

May 12, 1936.

H. S. HART

2, 040,307

CAR WALL CONSTRUCTION

Filed June 8, 1935

3 Sheets-Sheet 1

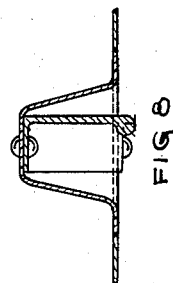
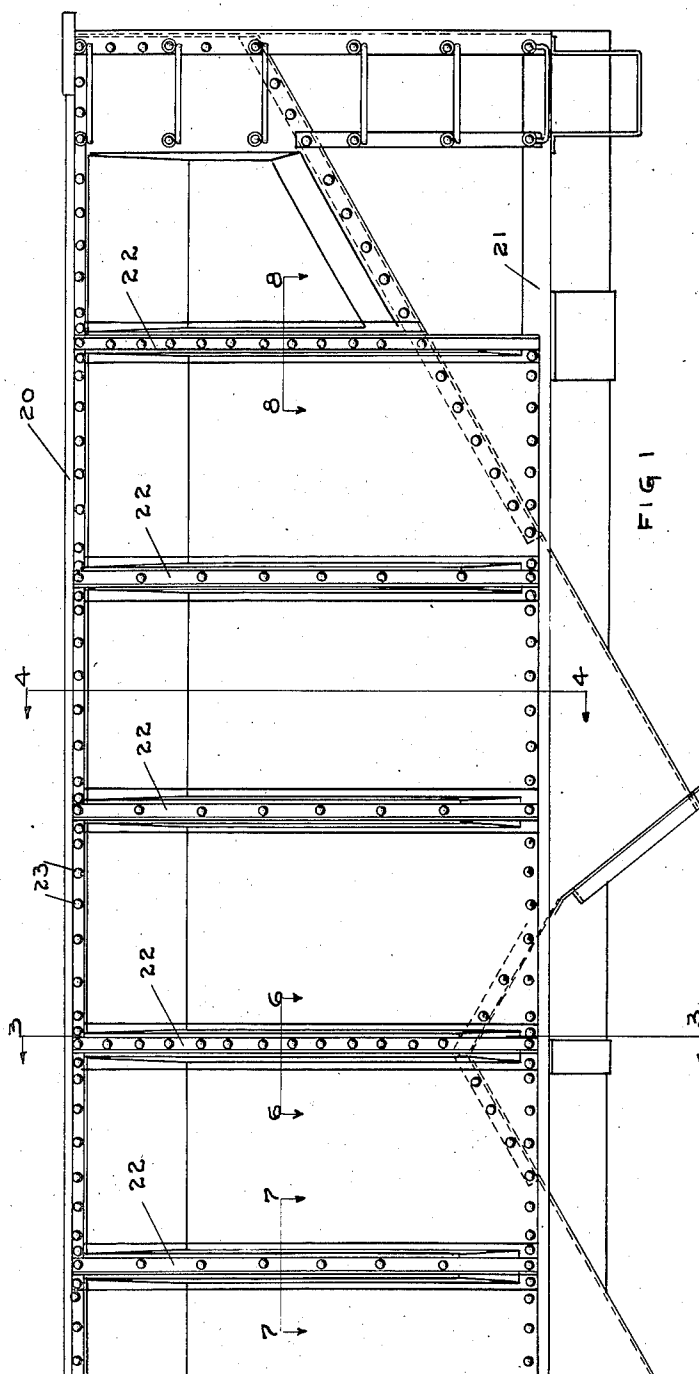


FIG 8

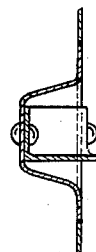


FIG 7

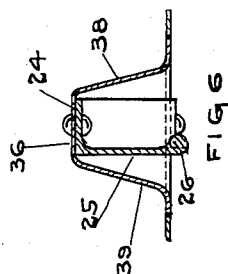


FIG 6

INVENTOR
HARRY S. HART

By *Wilkinson, Huxley Byrom & Knight*
ATTORNEYS

May 12, 1936.

