

# Modelers guide to boxcar ends of the 20th Century

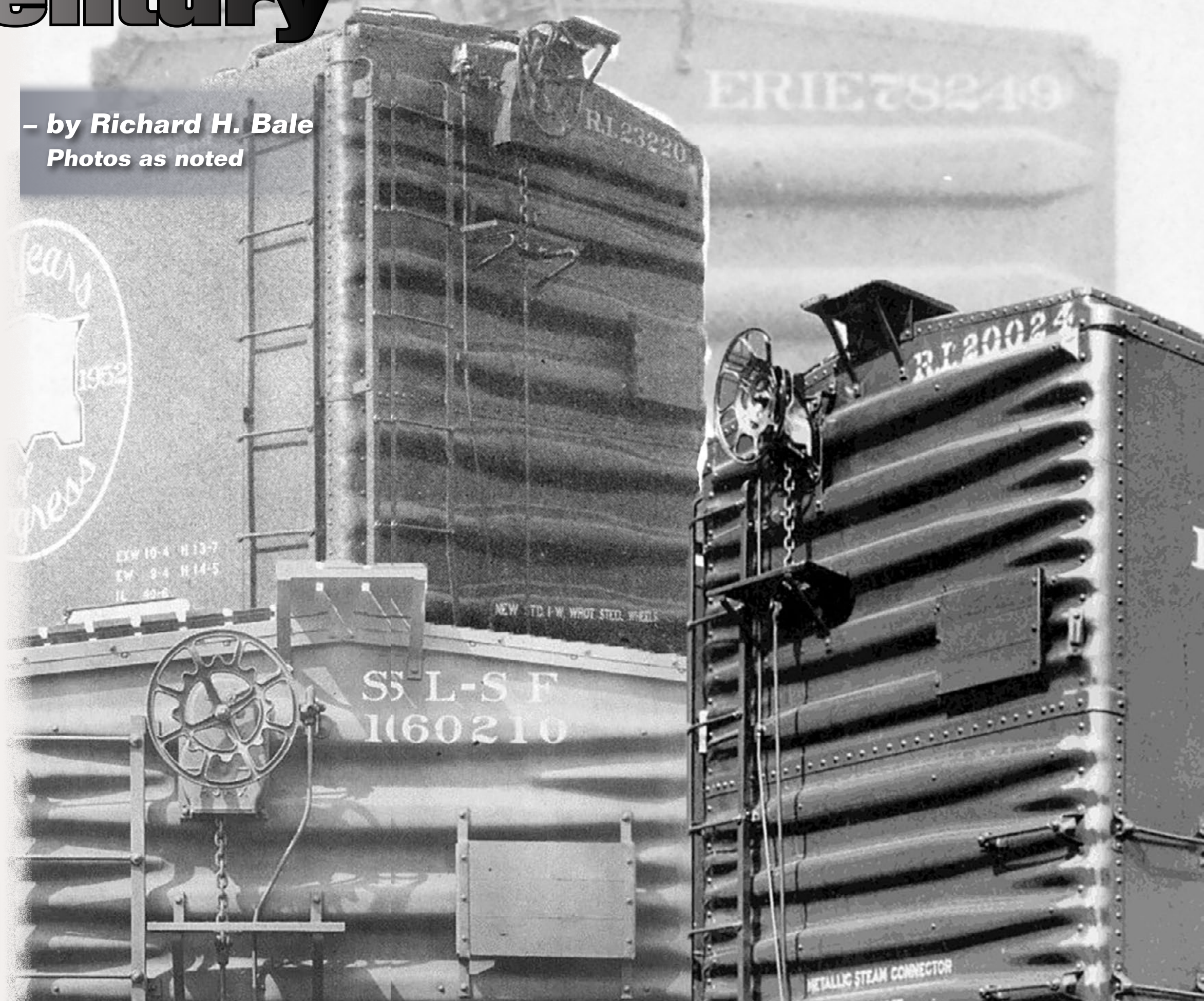
## A brief history of boxcar ends ...

One of the principal spotting features of boxcars are the ends. During the 20th century, the material used in fabricating car ends evolved from wood to steel, with a myriad of design ideas tried along the way. Although the evolution of car ends was mostly logical, there were some unusual designs that were short-lived, but no less interesting.

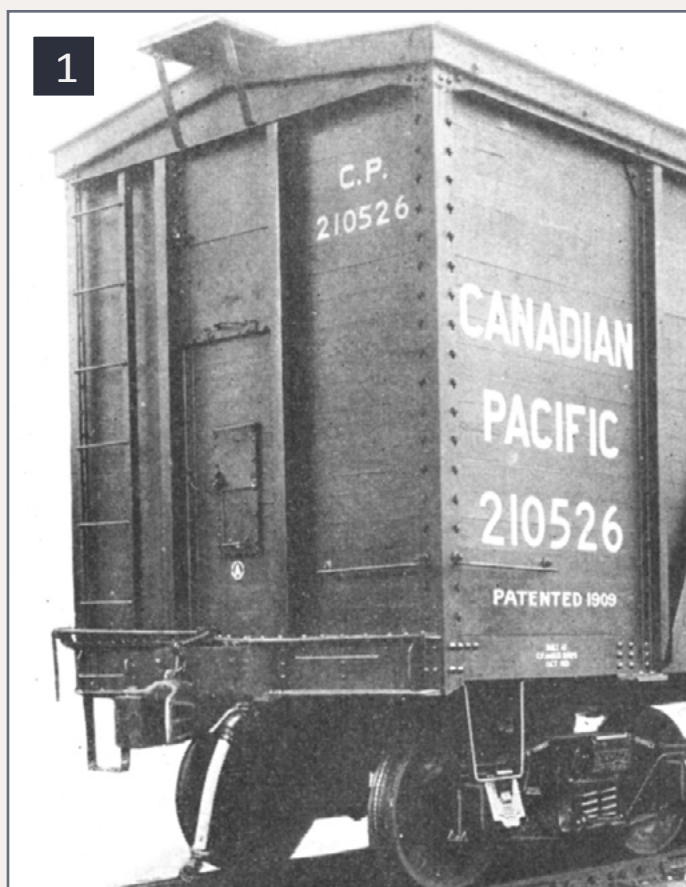
### Wood ends

By the late 1890s, the wood ends of most boxcars were

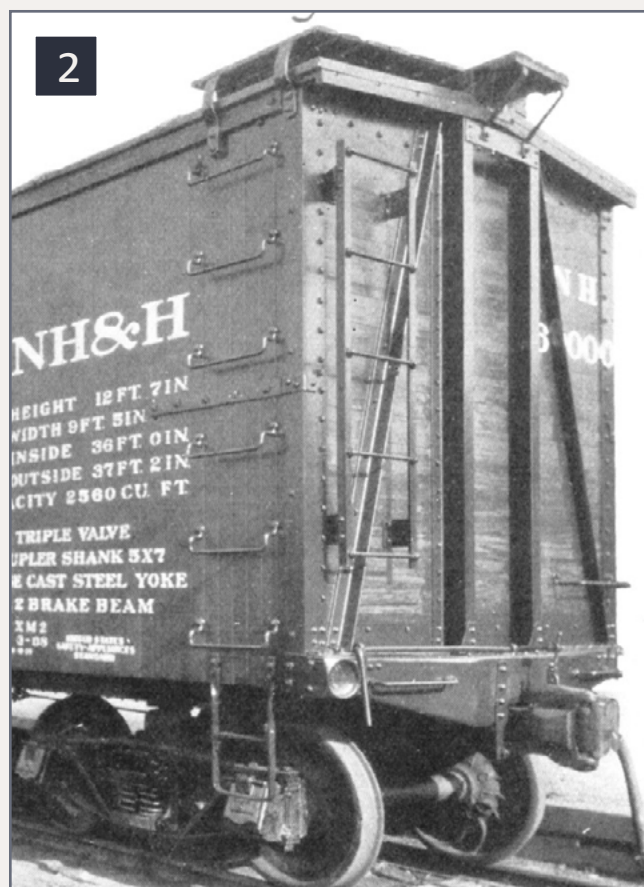
– by **Richard H. Bale**  
Photos as noted



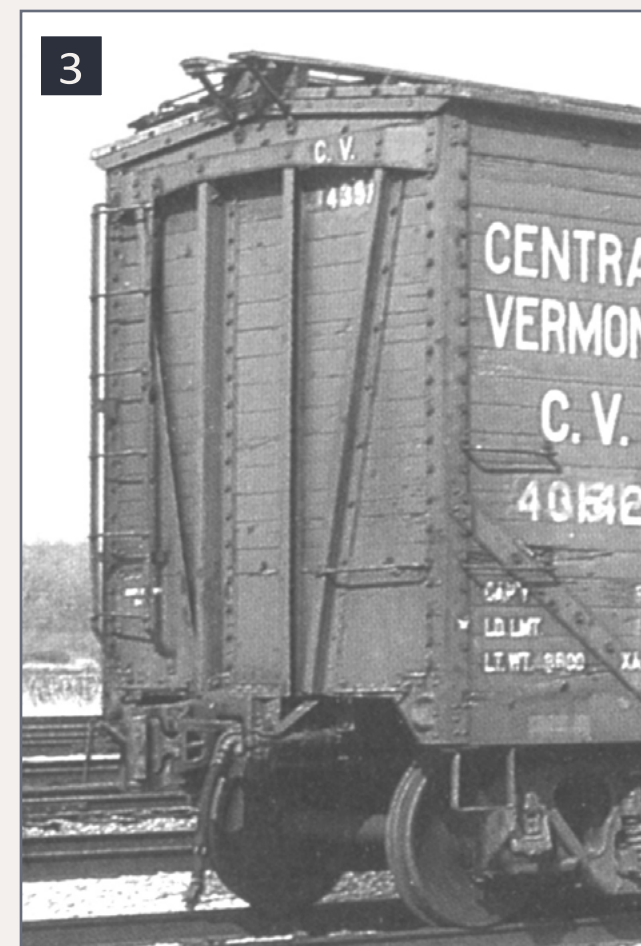
constructed with steel bracing using standard and Z-section steel. End bracing was intended to keep car bodies square and to help minimize collision damage to the car and its lading. The steel bracing was arranged in several patterns including vertically [1]. The vertical bracing was frequently augmented with additional steel in either an 'A' [2] or an 'V' [3 and 4]



1. 36' Single-sheathed wood car with vertical steel bracing manufactured by Fowler Car Co. circa 1909.



