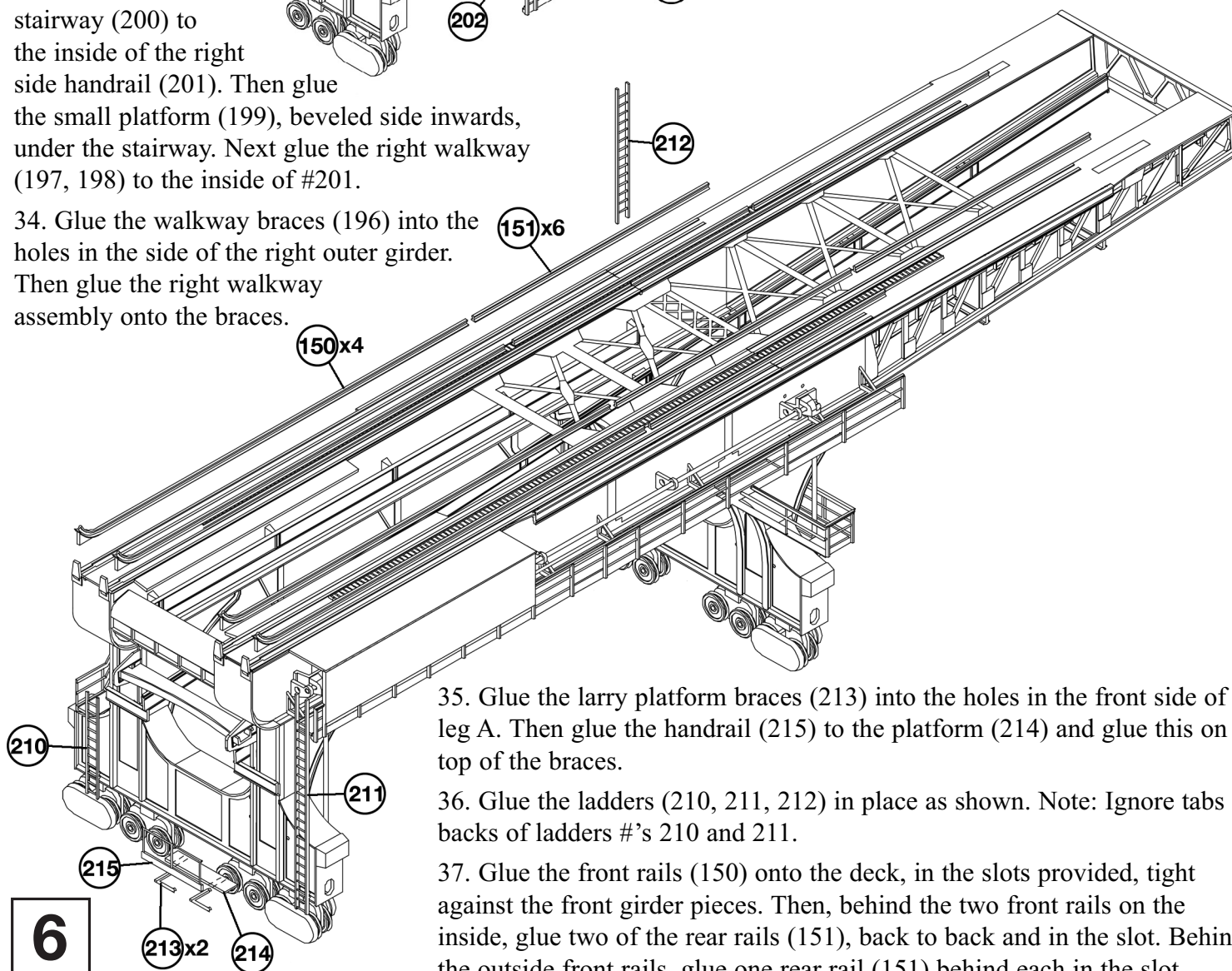
Next glue the left walkway assembly onto the braces.

Note: The wall goes underneath the roof of #147.



33. Glue the stairway (200) to the inside of the right side handrail (201). Then glue the small platform (199), beveled side inwards, under the stairway. Next glue the right walkway (197, 198) to the inside of #201.

34. Glue the walkway braces (196) into the holes in the side of the right outer girder. Then glue the right walkway assembly onto the braces.



35. Glue the larry platform braces (213) into the holes in the front side of leg A. Then glue the handrail (215) to the platform (214) and glue this on top of the braces.

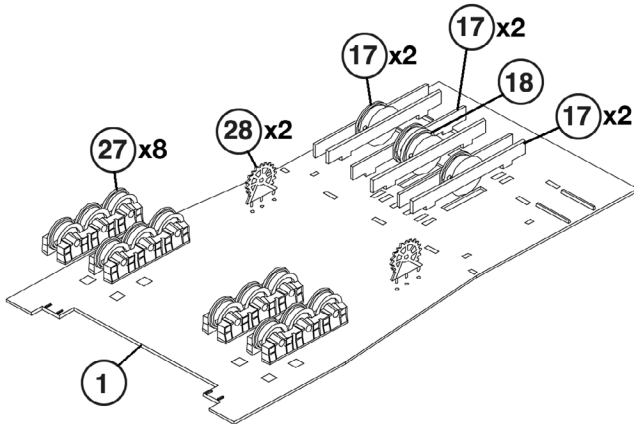
36. Glue the ladders (210, 211, 212) in place as shown. Note: Ignore tabs on backs of ladders #'s 210 and 211.

37. Glue the front rails (150) onto the deck, in the slots provided, tight against the front girder pieces. Then, behind the two front rails on the inside, glue two of the rear rails (151), back to back and in the slot. Behind the outside front rails, glue one rear rail (151) behind each in the slot.