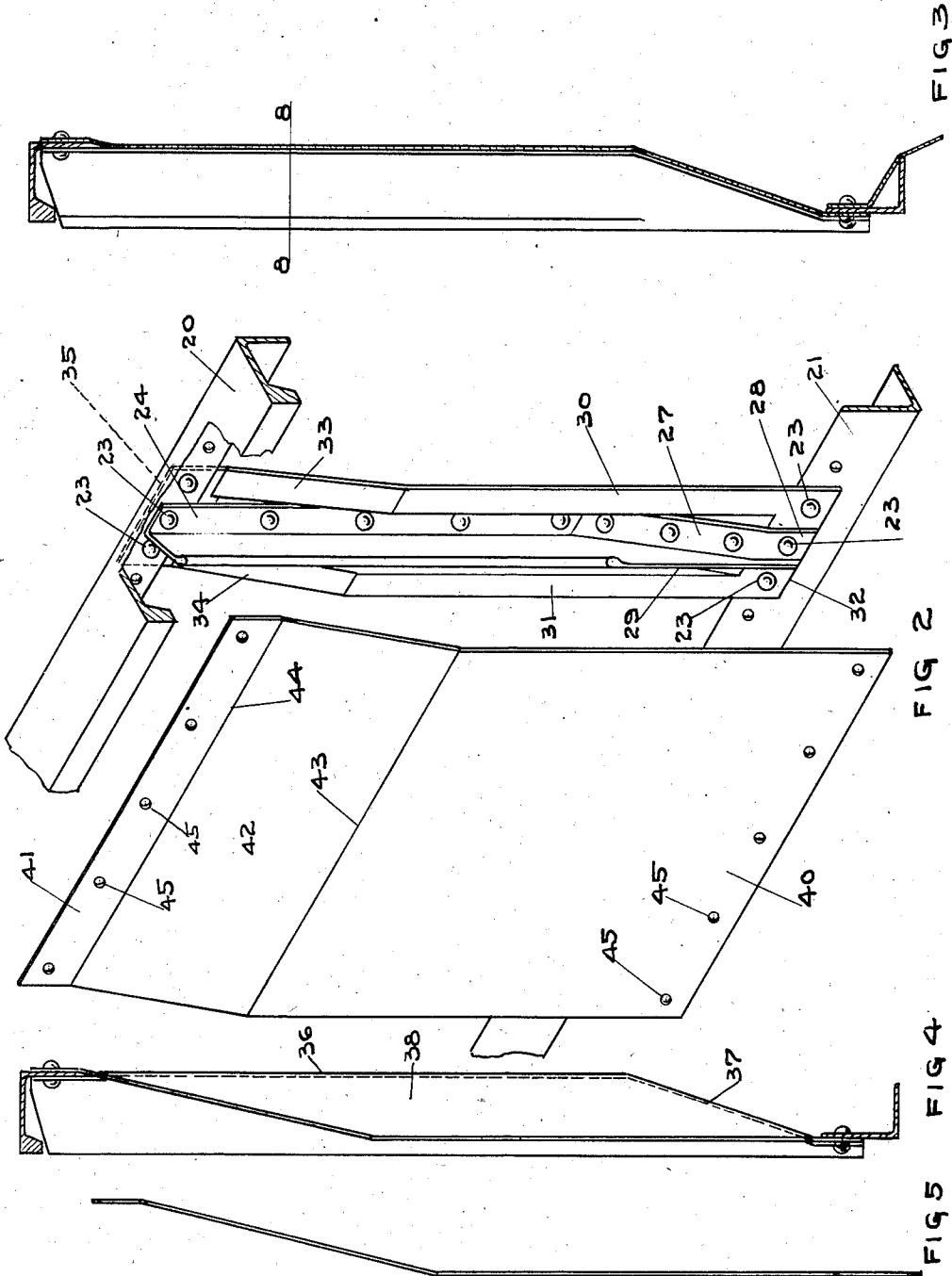
H. S. HART

2,040,307

CAR WALL CONSTRUCTION

Filed June 8, 1935

3 Sheets-Sheet 2



INVENTOR
HARRY S. HART

By *Wilkinson, Hixley, Byrson & Knight*
ATTORNEYS

May 12, 1936.

