

Sept. 24, 1935.

C. S. SHALLENBERGER ET AL

2,015,197

HOPPER CAR

Filed March 24, 1933

5 Sheets-Sheet 1

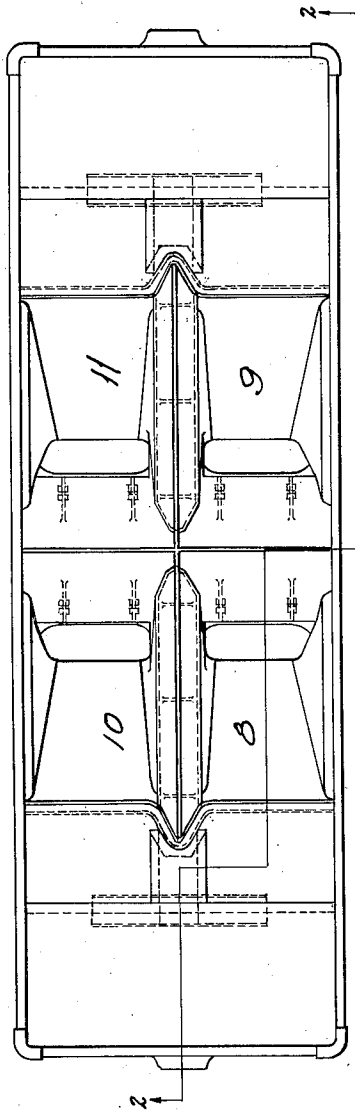


Fig. 1-