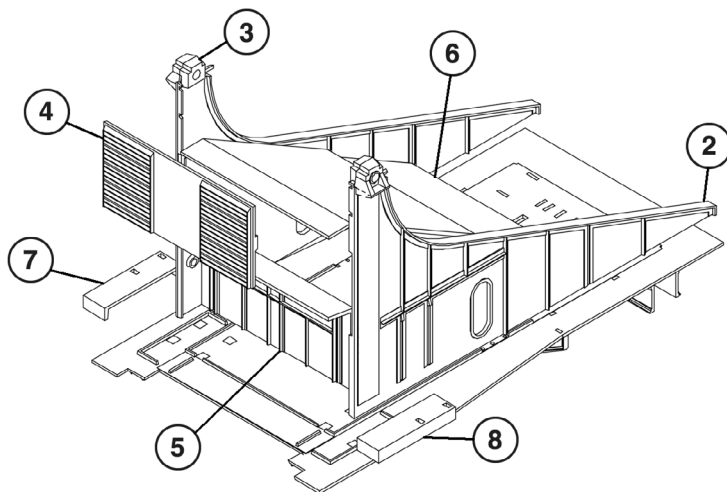
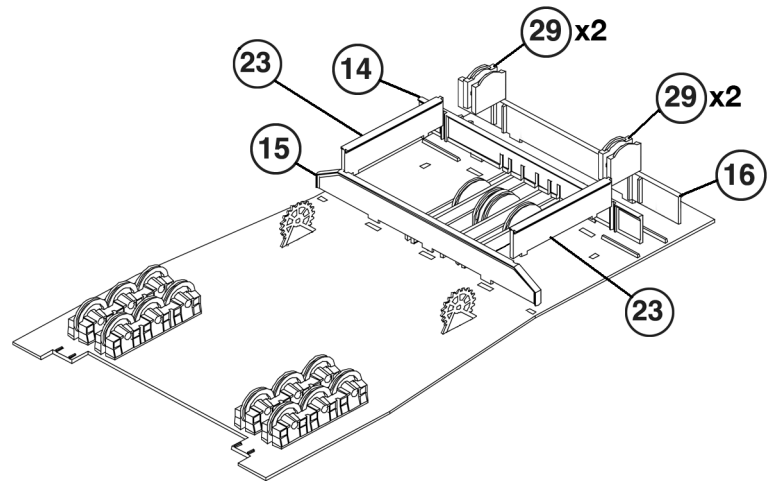
38. Glue the bogey side/wheel halves (27) together. Then glue them in place on the bottom of the trolley floor (1).

39. Glue the drive pinions (28) into the holes on the bottom of #1. Note: The spacing of the pegs allows only one way to attach.

40. Glue the sheave halves (17) together and then to the outer positions on the bottom of #1. Next glue the center sheave (18) in between two sheave halves (17). Glue this into the center position as shown.



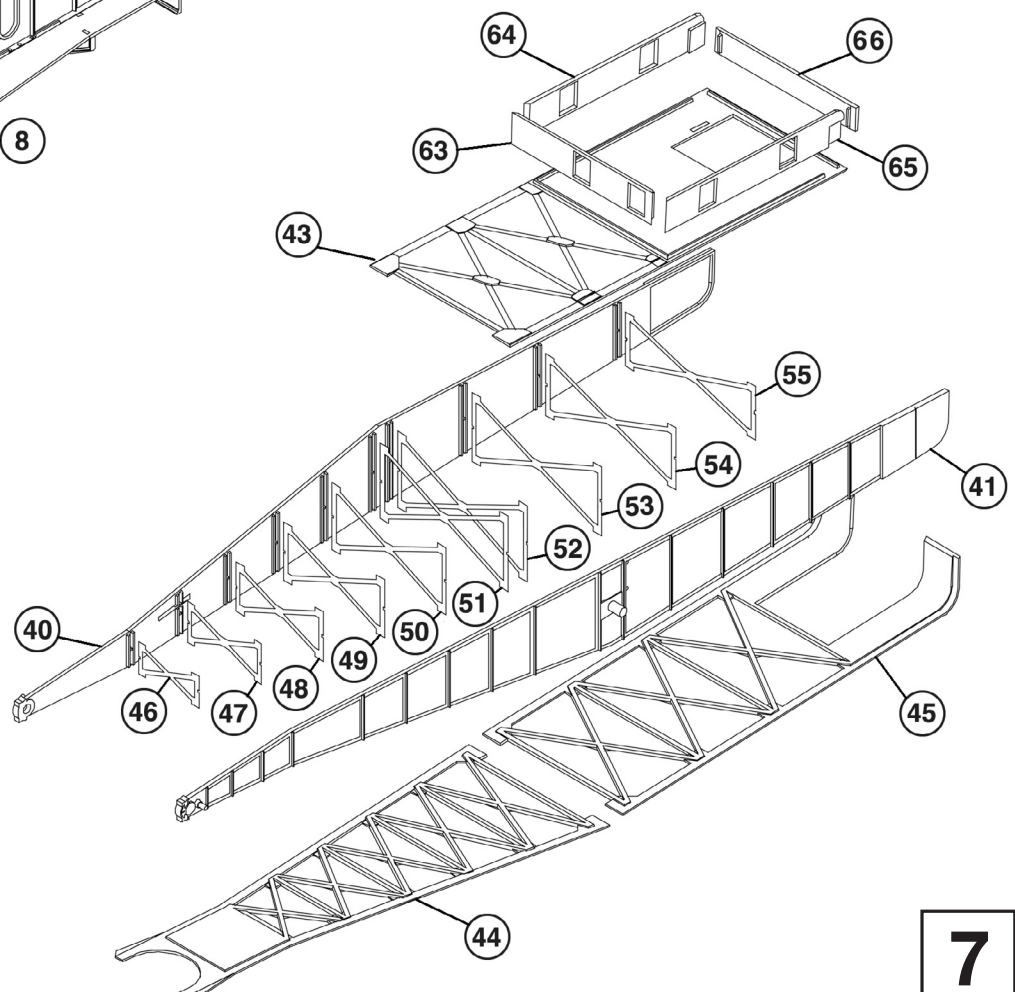
41. Glue front (15), inner (14) and rear (116) crossbeams in place. Then glue the longitudinal beams (23) in between #'s 14 and 15. Next glue the rear wheel halves (29) together and then in between #'s 14 and 16.