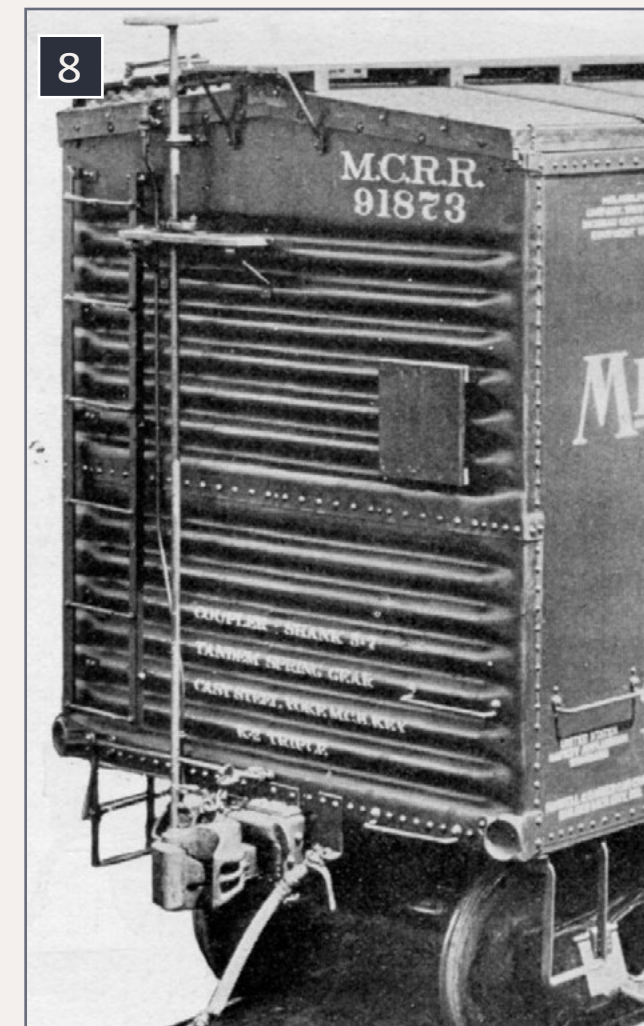
2. 1908 car rebuilt in late 1920s with heavy vertical steel bracing augmented with lighter L-sections angled inward from the lower corners. Note overhanging roof.



3. Single-sheathed wood car built in 1925 with steel end bracing in a 'V' pattern. Note the protective shield over top of steel bracing.



4. Distinctive 'V' braces with a single vertical brace in the center of the end.



**5. Double-sheathed car with vents installed between the vertical steel end braces.**

**6. Double-sheathed wood car with unique vertical braces.**

**7. ACF builder's photo of 36' steel car built in 1912 with 7-7 Murphy end. Note lack of end ladder.**

**8. Car built in 1918 by Pressed Steel Mfg. Co. with 6/6 Murphy steel end.**

configuration. Internal steel bracing was hidden from view on cars with double-sheathed wood ends [5]. As the load capacity of boxcars increased there was a greater need for stronger ends to minimize damage from shifting loads and to protect the car itself.

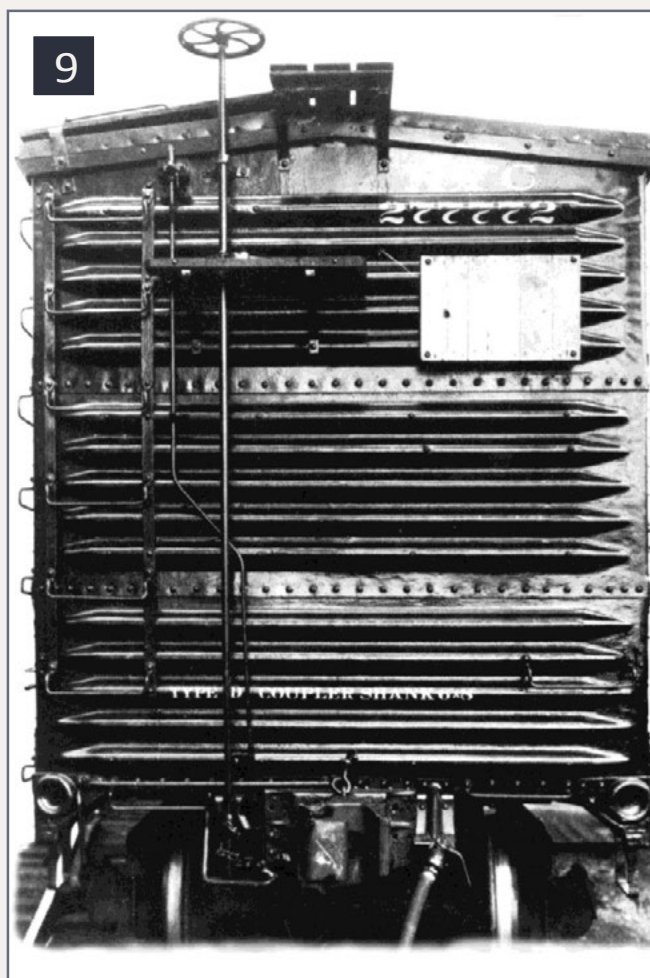
## Corrugated metal ends

The first widely-accepted stamped steel corrugated car ends were introduced in 1912 by the Pressed Steel Mfg. Co. [7]. The company marketed them under the trade name Murphy, and

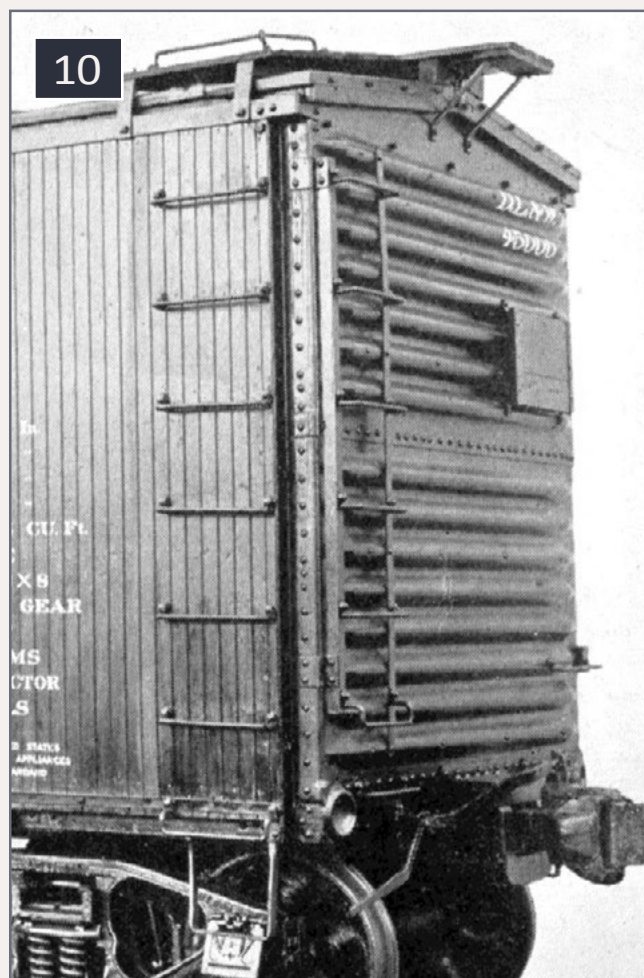
licensed the design to other manufacturers. Corrugated steel ends were made in two [8], three [9] or more [13] sections that were riveted together. Heavier steel was favored for the bottom section where the impact from shifting loads would be greater.

In 1914 the A.R.A. recommended that one-piece corrugated steel ends must be not less than  $\frac{1}{4}$ " in thickness, and when constructed of more than one piece, the lower third of the end should be  $\frac{1}{4}$ " thick, and the remainder should be not less than  $\frac{3}{16}$ " thick. About 1916 the Master Car Builders recommended that all new boxcars have steel ends.

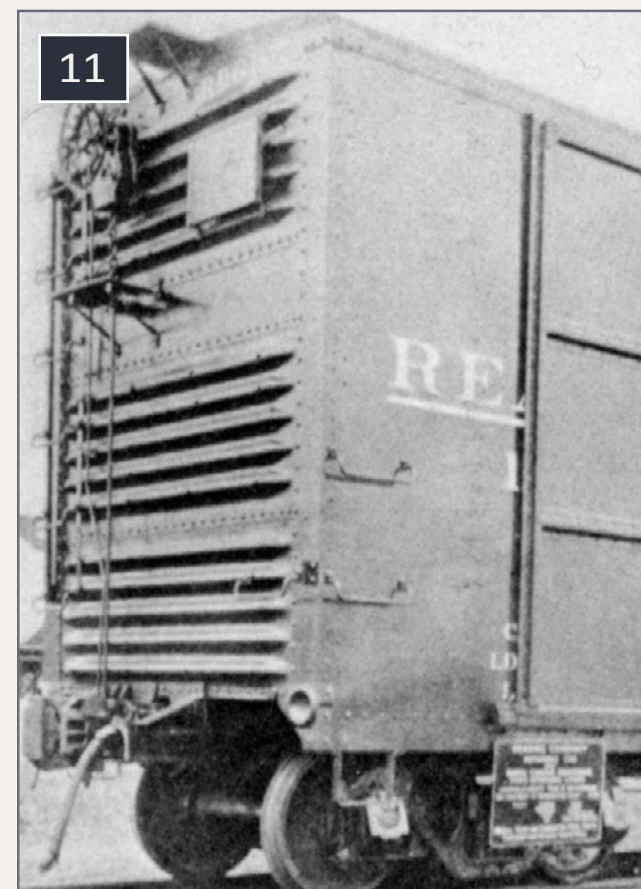
The nomenclature of steel corrugated ends is readily understood. For example, a 6/6 end [8] indicates that the end is composed of two sections with six corrugations in each section. Damaged cars were sometimes repaired with unusual combinations of end sections [11]. The majority of ends had the corrugations pressed outward, but a few inward corrugations were also made [12].