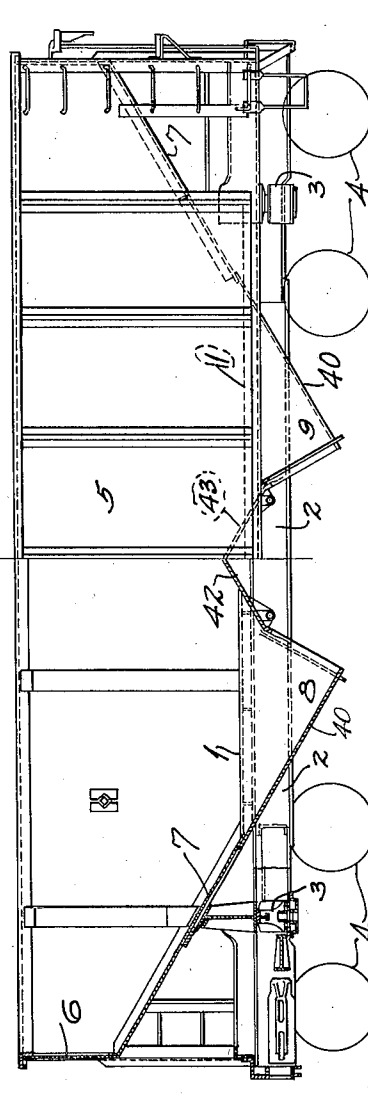


Fig. 2-

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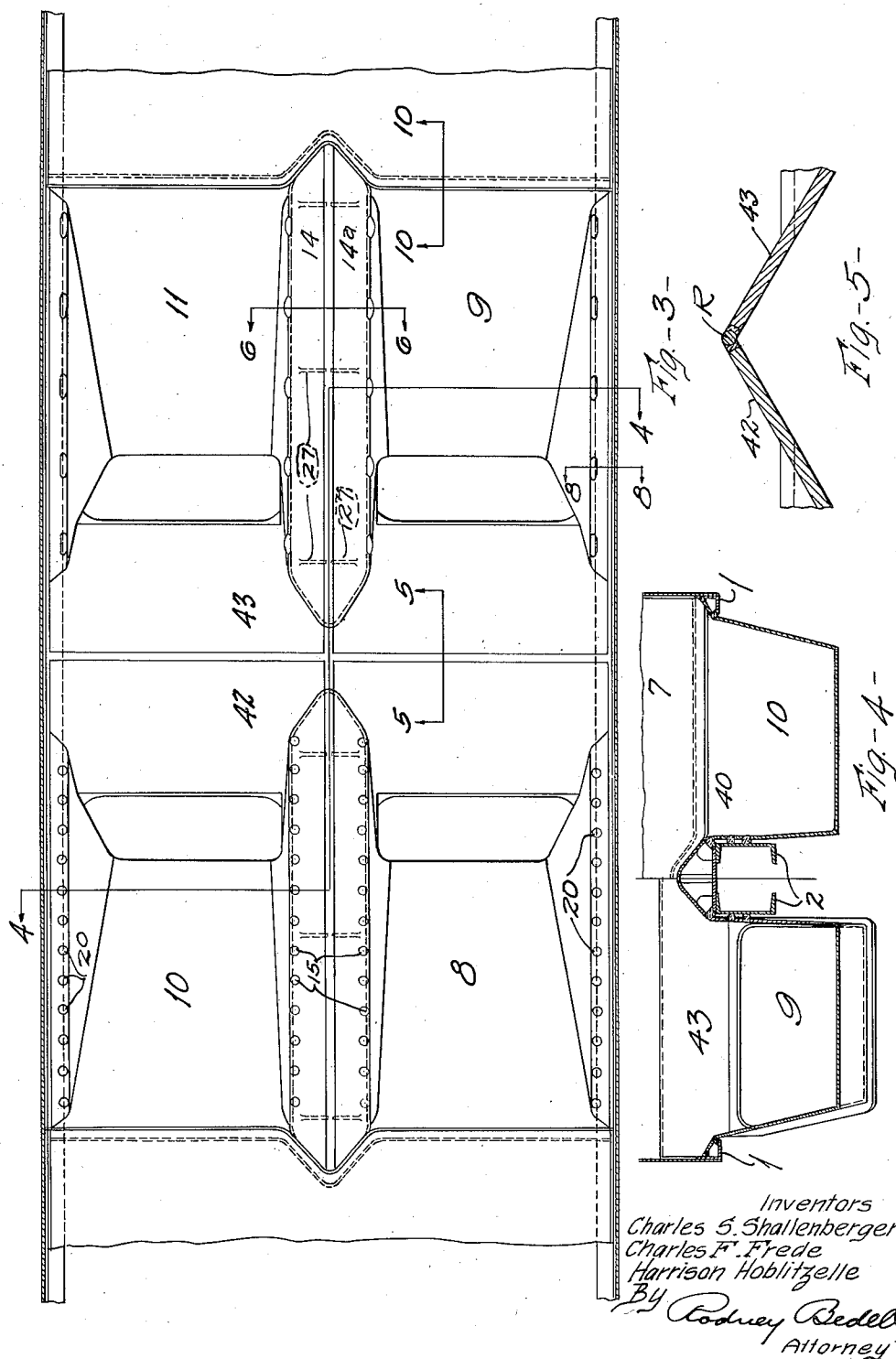