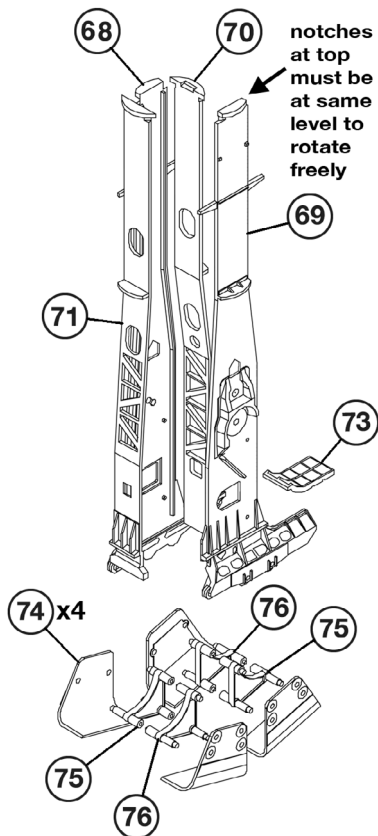


42. Glue the trolley roof (6) to the inside of the trolley right side (3). Then glue the lower bulkhead (5) to the inside of #3. Next glue the left side (2) on. Now glue this onto the floor. Glue the right (7) and left (8) boxes in place. Glue the upper bulkhead (4) in position. Set aside.

43. Glue the cross members (46, 47, 48, 49, 50, 51, 52, 53, 54, 55) to the inside of the right walking beam side (40) in the order shown. Then glue on the left side (41).

44. Glue the bottom back bracing (45) and top back bracing (43) in place. Next glue on the bottom front bracing (44). Glue the machinery house sides (63, 64, 65, 66) together and to the top of the walking beam. Set aside.

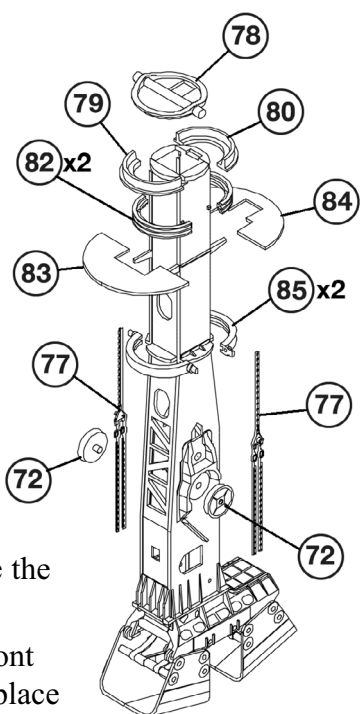




notches at top must be at same level to rotate freely

45. Glue the front (70) and rear (71) to the inside of the right leg side (68), using the ridges to position correctly. Next glue on the left side (69). Note: In order for the leg to rotate a full 360 degrees, you must trim down the taller notches at the top of the leg so that they are level with the lower notches. Otherwise, the leg will only have limited travel.

46. Glue the bucket bell crank halves (75, 76) together. Then glue the bucket halves (74) together and to the bottom pegs of the bell crank. Snap the upper pegs on the cranks into either the inner or outer holes in the insides of the sides. Note: Using the inner holes would display the bucket closed while the outer holes, the bucket wide open. Glue the back plate (73) on.



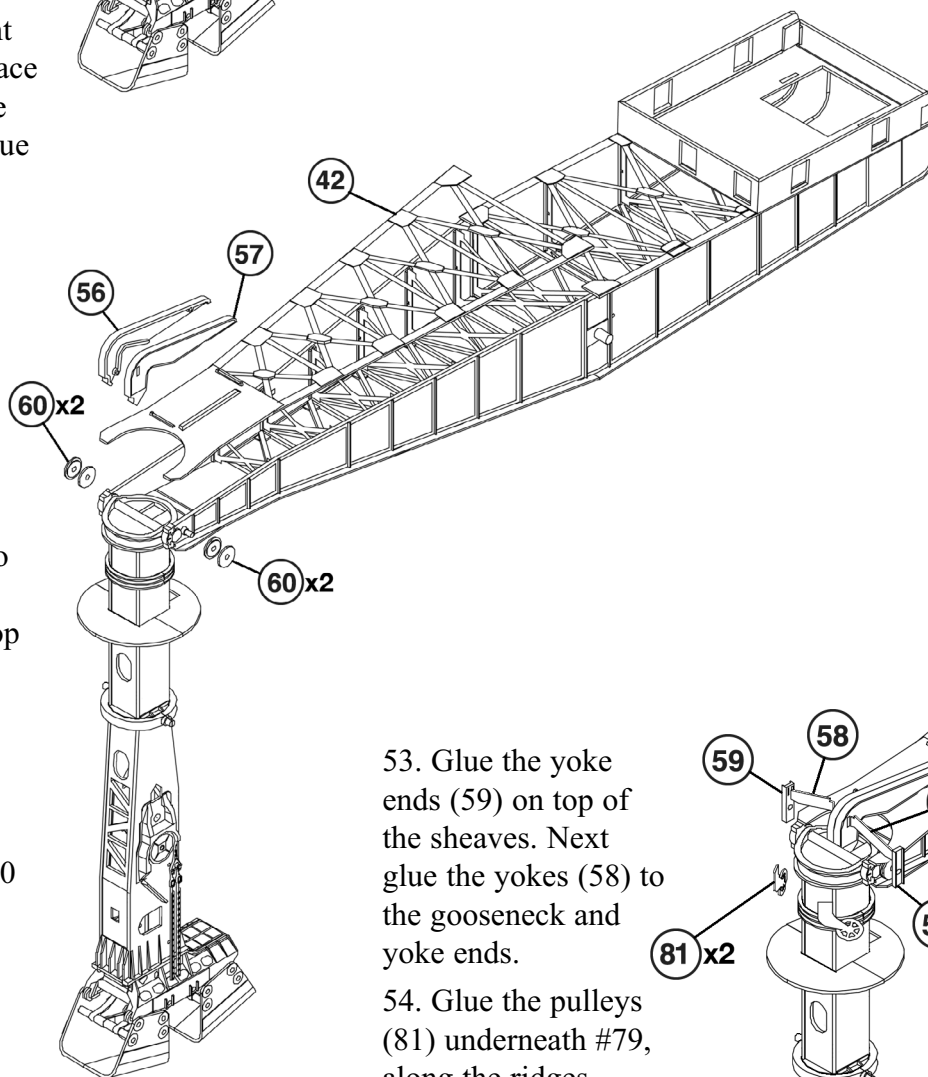
47. Glue the wheels (72) onto the sides. Then glue the chains (77) onto the sides. Note: There are two options. The first is to glue the peg on the back of the chain into the top hole on the side. The chain would be in this position when the bucket is closed. If the bucket is displayed full open, glue the chain in the bottom hole. Both options require you to trim the chains to fit. For the wide open position, you will also have to add a section of chain, cut off from the bottom, spanning from the top of the chain to the wheel.