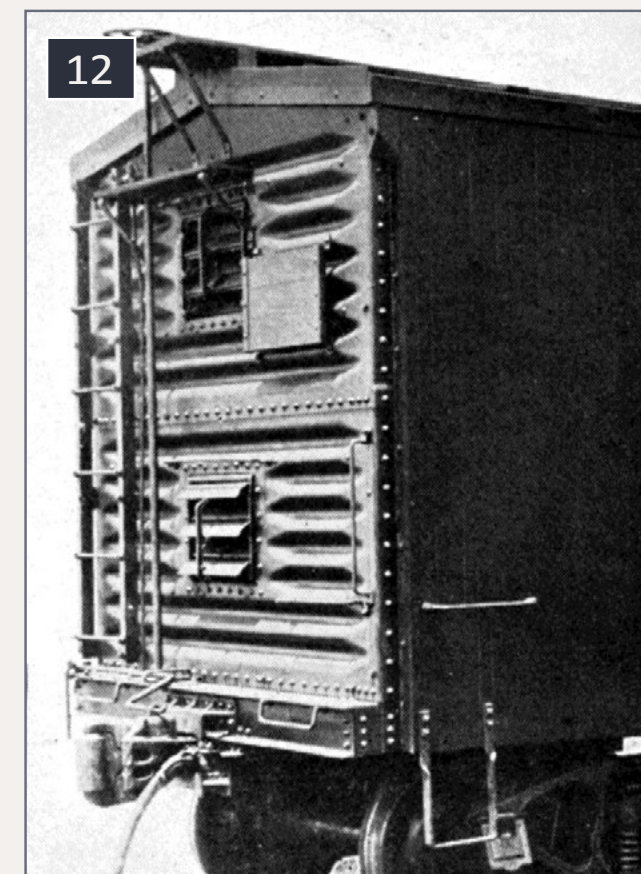
**9. 50-ton USRA box car built in 1919 with 5/5/5 Murphy end.**



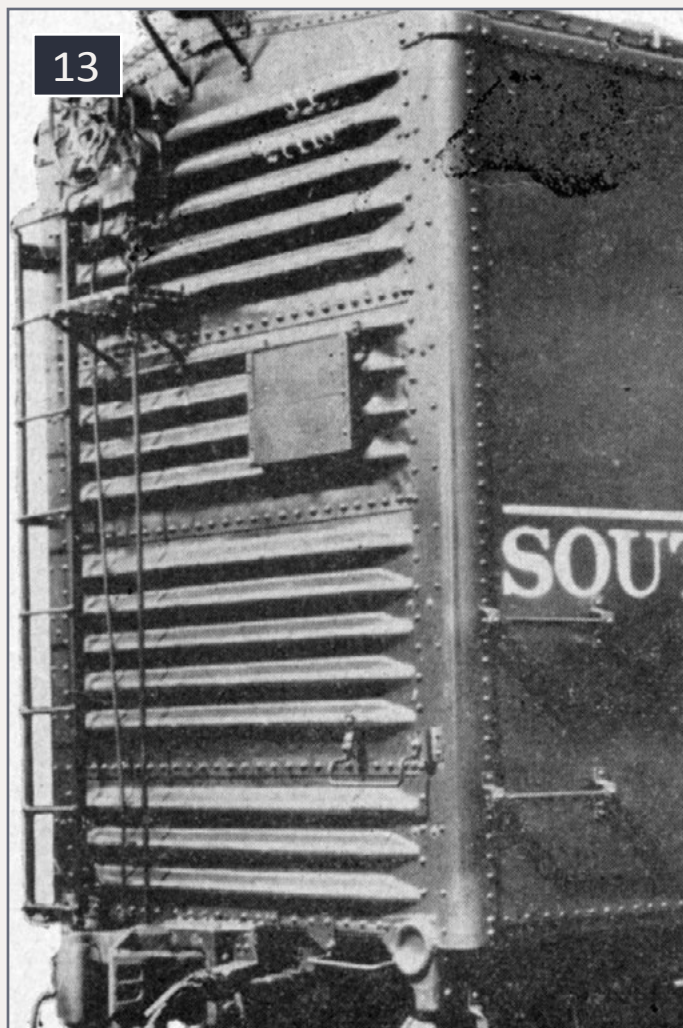
**10. Double-sheathed car built by ACF in 1925 with 7/8 Murphy corrugated steel end.**



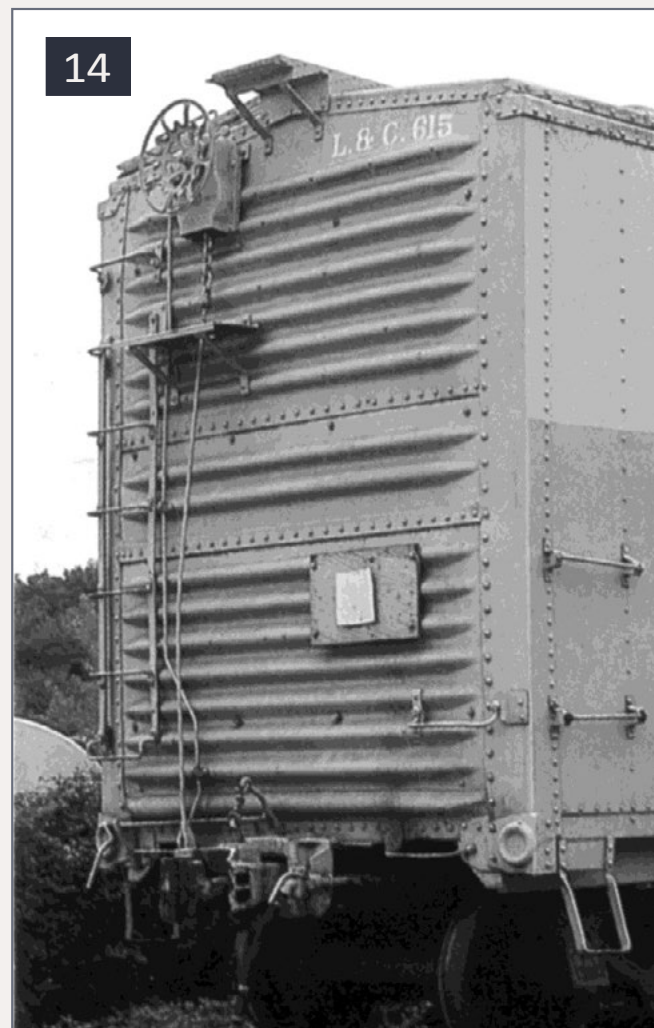
**11. Murphy 5/0/5/5 corrugated steel end on a Reading auto car.**



**12. A pair of Wine ventilators installed in 7/7 Murphy end with inward corrugations. Circa late 1920s.**



13. Murphy 5/4/5/3 corrugated steel end.

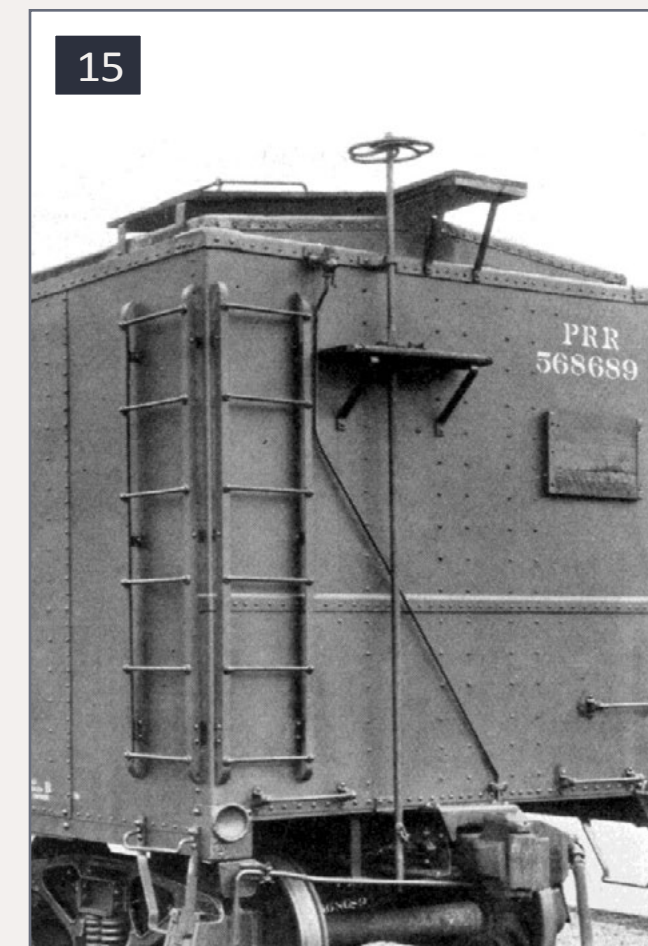


14. Rebuilt car with Murphy 7/2/8 corrugated end.

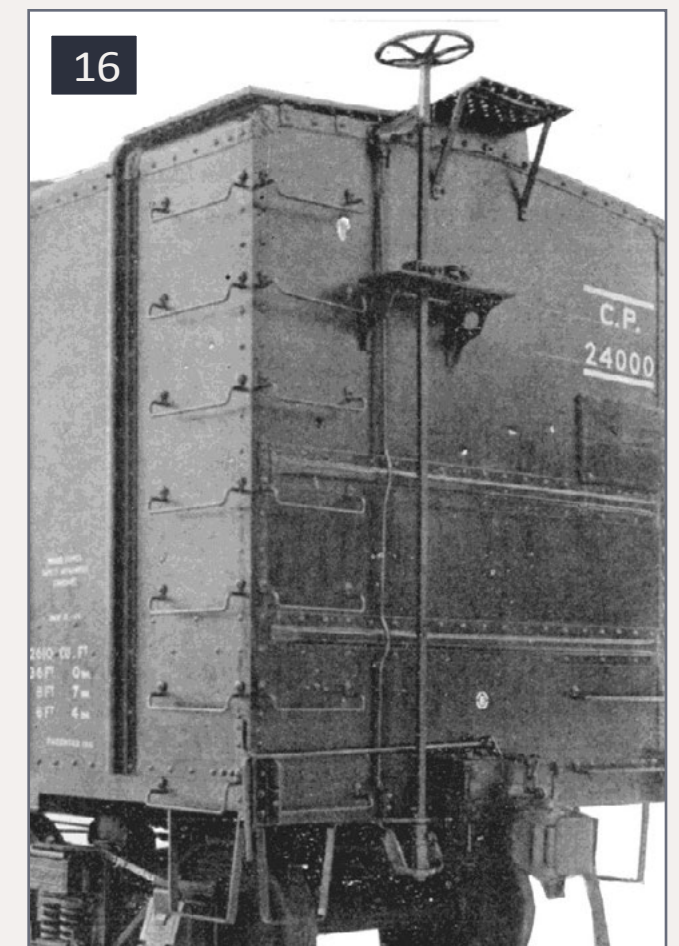
Hobbyists sometimes label Murphy corrugated ends as Youngstown ends. This is erroneous since the Youngstown Steel Door Company did not manufacture any car ends.

## Flat ends

The Pennsylvania Railroad pioneered the flat steel plate ends with the introduction of the class X-29 boxcar in 1914 [15]. The A.R.A. recommended that flat steel ends be reinforced with at least three internal vertical braces. Note the rivet pattern visible on the end in [15].

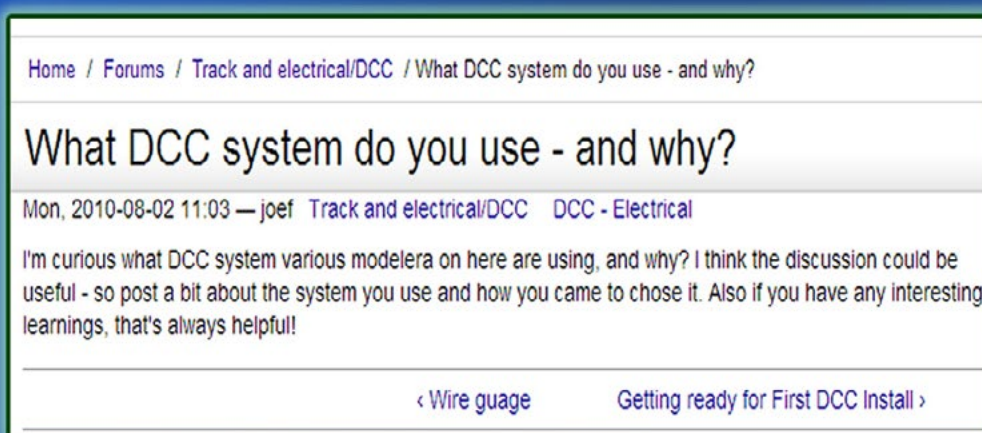


15. Pennsylvania Railroad X-29 car built with flat steel end. Note rivet pattern for internal braces and separate hat section.