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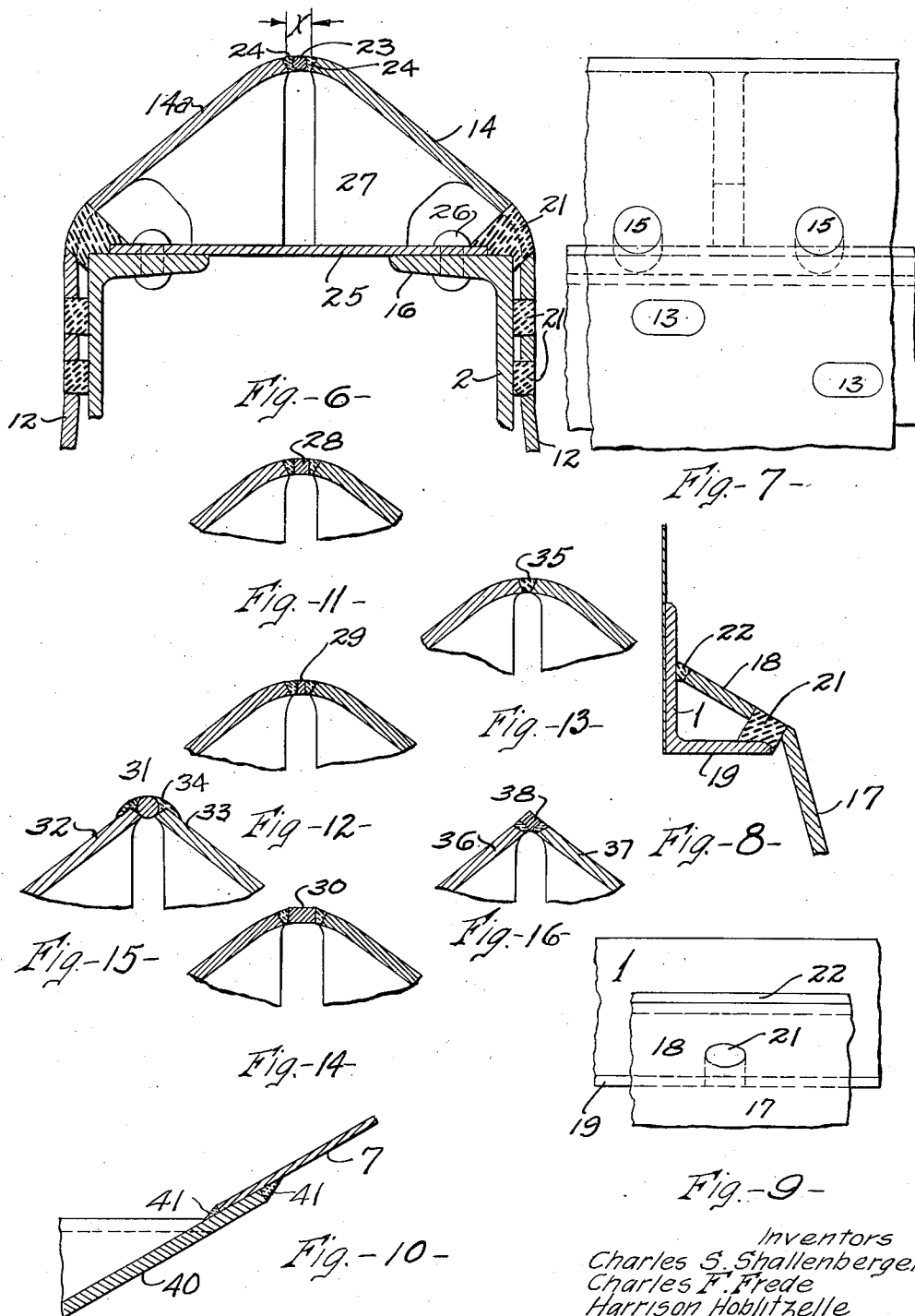
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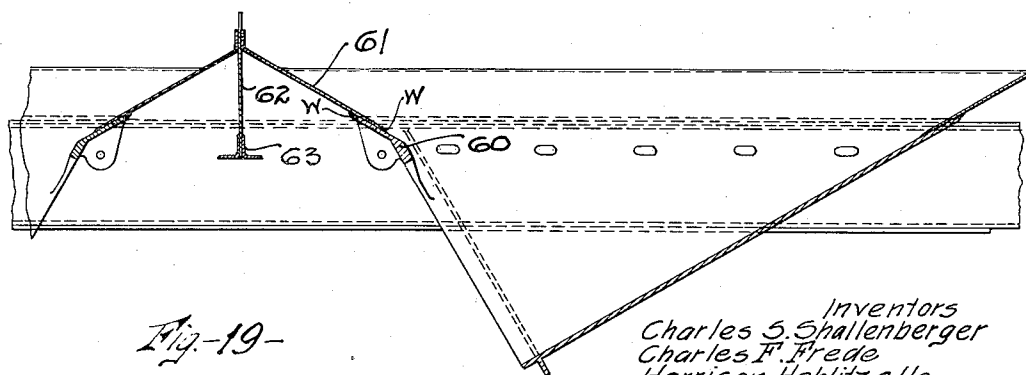