48. Place the lower rotating rings (85) around the leg as shown, gluing only the outer pegs together. Note: Ring must be able to rotate freely.

Glue the front (83) and rear (84) platform halves to the top of the braces on the leg.

49. Glue the ring halves (82) together, around the leg above the four pegs.

50. Glue the top ring lower front (79) to the lower rear (80) in place around the leg. Note: Make sure no glue gets on the leg. Then glue the top ring cover (78) on as shown.

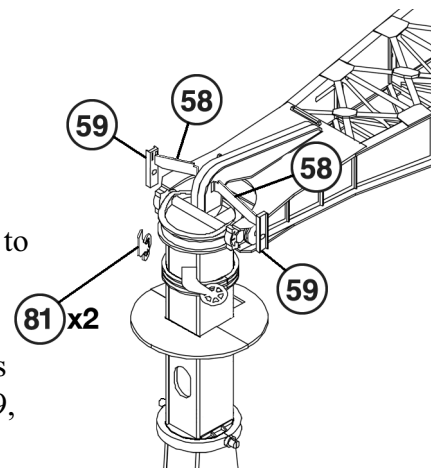


51. Spread #'s 40 and 41 apart and snap the pegs from #78 into the holes on the inside of the beam sides. Then glue on the top front bracing (42).

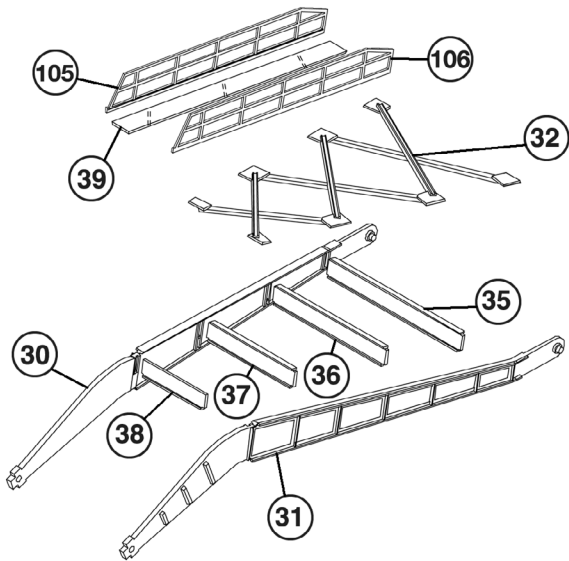
52. Glue the gooseneck halves (56, 57) together and on top of #42 with the end entering the hole in #78. Place the sheave halves (60) on the pegs of #'s 40 and 41.

53. Glue the yoke ends (59) on top of the sheaves. Next glue the yokes (58) to the gooseneck and yoke ends.

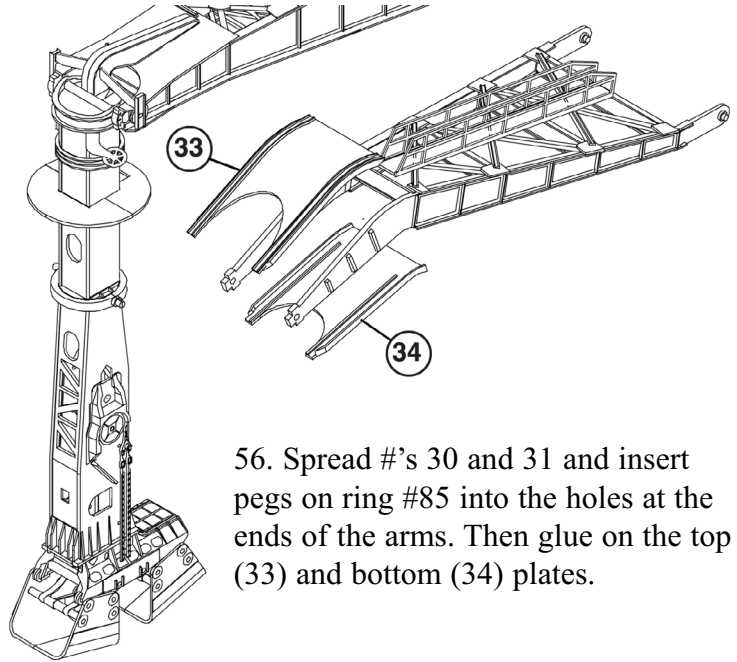
54. Glue the pulleys (81) underneath #79, along the ridges.