16. 36' boxcar with three-panel flat steel end built by Canadian Car Mfg during the teens.

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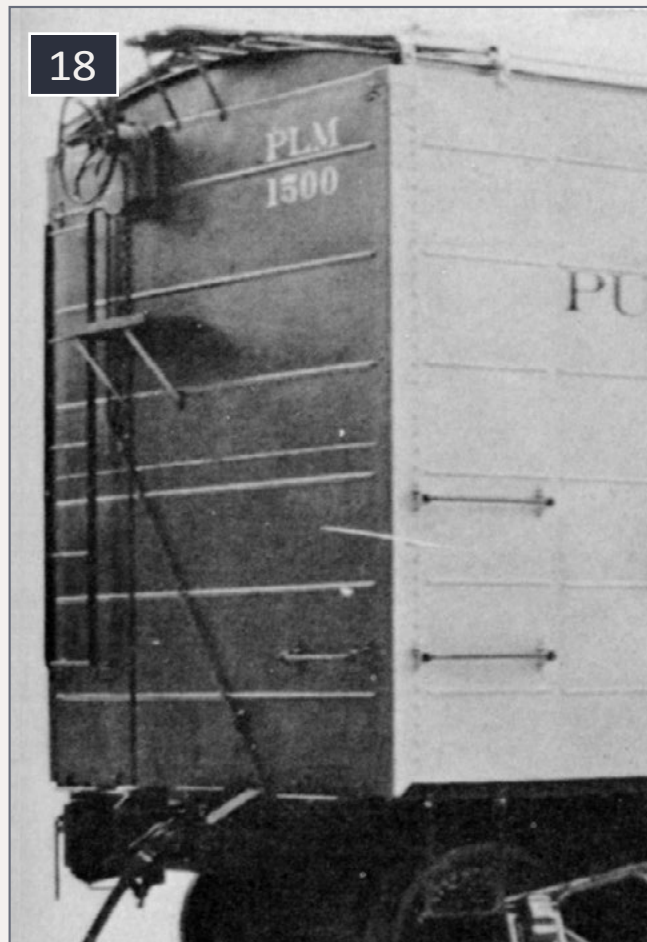


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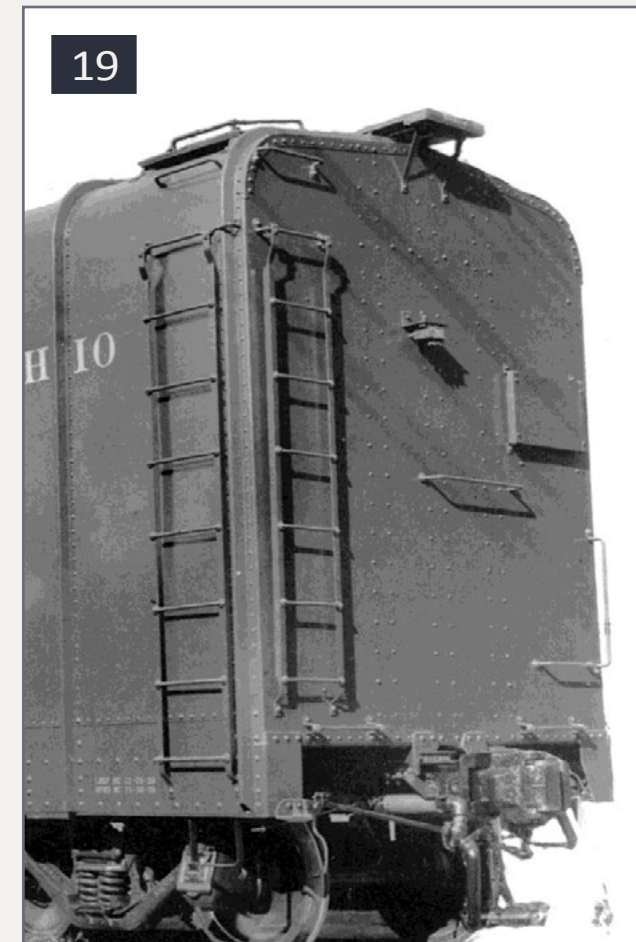




**17. Flat steel end fabricated with three vertical panels on express car built by Pullman-Standard in 1937.**



**18. Flat steel end with minor indentations to match sides. Car built in the late 1930s by Pullman-Standard.**



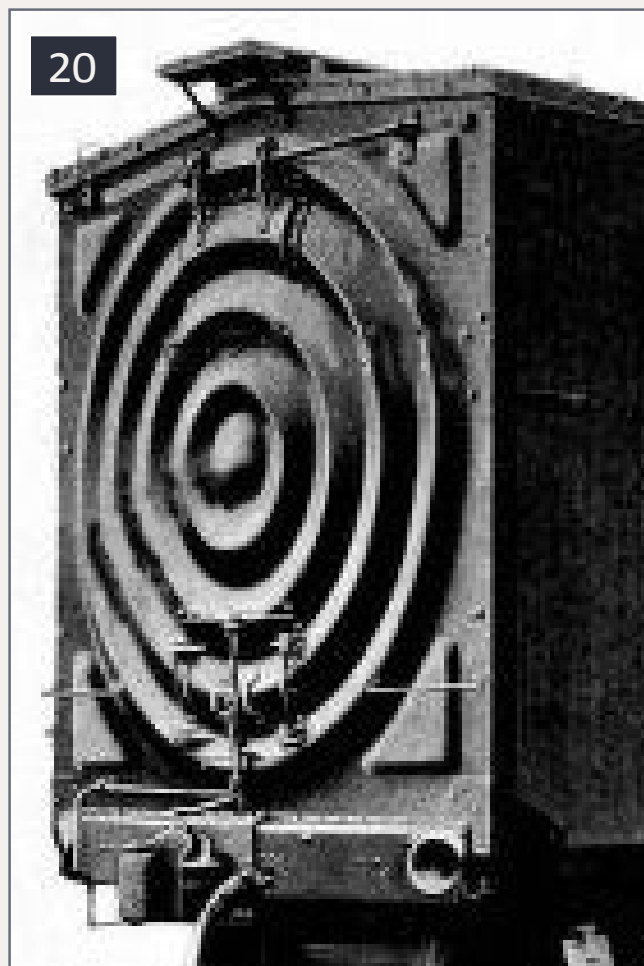
**19. B&O C-16 wagon-top express boxcar with flat steel end.**

## Poling Pockets

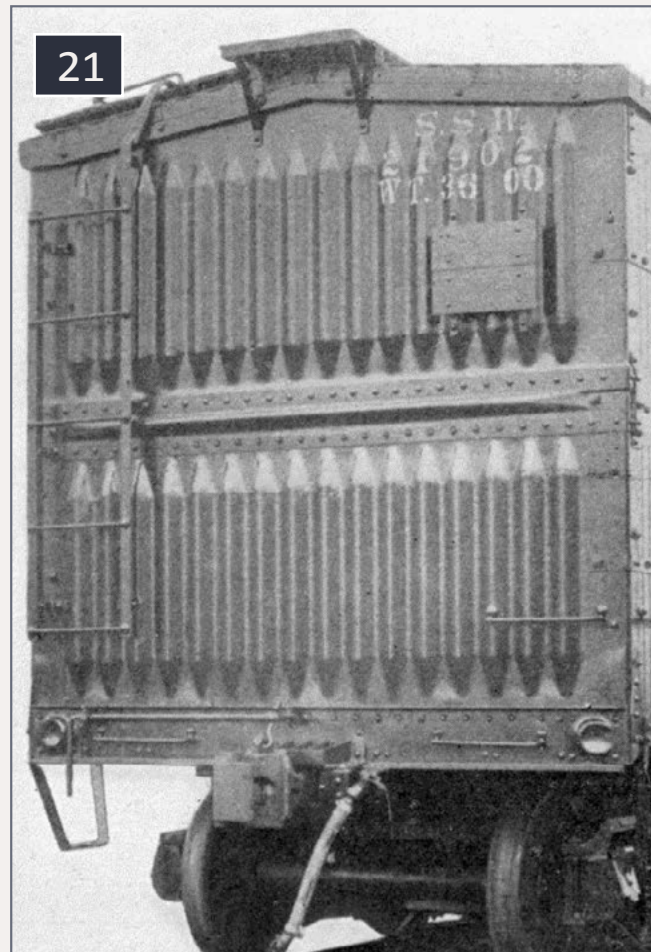
To move cars on an adjacent track, switch crews used a hardwood pole about 8' long pressed into round poling pockets located at the bottom corners of the freight car [13, 14, and 15]. The pilots and tenders of switch engines had similar pockets. The poles were typically about 6" in diameter tapering down to 3" or 4" at the ends, with a metal band to prevent splitting. Trainmen held the pole in position while the engine nudged the car on an adjacent track to the desired location. When not in use, the poles were stored under the tender's side sill. Poling was dangerous, and many railroads banned the practice. Poling pockets began to disappear as tow ropes and reinforced slings came into use. Poling was eventually banned on all American railroads.

## Miscellaneous stamped metal ends

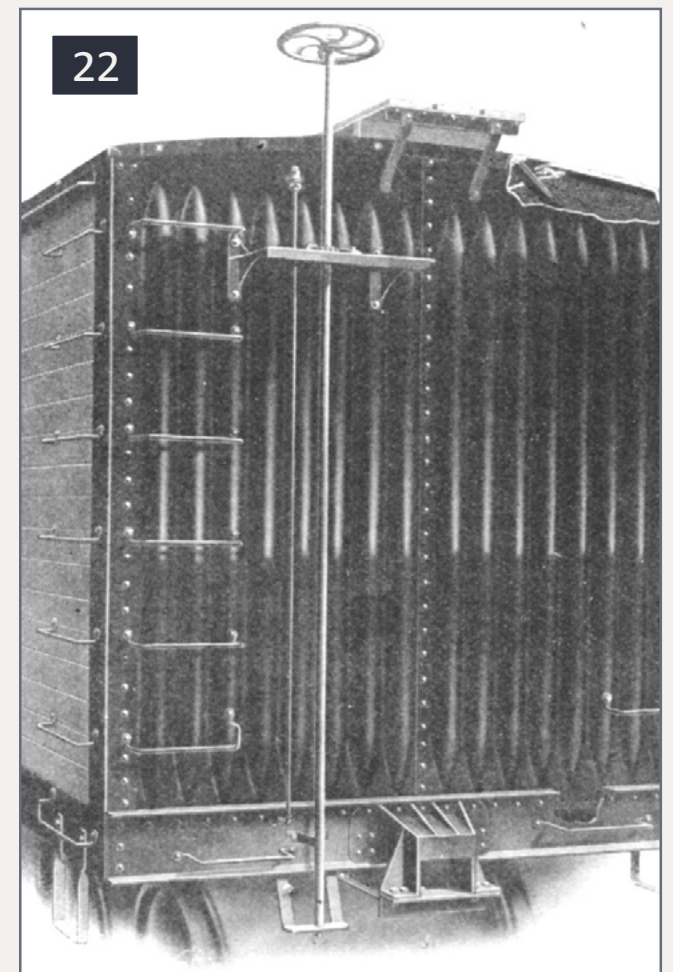
Although Murphy ends and variations on the Dreadnaught theme dominated the field, several additional stamped steel freight car ends made brief appearances. Prior to World War I, Vulcan advertised steel ends with vertical corrugations [21 and 22]. AC&F briefly produced a one-piece steel end with a circular pattern that was quickly nicknamed the Bullseye end [20]. Another unconventional end was a waffle pattern that appeared just prior to World War II [26].