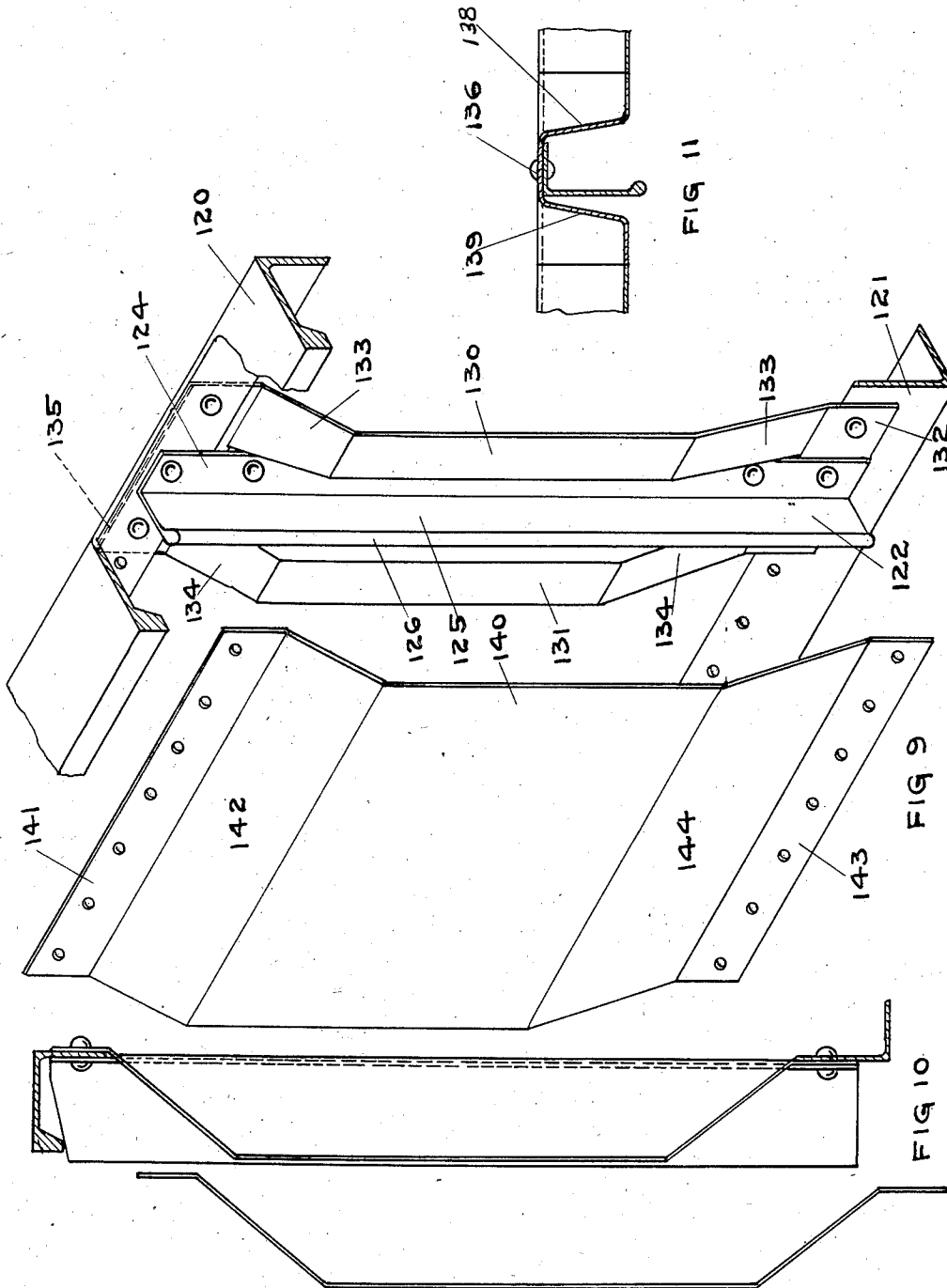
H. S. HART

2,040,307

CAR WALL CONSTRUCTION

Filed June 8, 1935

3 Sheets-Sheet 3



INVENTOR
HARRY. S. HART

By Wilkinson, Huxley, Bygones & Knight
ATTORNEY'S

UNITED STATES PATENT OFFICE

2,040,307

CAR WALL CONSTRUCTION

Harry S. Hart, Chicago, Ill.