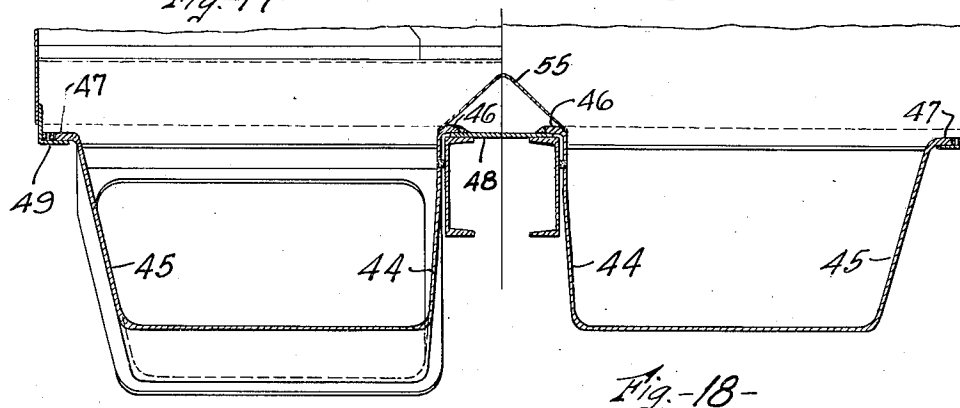
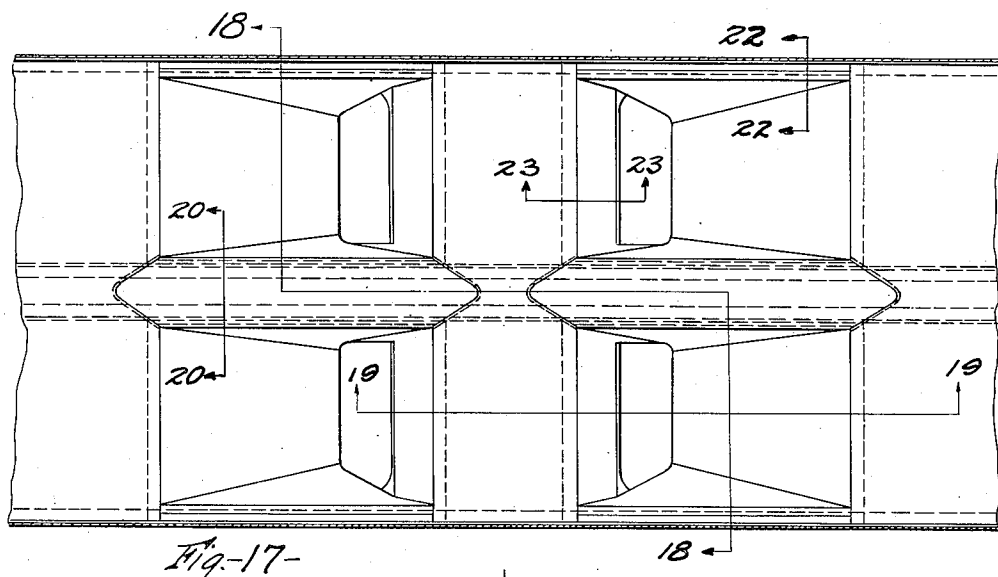
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5 Sheets-Sheet 4