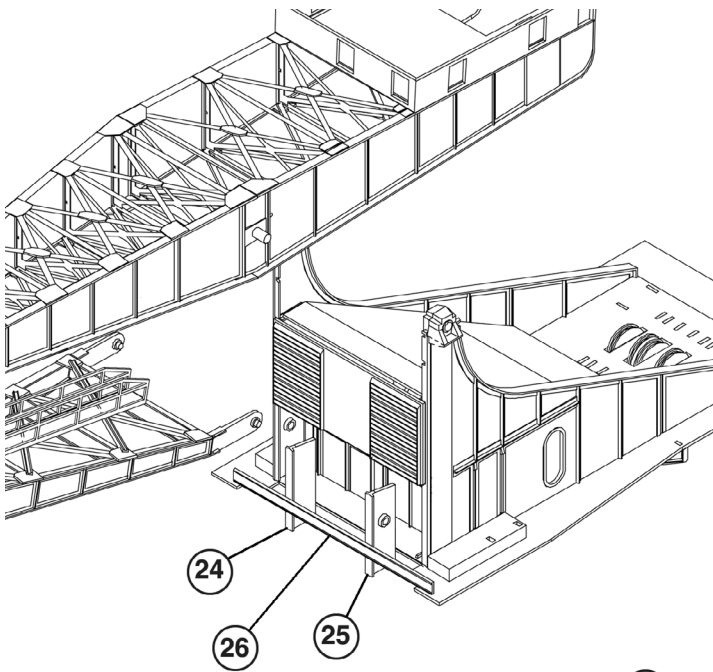




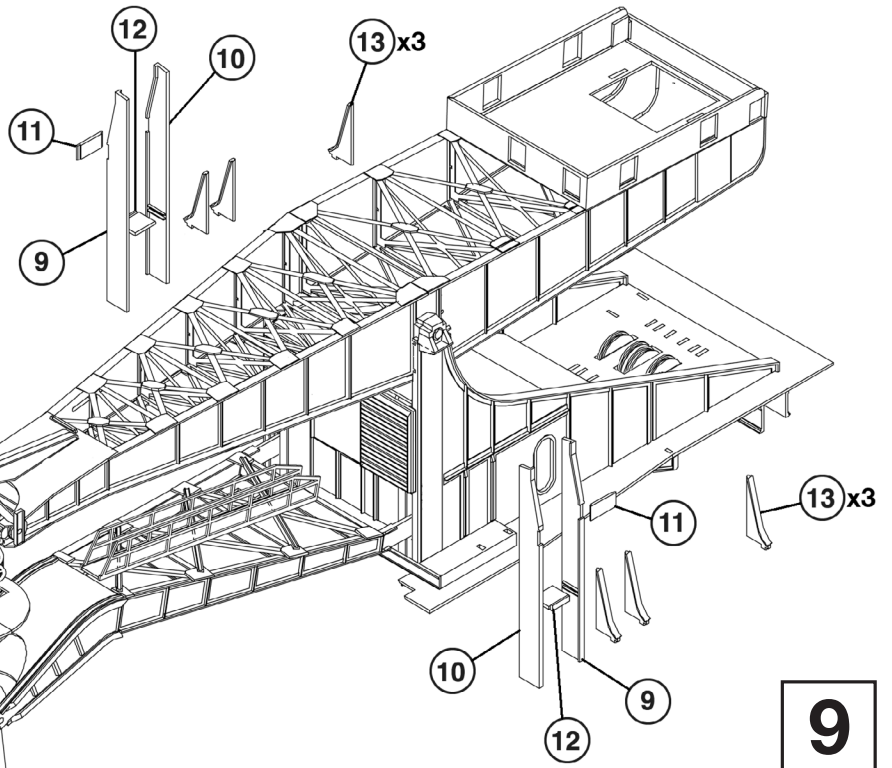
55. Glue the cross members (35, 36, 37, 38) to the inside of the right stabilizer arm (30). Glue on the left arm (31). Next glue the top bracing (32) on top. Glue the handrails (105, 106) to the walkway (39). Then glue this on top of #32, using the ridges on the bottom of #39 to position correctly.



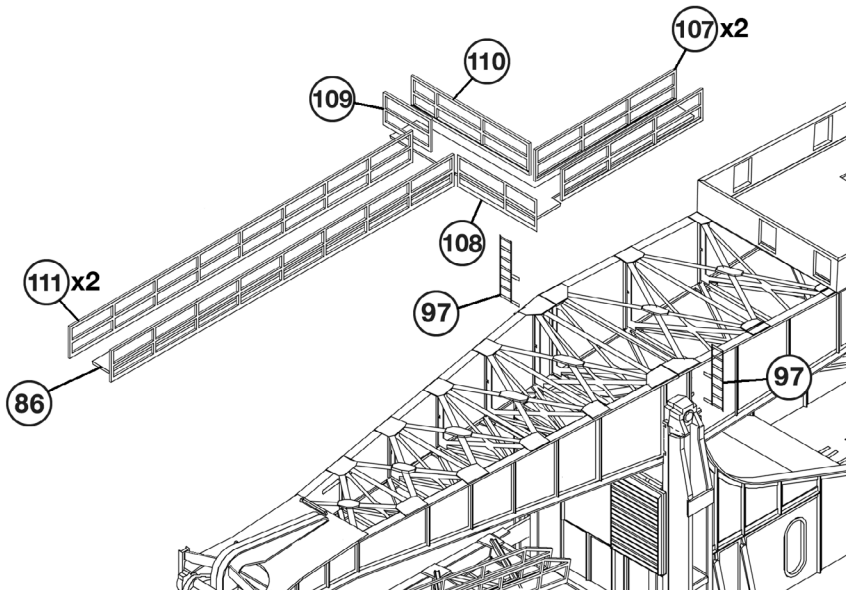
56. Spread #'s 30 and 31 and insert pegs on ring #85 into the holes at the ends of the arms. Then glue on the top (33) and bottom (34) plates.