20. Van Dorn "bulls-eye" end manufactured briefly by AC&F.

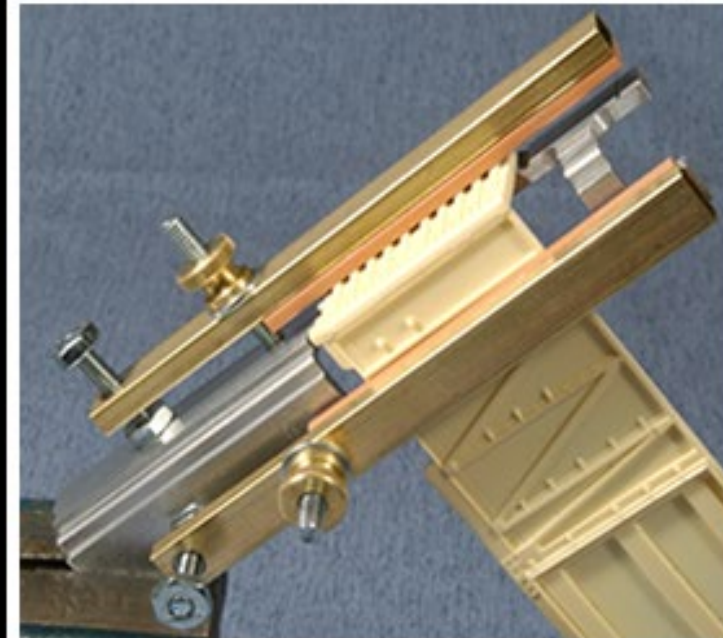


21. Two panels of vertical corrugations and a center panel with a single horizontal rib on circa WWI car. Railroad modeler/historian John Nehrich dubbed this a 'jail-house' end.

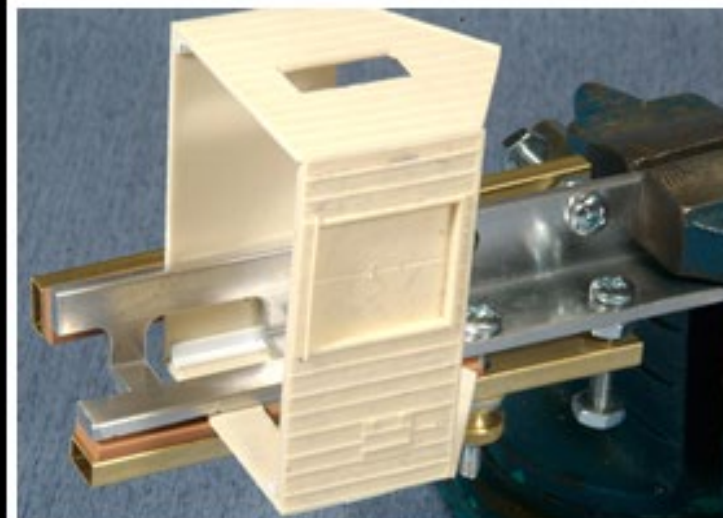


22. Vulcan all-steel end composed of two vertical panels each with eight corrugations fabricated circa 1912 by Chicago-Cleveland Car Roofing Co.

### Combo Right Clamp™



Combo Right Clamp™  
with cast resin boxcar



Combo Right Clamp™  
with Wolf Design Pump House

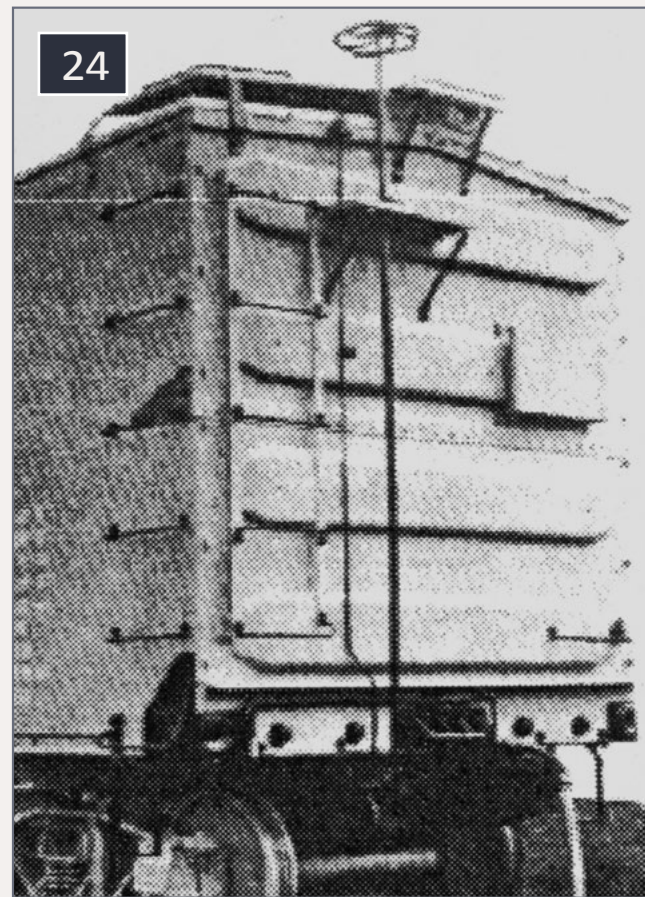
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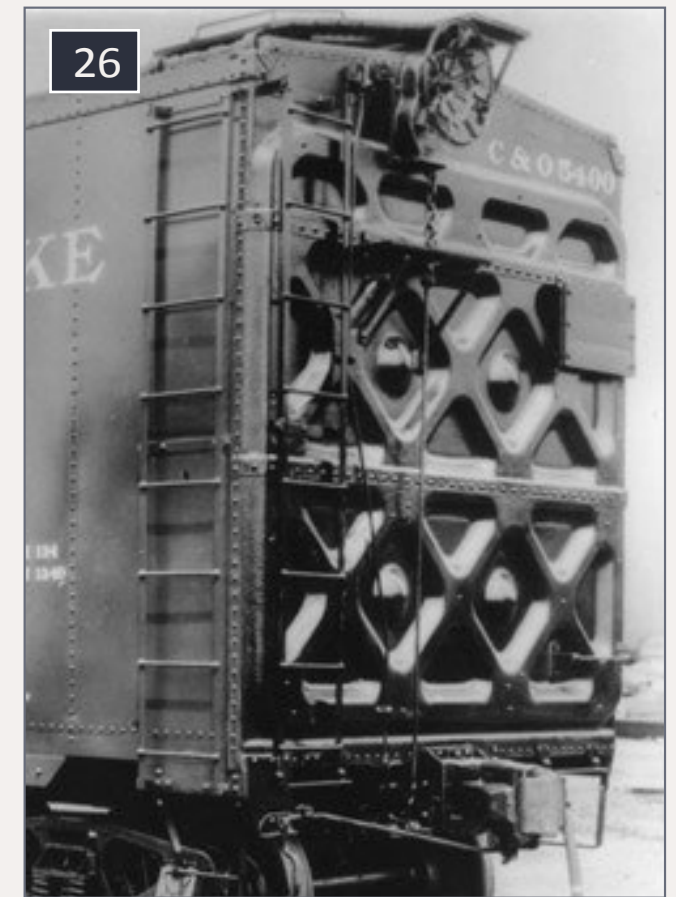
23. Buckeye two-panel end with straight corrugations that flatten at sides. Built in late 1920s by Chicago-Cleveland Car Roofing Co.



24. Hutchins Car Roofing Co. introduced this end with four broad ribs in the early 1920s.



25. Unidentified variation on a Hutchins end. Neither this or the original Hutchins gained a following.



26. Boxcar built for C&O in 1937 had interesting art deco waffle end.

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## End doors, automobile and lumber doors

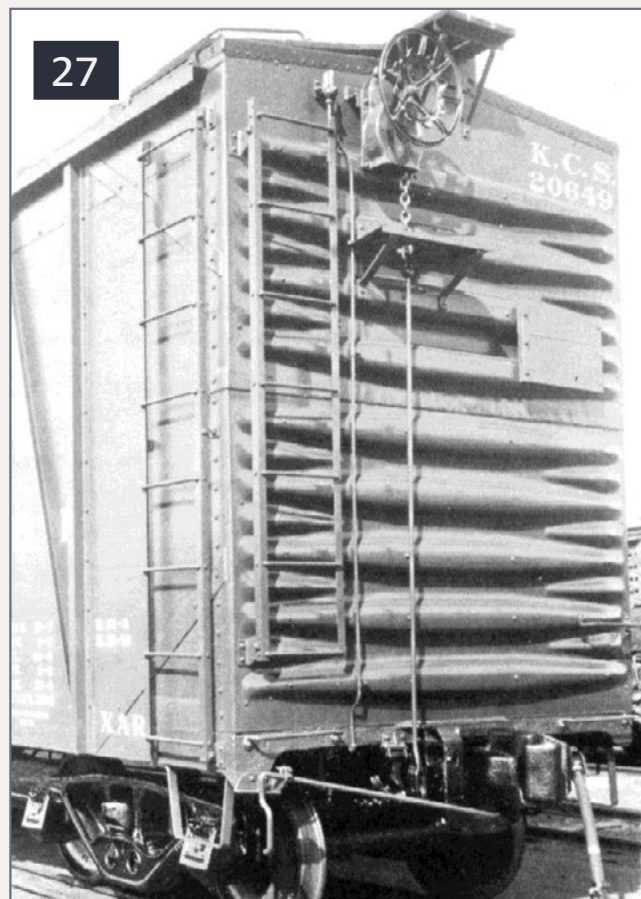
Lumber doors in the end of boxcars were not used for inserting or withdrawing lumber [30]. Long pieces of lumber were loaded through the regular side door, and poked out the lumber door as far as needed for the opposite end to clear the jamb of the side door. Once inside the car, the lumber was stacked in a conventional manner. Unloading was accomplished in the same way.