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5 Sheets-Sheet 5

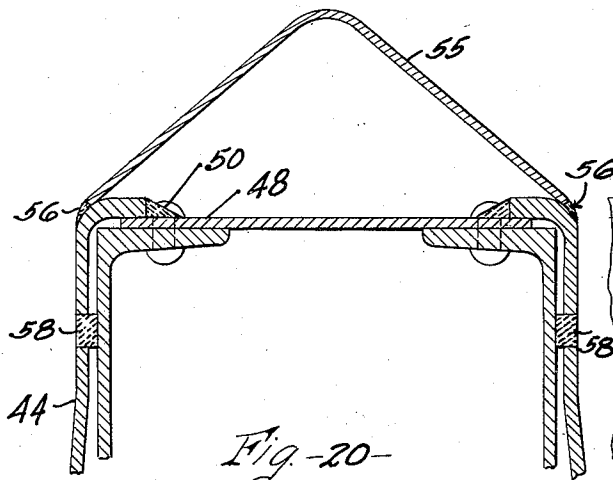


Fig. 20-

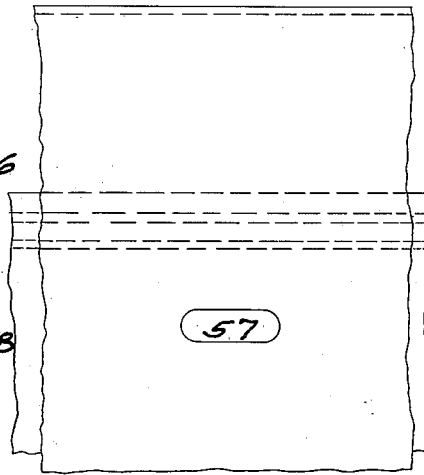


Fig. 21-

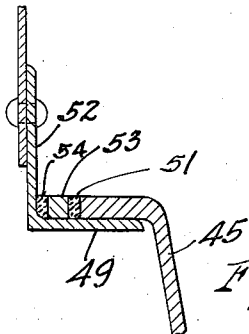


Fig. 22-

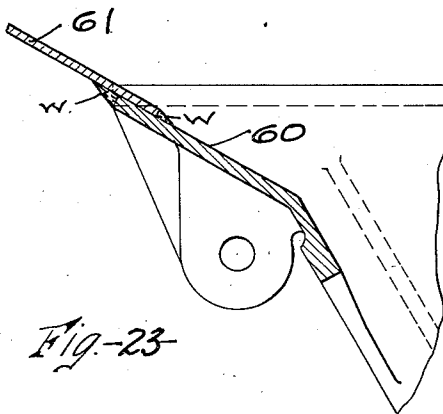


Fig. 23-

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UNITED STATES PATENT OFFICE

2,015,197

HOPPER CAR

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Application March 24, 1933, Serial No. 662,494

8 Claims. (Cl. 105—249)

The invention relates to railway rolling stock and consists in a novel construction of hoppers, or like parts, and in their assembly with each other and with the framing of the vehicle to which they are applied.

It has long been the practice to construct railway vehicle floors and hoppers of rolled steel plates, angles, and other structural shapes, riveted to each other and to the side sills, center sills and transoms of the vehicle frame. Due to the presence of numerous crevices between overlapping elements, including a multitude of joints between rivet heads and the parts secured thereby, the type of construction just described is subject to rapid deterioration which is accelerated when the vehicle is used for transporting lading which has any acid property, such as the sulphur content of coal and the saline content of other classes of lading.

In an effort to resist these corrosive tendencies, it has been suggested comparatively recently that hopper and similar parts may be constructed of cast metal, which resists corrosion much better than rolled steel and by use of which the crevices formed between assembled elements may be largely eliminated.

An embodiment of such structure is illustrated and described in the application of Gilpin & Small, Serial No. 353,494, filed April 8, 1929, in which one construction illustrates hoppers located on opposite sides of the center sill which are formed by a continuous casting extending from one side of the car to the other. Another construction in that application illustrates the use of hoppers formed separately from each other but riveted to center sill elements to which a hood with inclined sides is also riveted.

Another advantageous structure is disclosed in the application of Pflager & Hallquist, Serial No. 482,034, filed September 15, 1930, in which the hoppers and underframe sills are united in an integral casting.