57. Gently spread the tops of #'s 2 and 3 and insert the pegs from sides #'s 40 and 41. Next pinch in the ends of #'s 30 and 31 and insert their pegs into the holes in the insides of #'s 2 and 3. Then glue the inner girders (24, 25) to bulkhead #5, inserting the pegs from #'s 30 and 31 into the holes on the insides. Make sure no glue gets on the pegs/ holes. Glue the end sill (26) in place.



58. Glue the middle cross plates (12) to the inside of the left risers (10). Then glue the right risers (9) on. Next glue on the upper cross plates (11). Glue these assemblies to the trolley sides as illustrated.  
59. Glue the gussets (13) in place.



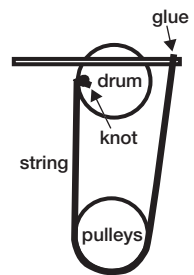
60. Glue railings (107, 108, 109, 110, 111) on walkway (86) as shown. Bend the front platform down slightly, at the groove underneath, and glue on top of the beam.

61. Glue both side ladders (97) into the holes in the sides of the beams.

62. Cut both strings into two equal lengths (total of four pieces). Tie knots on one end of each string. Place the knotted ends on the inside of one winding drum (61) half through the grooves found on the drum. Glue the halves together. Press the drum supports (62) on the ends of the drum. Then press the tabs on the supports into the slots from the bottom of #43. Once in position, glue in place.

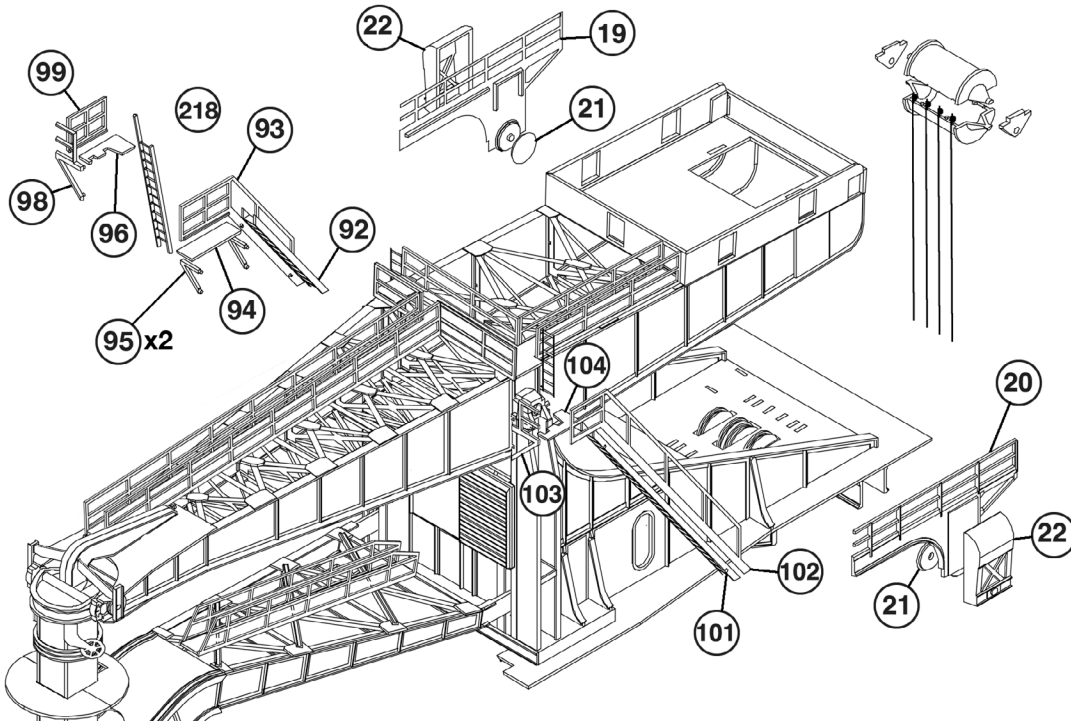
**Rigging**

Position the head all the way down. Then draw the strings up through the holes in #43 until taut. Glue stings in place and cut off excess. Wind strings around drum until head is at the position you want.



Note: Rig each string as shown.