Lumber that was too large to be jockeyed through the lumber door was not usually loaded into box cars. Tamper-proof vents

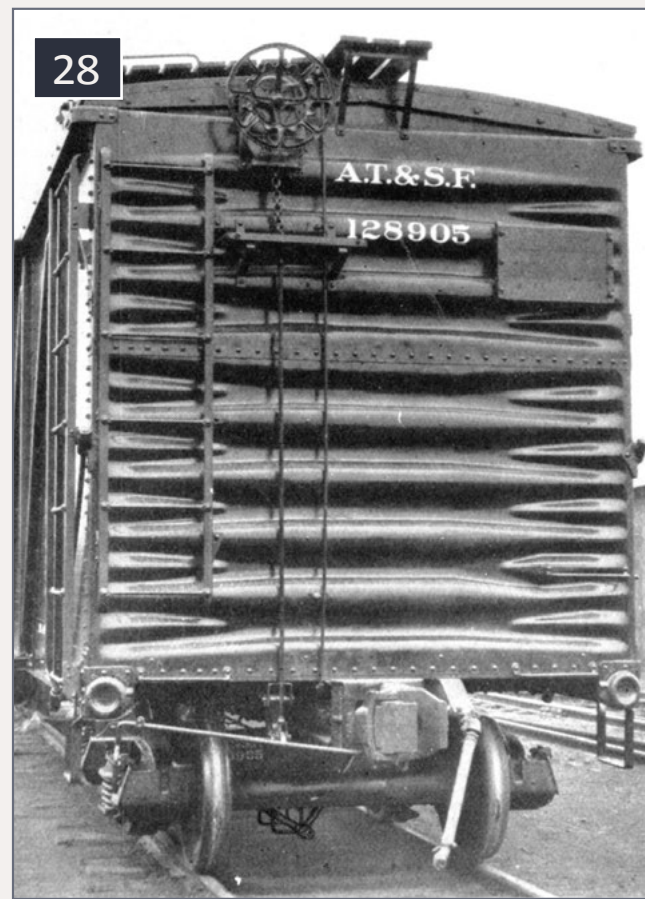
were also installed in car ends [5 and 12]. Boxcars designed to transport automobiles frequently had full-width end doors to ease handling their intended lading [32].

## Dreadnaught ends

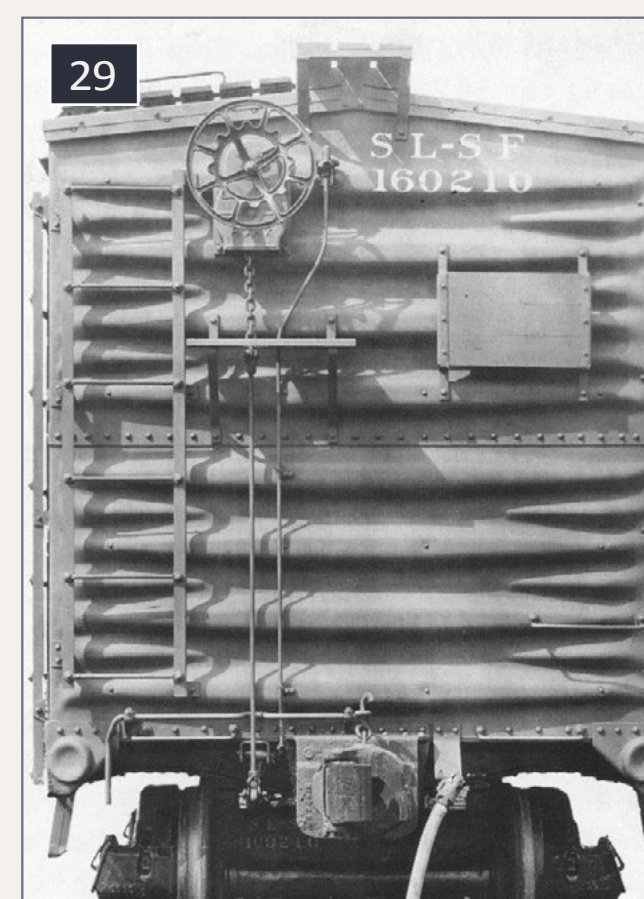
The Dreadnaught stamped steel car end was introduced in 1925 by Union Metal Products, a company under the control of Standard Railway Equipment Company since the early 1920s. The distinctive new end featured large horizontal ribs that tapered toward the sides. For added rigidity, short darts from



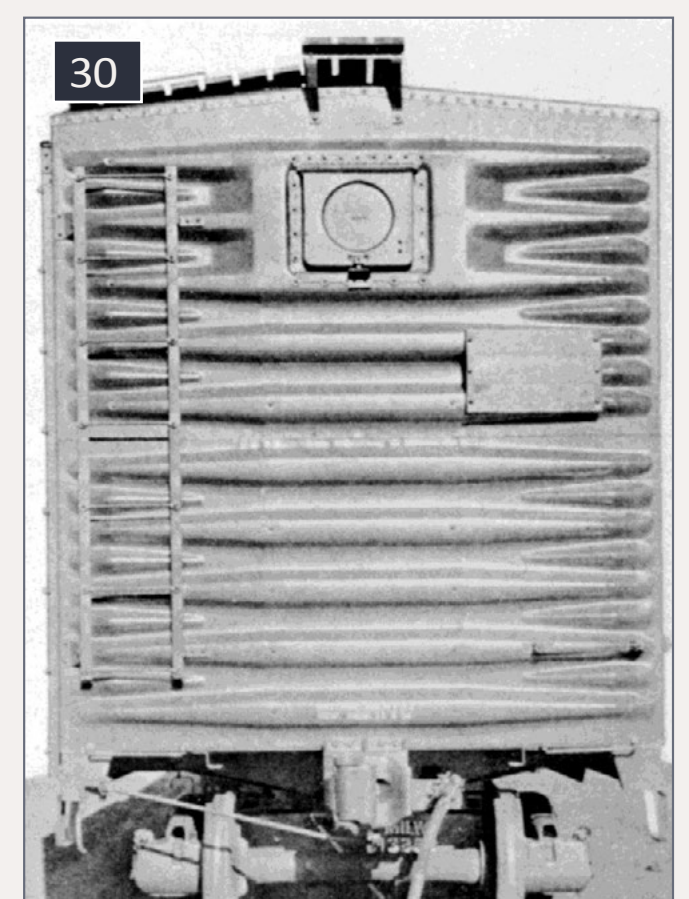
**27. Dreadnaught 4/5 ends cost \$117 pair on this 1936 rebuilt single-sheathed boxcar.**



**28. Dreadnaught 3/4 end on car built by ACF in 1930. End panels are joined at the peak of corrugations rather than between the ribs.**



**29. Basic 4/4 Dreadnaught steel end with small side darts between large corrugations applied to Frisco boxcar in late 1920s.**



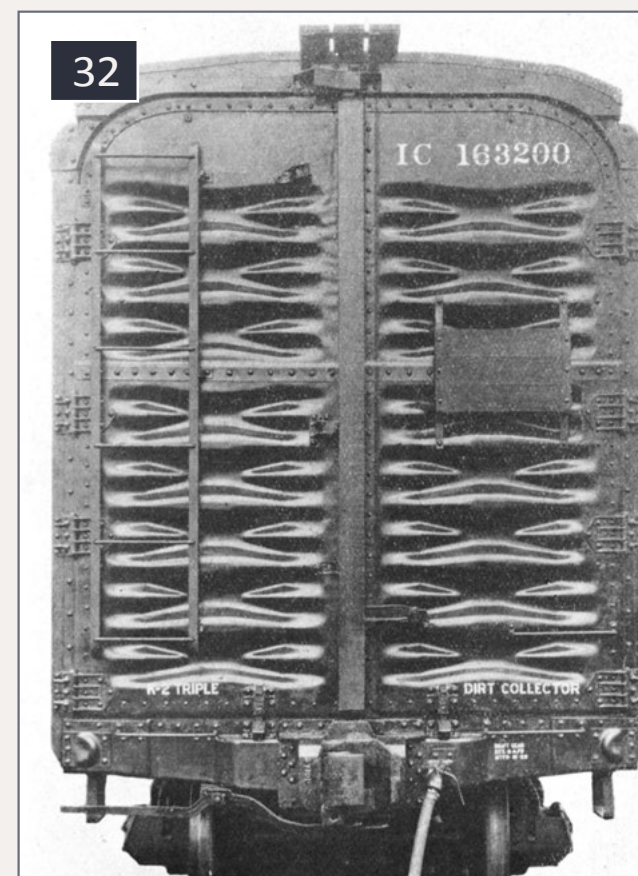
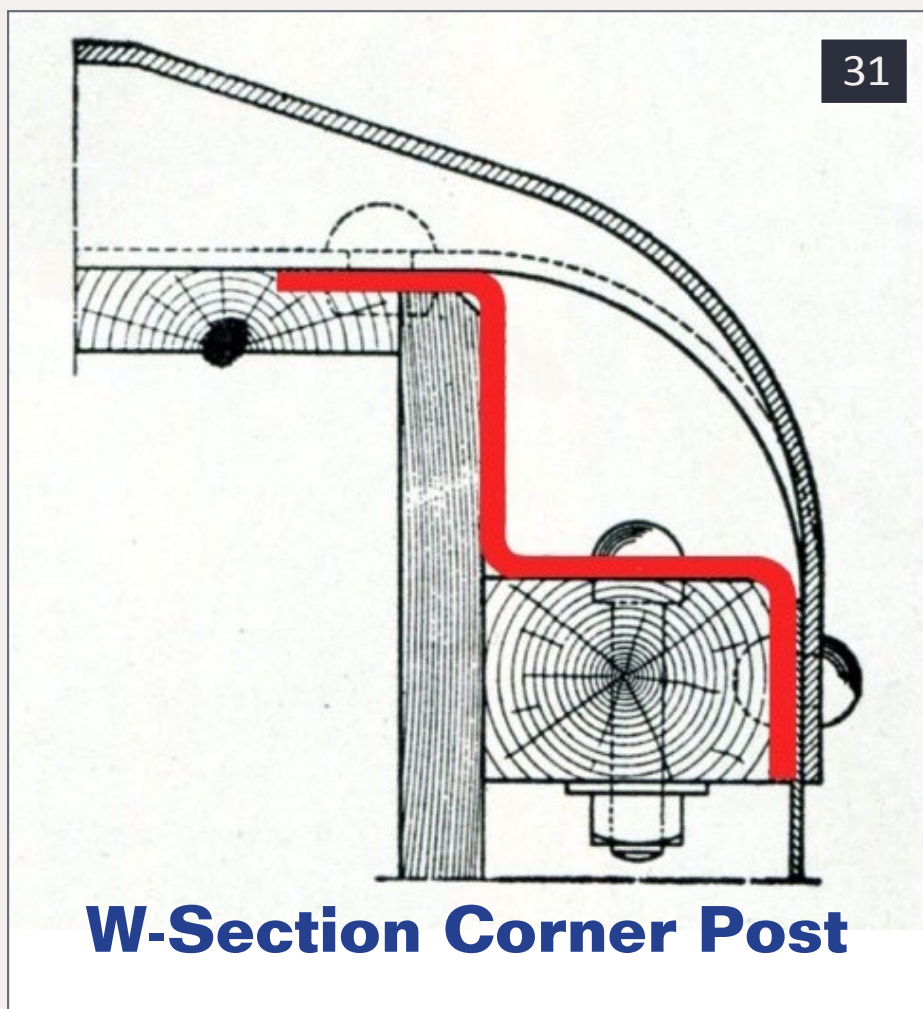
**30. Two-panel 5/5 Dreadnaught end with lumber door in upper panel.**

the sides filled the area between the ends of the main ribs [27, 28, and 29]. The ribs on the introductory design were formed inward; however subsequent Dreadnaught ends were stamped with the ribs formed outward. The upper panels of some Dreadnaught ends were formed with shallower ribs than in the lower, thicker sections [27]. The seam where the panels were joined together with rivets was usually in the valley between two main ribs [29], however, in some cases the riveted seam was along the center of the outward corrugation [28].