One of the objects of the present invention is to facilitate the application of separately formed hoppers of unitary metal, whether cast integrally or otherwise formed, to car framing, it being desired in many instances to substitute such hoppers for damaged or worn out hoppers of built-up construction such as has been used previously. It is also desired to apply the unitary hoppers to framing which may vary in the spacing of the hopper supporting elements due to inaccuracies in manufacture or to irregularities arising from the hard usage to which the car has been subjected.

Another object of the present invention is to

provide a continuous seamless surface for the hoppers and adjacent load contacting elements irrespective of the inaccuracies and irregularities mentioned above.

Briefly, the above mentioned objects are attained by constructing the unitary hoppers somewhat smaller than the maximum dimensions between the hopper supporting elements of the framing and selectively applying filler bars and/or welding material to connect the hoppers with each other and with the supporting elements.

Another object of the present invention is to include a hood covering the sill in the load supporting surface and to support all parts of the hood on the sill in such manner as to prevent it from being hammered in by the force of loaded material dumped thereon and at the same time to avoid interference with the assembly of hood sections with other hopper structure and with the framing.

These and other detailed objects of the invention are attained by the structure illustrated in the accompanying drawings, in which—

Figure 1 is a top view and Figure 2 is a side view of a hopper car having spaced center sills of rolled channels, side sills of rolled angles, and unitary hoppers, preferably of cast metal, applied to and supported on said sills.

Figure 3 is a top view on an enlarged scale of the hoppers and adjacent parts shown in Figures 1 and 2, the side walls of the car being sectioned.

Figures 4, 6 and 8 are vertical transverse sections taken on the corresponding section lines of Figure 3, Figures 6 and 8 being on a substantially larger scale to better illustrate the details involved.

Figure 7 is a detailed elevation of the structure shown in Figure 6.

Figures 5 and 10 are vertical longitudinal detailed sections taken on the corresponding section lines of Figure 3 and being on an enlarged scale.

Figure 9 is an enlarged elevation of the structure shown in Figure 8.

Figures 11, 12, 13, 14, 15 and 16 each illustrates a modified form of the construction of the center sill hood apex.

Figures 17 and 18 correspond to Figures 3 and 4, respectively, but illustrate a modified form of the invention, Figure 18 being taken on the line 18—18 of Figure 17.

Figure 19 is a longitudinal section taken on the line 19—19 of Figure 17.

Figures 20 and 22 are detailed cross sections taken on the lines 20—20 and 22—22 of Figure 17, respectively, but drawn to an enlarged scale.

Figure 21 is a side elevation of the details shown in Figure 20.

Figure 23 is a longitudinal section taken on the line 23—23 of Figure 17 but drawn to an enlarged scale.

The car illustrated has a familiar general arrangement comprising a structural underframe including side sills 1, center sills 2, and bolsters 3 supported upon four-wheel trucks indicated by the wheels 4. The superstructure includes side walls 5, end walls 6, sloping end floors 7 and a set of four hoppers 8, 9, 10 and 11 carried by the sills and projecting below the same.

Each of the hoppers is preferably formed separately from the others and is of unitary construction and may well be a one-piece casting arranged for insertion between opposing side and center sills and preferably will be narrow enough so that there will be considerable play between the hopper and the sills when it is first inserted. This will provide for the ready assembly of the hopper with the sills irrespective of slight variations in the distance between the sills due to irregularities in manufacture or distortion arising from blows or other forces applied to the sills in the operation of the car.

The upright web 12 forming the inner wall of each hopper is provided with a series of perforations 13 opposite the vertical web of the center sill 2. The upper portion of web 12 includes an inwardly and upwardly projecting extension 14 terminating short of a vertical plane passing through the longitudinal center line of the car. The web 12—14 is provided with additional perforations 15 opposite the corner of the center sill formed by its vertical web and upper flange 16. The upright web 17 forming the outer wall of each hopper includes an angularly disposed flange 18 extending over the inwardly turned leg 19 of the side sill 1 but terminating short of the upwardly turned leg of the side sill. A series of perforations 20 are provided in flange 17 adjacent the inner edge of the angle leg 19.