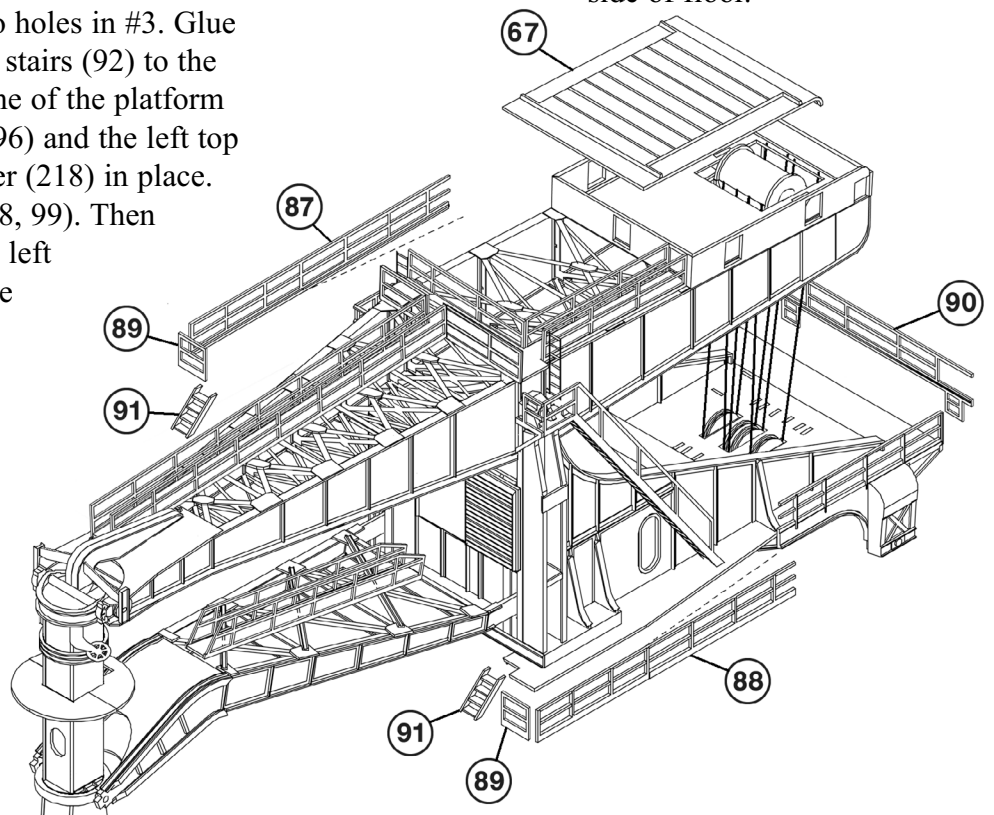
63. Glue the inner wheels (21) to the insides of the side plates (19, 20). Then glue on the cover plates (22). Glue to side of floor.



64. Glue the platform brackets (95) into holes in #3. Glue the platform (94) on top. Then glue the stairs (92) to the inside of the railing (93). Glue this to the of the platform and floor. Glue the right top platform (96) and the left top platform (104) on as shown. Glue ladder (218) in place. Next glue on the right side handrails (98, 99). Then glue the stairs (101) to the inside of the left railing (102). Glue this to the side of the platform and floor. Glue end railing (103) on.

65. Glue on the back railing (90). Then glue the side railings (87, 88) and front railings (89) as illustrated. Note: Bend #'s 87 and 88 inwards slightly at the groove to conform to the side of the floor.

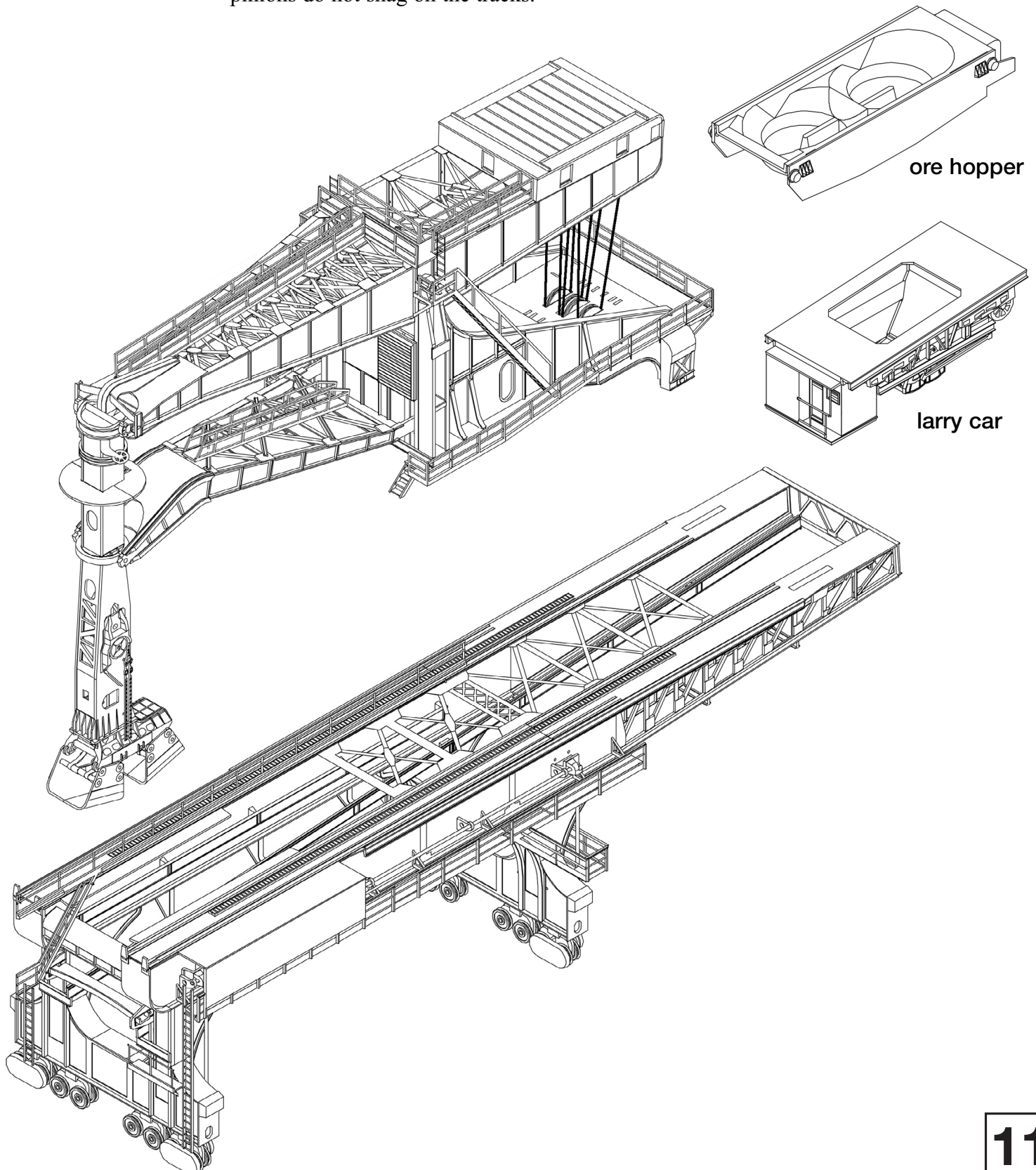
66. Glue on stairs (91). Put roof (67) on in place.