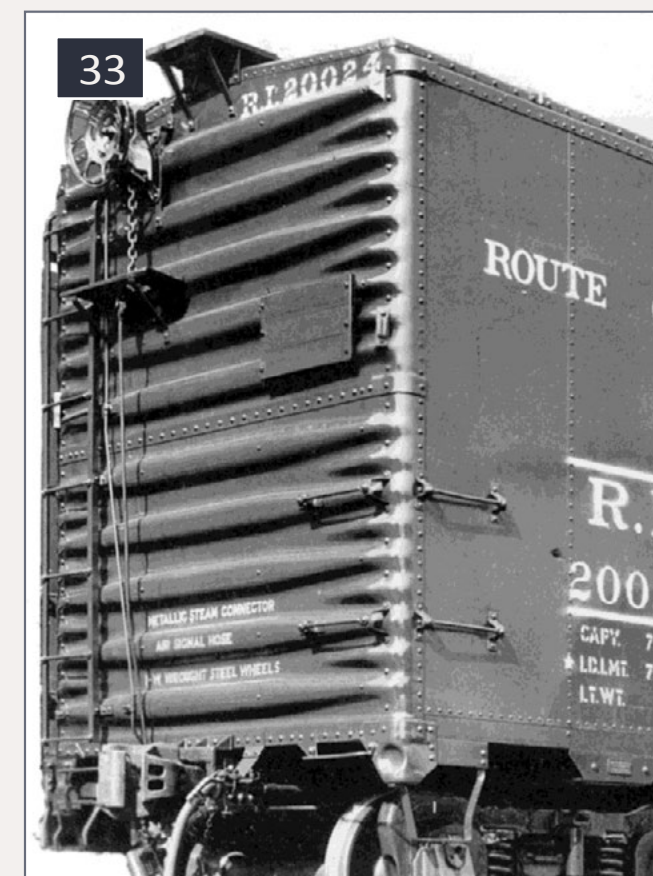
The brand name, Dreadnaught, was an Americanization of the British battleship HMS Dreadnought that was very much in the

**31. The W-corner post was introduced in 1939 by the Standard Railway Manufacturing Co. The intent was to develop a stronger connection between**

**the ends and sides. The name is somewhat misleading since the 'W' shaped steel post is internal. The spotting feature is the round end that wrapped around the corner and attached to the side of the car [33 and 34].**



**32. Dreadnaught 3/5 swing end door for automobile car built in 1929 by Mt Vernon Car Co.**



**33. Dreadnaught 5/5 end with rounded corner for W-section corner post. Note truncated top rib. Car built in 1941 by Pressed Steel Corp.**

news at the time the ends were introduced. In both cases, the name was meant to imply indestructibility.

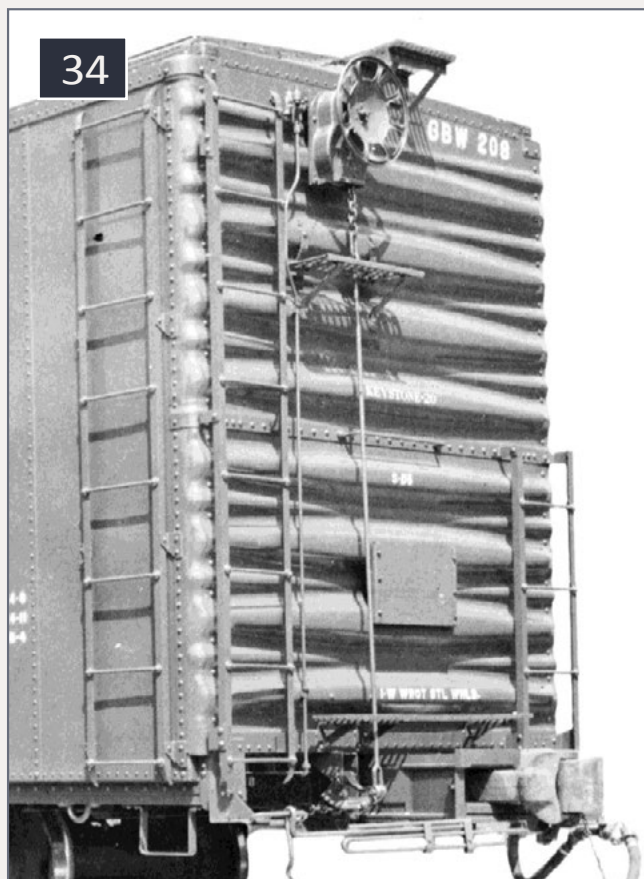
## Improved Dreadnaught ends

Following the expiration of the Dreadnaught patent in 1942, new and improved designs began to appear. The most widely accepted was a simple modification of the original Dreadnaught pattern with the small side indentations, or darts, being extended the full width of the end [35]. The design was marketed as the Improved Dreadnaught end. Although

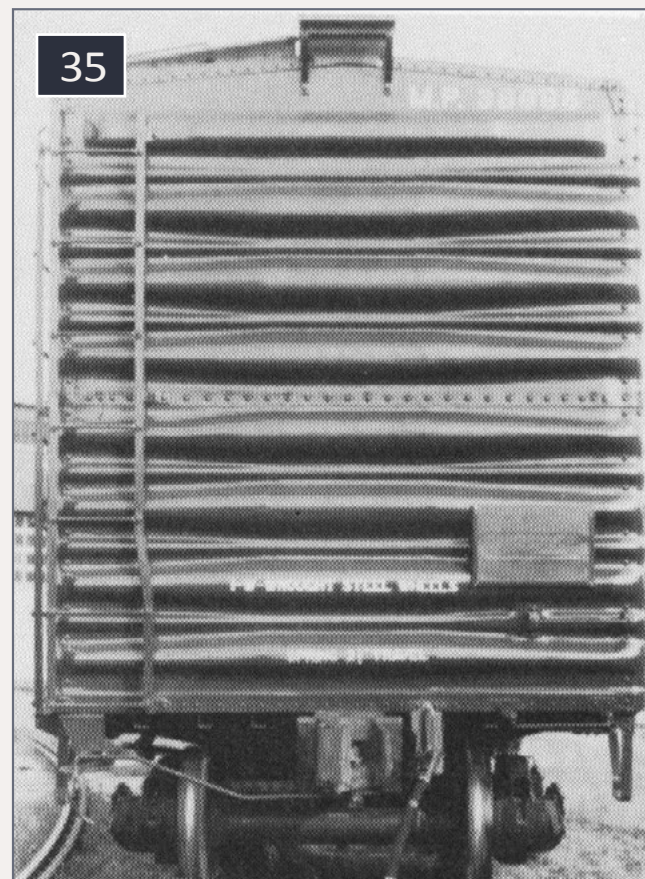
the larger rib was usually smoothly tapered [35], on some Improved Dreadnaught ends the main ribs took on the appearance of a rolling pin [36]. Improved Dreadnaught ends were made with both truncated [35] and full width top ribs [37].

## Dartnaught or dart-less ends

Stamped steel car ends with large ribs, but without the secondary ribs or darts, were introduced in the late 1930s [39], however, they did not come into common usage until after WWII. Although the railroad industry had no generic name for the design, John Nehrich coined the name dartnot, or dartnaught,



**34. Dreadnaught 4/4 end with round corners for W-section corner post. Car built by Greenville in 1963.**



**35. Improved Dreadnaught 4/4 end with smooth tapered corrugations. Note truncated rectangular top rib.**



**36. Improved Dreadnaught 4/4 end with main ribs shaped like rolling-pins. Note truncated top rib on this car built in 1953.**



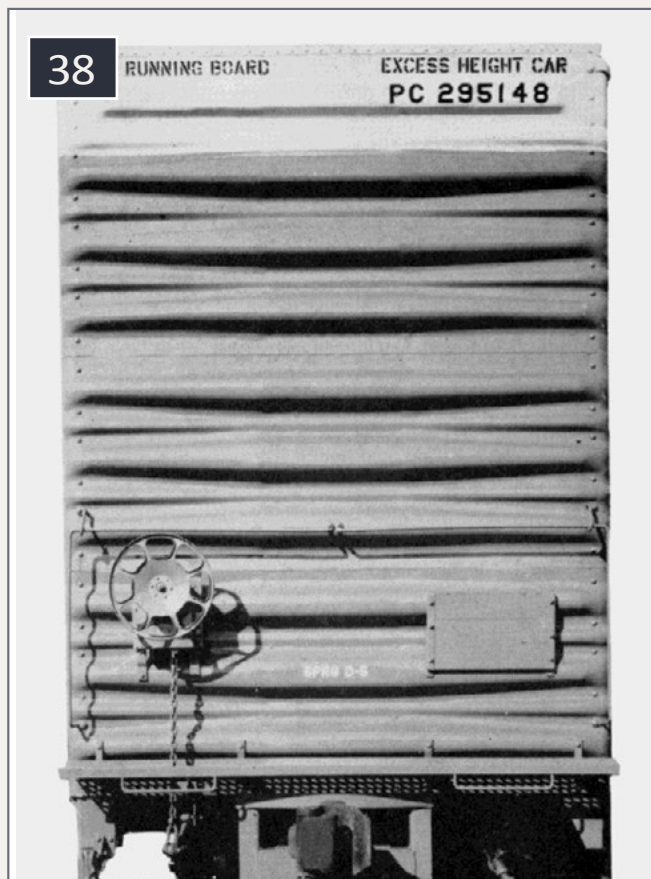
**37. Improved Dreadnaught end on car built by Pacific Car & Foundry. Note non-tapered top rib and six small vertical indentations in the hat section.**

because they looked like a standard Dreadnaught end without the usual small side darts. American Car & Foundry increased the rigidity of the dart-less end by adding dimples at the corners between each large rib [42]. Note that the four ribs in the lower panel are larger than those in the upper panel and, in accordance with A.R.A. recommended practice, are stamped from heavier-gauge steel.

The original Dreadnaught concept of a series of large tapered ribs continued to evolve as car builders developed their own

proprietary designs. In the 1950s Pullman-Standard developed a new end for its PS-1 boxcars. It had a series of distinctive non-tapering ribs across the face of the end [44]. Also distinctive during this period was the stamped signature of six small rectangles in the hat section of P-S ends.