After the hoppers are assembled with the car framing as illustrated, welding material 21 is inserted into and through the perforations 13, 15 and 20 so as to fill the same and project therefrom into contact with the adjacent sill elements to form a supporting connection for the hoppers. Welding material 22 is applied between the edge of flange 18 and the inner face of the upright leg of the side sill to form a smooth joint between these elements.

The sloping ends 40 of the hoppers substantially overlap the sloping floor 7 of the car and are welded thereto, as indicated at 41 (Figure 10).

The hoppers on opposite sides of the center sill preferably have their hood-forming portions 14 and 14a of such width that a substantial gap X remains between their adjacent edges when the hopper webs have been secured to the opposite sides of the center sill structure. The workman then selects an ordinary steel rod 23 having a thickness approximating but something less than the gap X and applies the same to the gap and welds the rod to each of the hopper edges by adding suitable material, as indicated at 24, thus making a smooth, continuous surface between the two hoppers irrespective of the exact spacing from each other of the opposed hopper webs 14 and 14a at different points along their length and irrespective of variations in the positioning of the

hoppers transversely of the car due to irregularities in the sill structure.

The center sill structure illustrated includes a top plate 25 secured to the upper flanges 16 of the center sill channels by rows of rivets 26 and preferably each hopper web 14 includes inwardly and downwardly extending ribs 27 having a lower portion resting upon top plate 25 and restricted transversely of the sill so as to clear rivets 26 and to be spaced from the innermost edge of the hood flange and thereby avoid interference with a similar rib provided on the corresponding web of the hopper on the other side of the sill. The lower portions of ribs 27 may be welded to the top plate, if desired, but this is considered unnecessary as the hopper is securely fixed by the other welding units. Ribs 27 will brace the hood against deformation likely to result from dropping material thereon.

Figures 11 to 16 illustrate variations in the detail of completing the gap between the hood-forming members of adjacent hoppers. Figure 11 shows the use of a square bar 28. Figure 12 indicates a relatively thin bar 29. Figure 14 shows the use of a substantially wider bar 30. Ordinarily one size and shape of bar will be used throughout the length of the hoppers but it will be understood that if there is sufficient variation between the hopper webs at different points along their length, the workman may select a rod of suitable width for one part of the gap and one or more rods of different width for the remainder of the gap. If the edges of the hood webs approach each other so closely that there is not sufficient room for a rod, the gap may be filled entirely by welding material, as indicated at 35 in Figure 13.

In Figure 15, the round rod 31 is large enough in diameter to rest upon the edges of the straight hopper webs 32 and 33 and the angular hood is provided with a rounded corner by means of the rod and a suitable deposit of welding material 34.

Figure 16 illustrates a hood formed by flat webs 36 and 37 in which the apex of the hood consists of a rectangular bar 38, the flat sides of which form continuations of the flat faces of the hood webs 36 and 37.

Any of the joints between the longitudinally extending edges of the hood webs described above may be utilized in connecting the inclined hopper webs 42 and 43 extending transversely of the car, an example of such joint being detailed in Figure 5 and including a rod R in addition to welding material.

In the modification illustrated in Figures 17 to 23, the upright hopper walls 44 and 45 terminate in horizontal flanges 46 and 47, respectively, and these flanges overlie horizontal elements 48 and 49 of the car center and side sills and are welded thereto, as indicated at 50 and 51. Preferably the crevice formed between the edge of the outer wall flange 47 and the adjacent upright portion 52 of the side sill is partially filled by a rod 53 which may be selected according to the space to be filled and joined to the edge of the flange and to the adjacent sill wall with welding material 54.