Application June 8, 1935, Serial No. 25,538

13 Claims. (Cl. 105—409)

This invention relates to a new and improved car construction and particularly to car wall constructions, especially adapted for cars of the hopper type. In its essential aspects, the invention relates to a new and improved construction and arrangement of parts constituting car wall constructions of this type, all of which can be more easily, cheaply and perfectly made, and more cheaply and easily assembled than the parts and wall constructions employed prior to this invention.

The novel arrangement of parts constituting the wall construction of this invention also provides a new, simple, inexpensive and highly efficient method of forming and assembling the wall parts to form the completed wall constructions and accordingly the invention also relates to such novel methods of procedure.

The improvements of this invention are particularly applicable to the type of hopper cars which have walls composed of outside side stakes and side sheets connected therebetween in a manner to protect the stakes from the wear and damage of the lading and at the same time having central portions deflected outwardly into substantially the plane of the outer permissible dimension of the car so as to provide cars of increased capacity.

One construction of car of this type is disclosed in applicant's Patent No. 1,623,951, issued April 5, 1927. This patent discloses particularly cars having lower chords disposed slightly inwardly from the maximum outside dimension and which are generally characterized as cars having underframes designed for external stakes.

Other constructions of this type are disclosed in the patents assigned to this applicant No. 2,007,272, issued July 9, 1935, and No. 2,007,273, issued July 9, 1935. The Hindahl constructions likewise provide protection for the stakes and increased capacities for the car but relate particularly to cars of the type having the lower chord disposed outwardly from the position disclosed in the Hart patent, or in other words, to cars of the type generally referred to as having underframes adapted for inside side stakes.

For a better understanding of the car constructions here referred to, attention is directed to the above identified patent and applications.

This invention relates to both types because the position of the lower chord is not critical to these improvements and are realized with equal desirability irrespective of whether the bottom chord is positioned inwardly or outwardly with

respect to the outer possible dimension of the car.

In the manufacture of cars having protected side stakes and increased capacities in accordance with the inventions disclosed in said Hart patent and Hindahl applications, it is usual to form the dished side sheets by a stamping or pressing operation. Due to the fact that these sheets are relatively large, this operation is difficult and expensive and furthermore, is troublesome due to the fact that the two directional displacement of the sheet required for forming the marginal edges in one plane and the central portion in another plane frequently results in a wrinkling or buckling of the sheet material, which either renders it defective so as to be unsuitable for use or imperfect in appearance which detracts from its value and desirability. This trouble is due to the fact that the sheets are so large that the two directional displacement of the metal is hard to control and thus such operations are apt to result in the damage above referred to. This difficulty is particularly undesirable because in addition to the above disadvantages, the rejection of such large sheets constituting the usual car wall side sheets involves a substantial loss of material which considerably increases production costs.

Furthermore, the wall assembling operation required as a part of the process in constructing the cars, is rendered more cumbersome and expensive when the large sheets are handled as required with the prior art constructions.

Accordingly, it is an object of this invention to provide newly constructed parts which when assembled to form hopper car walls of the above described type eliminate the above mentioned difficulties and which will lend themselves to simple and inexpensive manufacturing and assembling operations which are free of the hazard of damage and consequent loss heretofore encountered.

It is particularly an object of this invention to provide a car wall which comprises upper and lower chords and vertically disposed side stakes of suitable construction connected to the chords together with bracing and protecting shields associated with each of said stakes. These shields, which also form a part of the side sheet structure of the wall, may be pressed or otherwise formed to constitute the usual marginal portions of the wall sheets, that is to say, those portions lying in two planes, one inwardly for connection to the side stakes and one outwardly, substantially in the plane of the outer dimension of said car to provide for the increased capacity of the car. The

outer portions of the shields serve as means to which the intermediately placed side sheets are connected. It will thus be seen that the side sheets proper may be formed of a much simpler construction requiring bending or deformation only in a single direction whereby these relatively large sheets of metal may be processed by simple and inexpensive methods and machinery which are free from the difficulties and liabilities of damage above referred to.