New York Central's Despatch Yard created a new look with non-tapered ribs that flared slightly as the ribs rounded the W-section corner post [45]. Used initially on NYC equipment, Despatch later applied the end to cars it built for other railroads. Despatch ends were used on all post 1956 NYC built boxcars and MDT reefers.

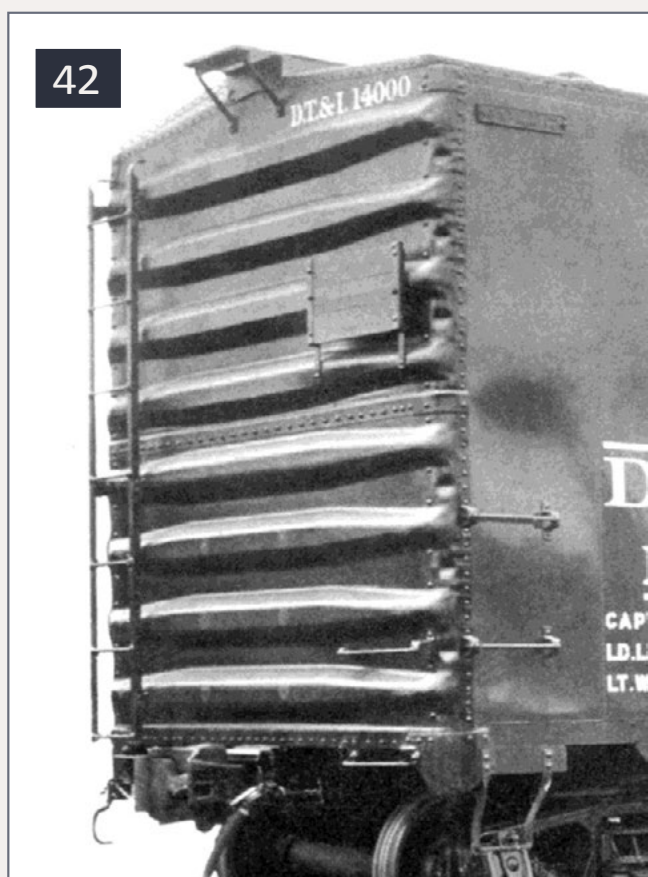


**38. Improved Dreadnaught 3/3/3 end on excess height car built in the late 1960s. Note short thin rib in top panel.**

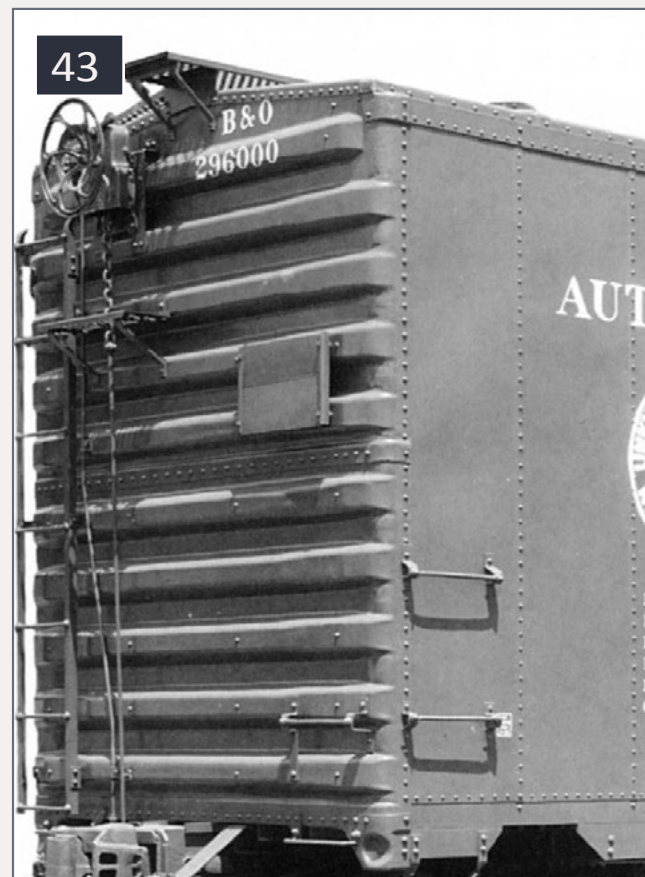


At about the same time, Greenville Steel Car Company developed a proprietary end that was similar to the Despatch end. The design was used exclusively on cars built by Greenville. Railroad historian, Richard Hendrickson, cites the ends on the B&O M55c class boxcars Greenville built in 1945 as an example of this practice [43].

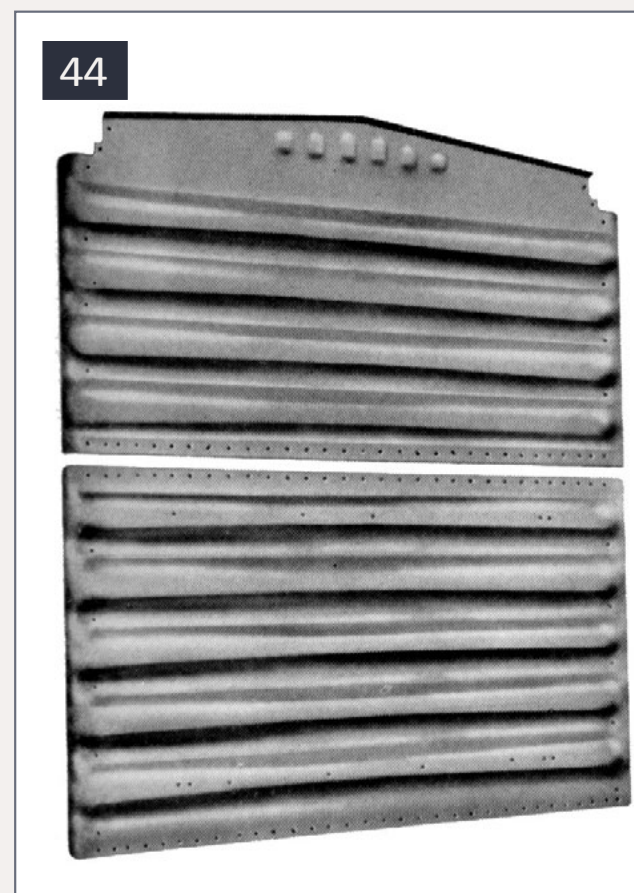
In the 1970s, Stanray introduced heavy non-terminating box ribs that were welded directly to the corner posts [48]. The non-tapered design provided some flexibility in the



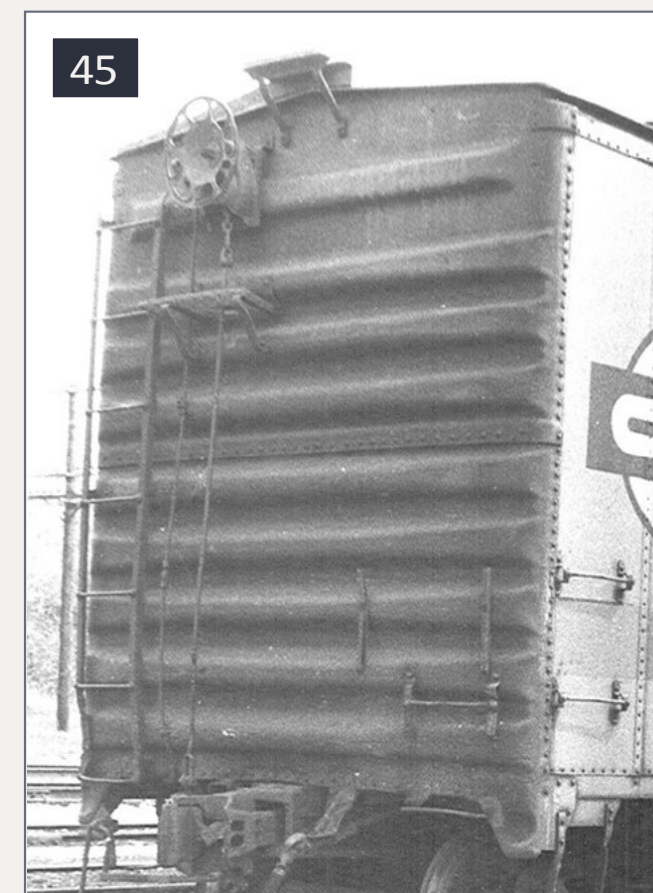
**42. Corner dimples between the dart-free ribs identify this as an ACF proprietary end introduced in 1948.**



**43 Greenville Steel Car Co. built this car in 1945 with a 5/5 end with non-tapered ribs that wrap around the W-section corner post. Note the shortened top rib.**



**44. Pullman-Standard promoted this 4/5 steel end in 1953. P-S frequently identified their ends with six indentations in the hat section.**



**45. Proprietary 4/5 end designed by Despatch Shops in East Rochester, NY. Note the truncated top rib.**

manufacturing process without the need for specialized tooling for various car sizes.

## **Terminating and non-terminating end ribs defined**

A terminating end wraps around the side of the car and is bolted or welded to the sides [45, 46]. Non-terminating ends are recessed flush with the corner of the car and are either bolted or welded to the corner post [48]. ☒



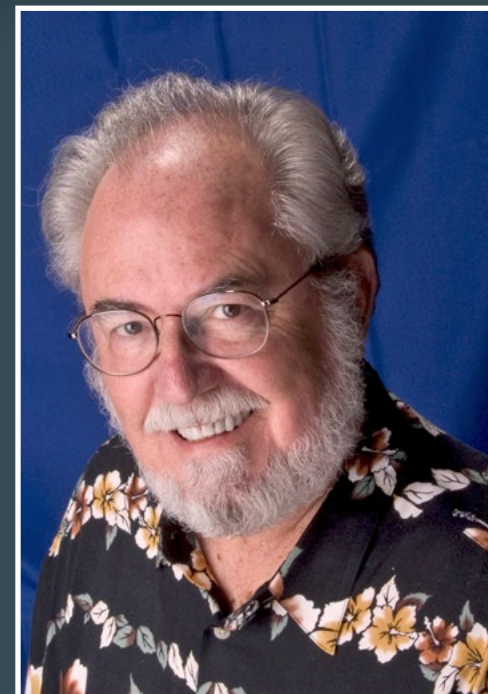
46. P-S-built this car in the late 1960s using 4/5 ends with bold nontapering ribs. Note the small short rib at the top.



47. The 2/2/3 ends on this Cotton Belt car built in 1979 feature split or bifurcated ribs.



48. Pacific Car & Foundry built this RailBox car in 1979 using Stanray steel ends welded to the corner posts. The six non-terminating box corrugations are on 20" centers.



Author Richard Bale writes our news column under the byline of "The Old Yardmaster." He has been writing about the model railroad trade for various hobby publications since the 1960's.

He enjoys building models, particularly structures, some of which appeared in the June 2006 issue of *Model Railroader* magazine.



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