Preferably these hopper flanges 46 and 47 are increased in thickness over the adjacent portions of the hopper and the horizontal elements of the sills to better withstand the corrosion to which they are subjected because of their horizontal surfaces and because of their forming at least a part of a pocket in which material is likely to collect and be retained together with atmos-

pheric or other moisture tending to increase corrosive reactions.

In this structure the center sill hood 55 is formed by a separate plate having its lower edges resting upon the upper portions of the hopper structure and welded thereto, as indicated at 56. The upright sides of the hopper are perforated at 57 and filled with welding material 58 similarly to the arrangement previously described in connection with the structure shown in Figures 1 to 10. The door frame forming portion 60 at the inner end of each hopper is welded at W to a separately formed inclined member 61 extending transversely of the car and mounted on the car framing by means of a suitable vertical web 62 and angle braces 63.

As indicated in the introductory portion of the specification, the structures described in detail above contribute substantial economies to the makers and users of railway hopper cars. In the manufacture of new cars, the framing may be constructed at one place, or in the railroad shops, and the hoppers may be manufactured in quantity at a suitable foundry and assembled elsewhere with the framing without the necessity of tedious and expensive machining to provide for close fitting of the parts. Similarly, worn and damaged hoppers may be readily replaced by unitary metal hoppers, and in all of the assemblies, whether replacement or original construction, smooth creviceless surfaces are provided to increase the useful life of the hopper members.

It is realized that many of the details of the construction may be varied without departing from the spirit of the invention, and the exclusive use of such modifications of the described structures as come within the scope of the claims is contemplated.

What is claimed is:

1. In a railway car, side sills, a center sill structure, unitary metal hoppers each extending between said center sill structure and one of said side sills and including parts extending over said center sill structure, each hopper having sufficient play between said center sill structure and the adjacent side sill to permit said hoppers to be shifted relative to each other to accommodate variation in the spacing of said side sills and center sill structure, and a long narrow rod inserted between the adjacent edges of said hoppers and welded to the same to form a continuous surface.

2. In a railway vehicle structure, a framing element, a wall member overlying said element and spaced slightly therefrom and perforated to accommodate the application of material to form a spacer between said element and member and

for welding said element and member to each other.

3. In a railway vehicle, a sill element, a hopper web overlying and spaced from said sill element, there being openings through said web opposite said sill element, and welding metal inserted in and filling said openings and projecting therefrom towards and contacting with said sill element and securing said web thereto.

4. In a railway hopper car, a sill member, a hopper having a web extending angularly about an upwardly and laterally facing corner of said sill, there being perforations in said hopper web adjacent said corner, and welding material filling said perforations and projecting therefrom to support said hopper web spaced from said corner.

5. In a railway hopper car, a side sill comprising an angle having upwardly and inwardly disposed legs, a hopper having a web extending past the inner edge of the inwardly disposed leg of said sill and then inclined upwardly and outwardly and terminating just short of the upwardly disposed leg of said sill, welding material supporting said web from the inner edge of said horizontally disposed leg and welding material forming a smooth joint between the edge of said web and the face of said upwardly disposed leg.

6. In a railway car, a sill member, and a unitary hopper having an upper flange resting upon said sill member and thicker than the remainder of the hopper structure to withstand the corrosive action of material tending to collect in the pocket formed by said flange and sill member.

7. A cast metal hopper for a railway car including inclined side and bottom walls and substantially horizontal flanges at the upper edges of said walls for mounting the hopper on the car sills, said flanges having a greater thickness than said walls so as to withstand a greater amount of corrosion.

8. In a railway car, side sills, a center sill structure, a pair of unitary metal hoppers cooperating to extend substantially across the car from side sill to side sill and over said center sill portion, each of said hoppers having sufficient play between said center sill structure and the adjacent side sill to permit said hoppers to be shifted relative to each other to accommodate variation in the spacing of said side sills and center sill structure, and selective means under control of the workman assembling the hoppers and sills for filling the gap and forming a continuous surface between said hoppers.

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