67. Through the hole at the rear of the deck, insert the completed ore hopper and place the pegs, on the sides, onto the ore hopper track beams up near the front. Position it where you want.

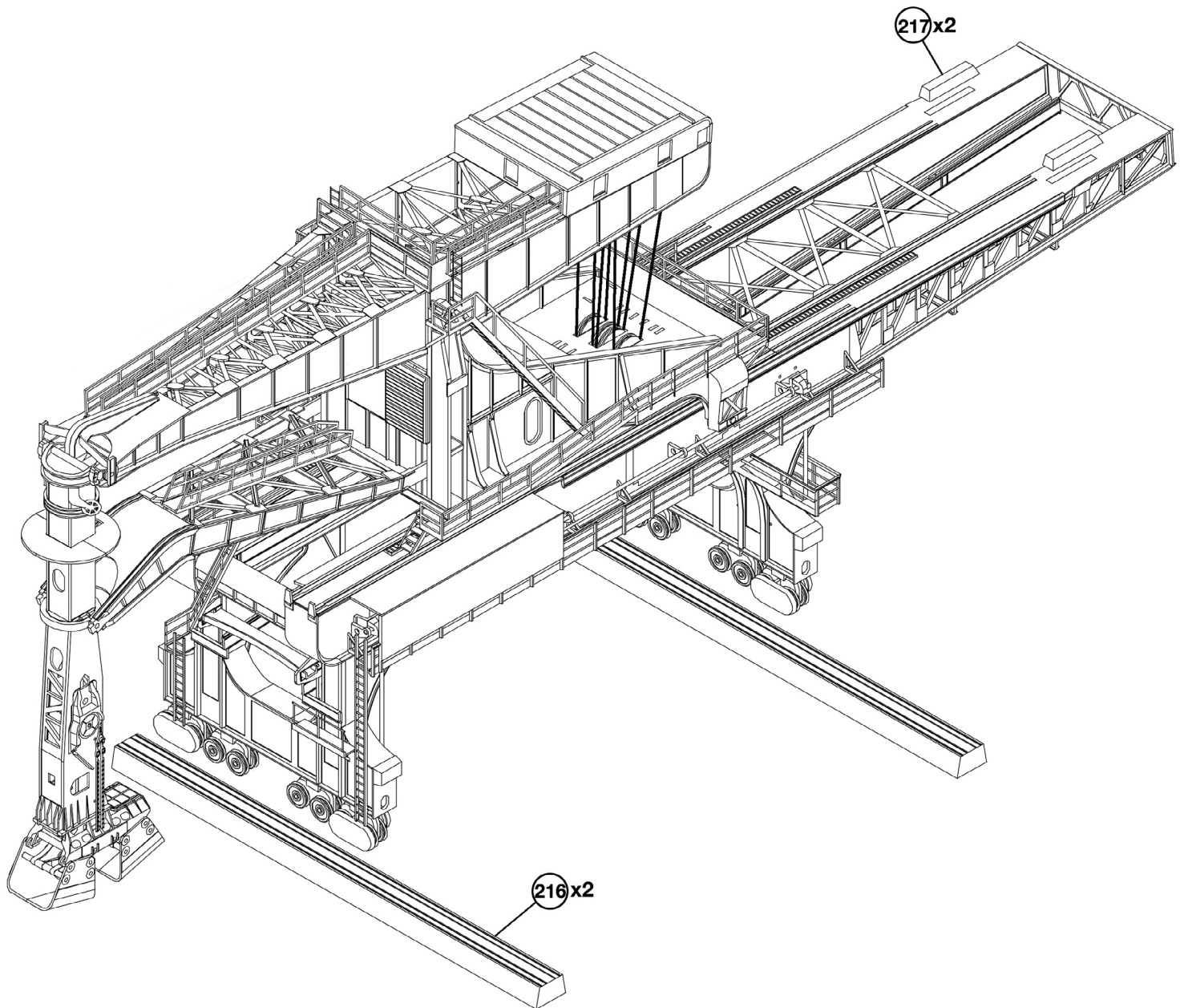
68. Also through the hole at the rear of the deck, insert the completed larry car and place it's wheels on the tops of the larry rails. You can then position it anywhere along the rails.

69. Slide the completed unloader onto the deck from the back by carefully bending out the side plates until wheels go under the deck. Move forward and make sure all underside wheels are on top of the rails. Lift up slightly moving forward so that the pinions do not snag on the tracks.



70. Once unloader is on the deck, glue the wheel stops (217) onto the back of the deck as shown.

71. Cut four pieces of rail, of your choice, to length (not included) and glue to the tops of the rail bases (216). Place the completed model on top.



## DECALING

1. After cutting out the decal, dip in water for 10 seconds, remove and let stand for 1 minute. Slide decal onto surface, position and then blot off any excess water.
2. Lightly brush Micro Sol® on top. This will soften the decal, allowing it to conform to irregular surfaces. **DO NOT TOUCH DECAL** while wet!
3. When decal is thoroughly dry, check for any trapped air bubbles. Prick them with the point of a small pin or hobby knife blade and apply more Micro Sol®.