On the other hand, the two directional pressing operations are confined to the reinforcing and protecting shields associated with the side stakes. These shields are relatively small compared to the large side sheets and require only very much smaller presses which are capable of being more accurately handled and controlled and which are free from the likelihood of wrinkling or buckling the material undergoing treatment.

Furthermore, the protecting shields associated with the side stakes are formed as a single integral piece providing backings for the side stakes. They not only protect the stakes against the wear and deterioration of the lading of the car but also serve as substantial reinforcing and strengthening members for the stakes. This arrangement of parts provides a materially different construction from that of the prior art cars where the side sheets were joined at the point of attachment to the side stakes. In the old constructions the bent marginal portions of the side sheets are joined at the region of the side stake, which, though satisfactory in many instances, does not provide the degree of strength and reinforcing support for the side stakes which is provided by the shield elements of this invention. Although the likelihood of damage or deformation to the relatively small shields during the manufacturing operations is substantially entirely eliminated by this invention, it will nevertheless be realized that if such should occur, that the loss suffered on rare occasions with such relatively small pieces is practically negligible compared to the loss occasioned by the more frequent discard of entire side sheets.

In addition, it will be noted that this invention alters materially the method of manufacturing and assembling car walls. For instance, it allows the supporting and protecting shield piece to be mounted in conjunction with the mounting of the side stakes between the upper and lower chords, and thus permits these parts to be secured by any suitable means such as riveting, welding, or any recognized equivalent thereof.

The frame structure of the wall thus assembled is relatively complete in itself insofar as the load sustaining strength of the car wall is concerned, because a part of the additional support supplied to the main frame of the car wall by the plates is thus supplied by the bracing strength of the angular margins of the supporting and protecting shields. Thereafter, the side sheets proper may be added to fill in the spaces between adjacent shields by simply placing them in position and securing their side edges to the shield plates and their top and bottom edges to their upper and lower cord respectively. The joints may be made by edge to edge welding or by bolts, rivets or any other recognized equivalent.

The side sheets may be added by very simple and inexpensive operations and also may be quickly and cheaply removed and replaced.

As above pointed out, a part of the main bracing strength of the side sheets is provided by the

shields which are first applied in association with the side stakes.

A more accurate understanding of this invention may be obtained by referring to the accompanying drawings in which;

Figure 1 is a side elevation of a car wall constructed in accordance with this invention;

Figure 2 is an enlarged prospective view with parts broken away and with the side sheet displaced, disclosing a portion of a car wall constructed in accordance with this invention;

Figure 3 is a vertical cross sectional view taken on line 3—3 of Figure 1 and looking in the direction of the arrows;

Figure 4 is a vertical cross sectional view taken on the line 4—4 and looking in the direction of the arrows;

Figure 5 is an end elevational view of the side sheets disclosed in Figure 2;

Figures 6, 7, and 8 are plan cross sectional views of the side stake and associated bracing and protecting shield taken respectively on the lines 6—6, 7—7, and 8—8 on Figure 1 and looking in the direction of the arrows;

Figure 9 is an enlarged perspective view partly broken away with the side sheet displaced, of a portion of a modified car wall construction made in accordance with this invention and differing from the construction illustrated in Figure 2, primarily in that the vertical flanges of the upper and lower chords lie in substantially the same vertical plane;

Figure 10 is a vertical cross sectional view with the side sheet displaced, of the construction shown in Figure 9, and

Figure 11 is a plan cross sectional view of the side stake and associated bracing and protecting shield illustrated in Figure 9.

By referring to the drawings it will be noted that the present invention is illustrated as applied to a car of the hopper type, the wall of which comprises an upper chord 20 and a lower chord 21, and vertical side stakes 22. The side stakes are secured at their upper and lower ends to the upper and lower chords respectively, by any suitable means such as rivets 23, or any other recognized equivalent thereof. Furthermore, the side stakes may be of any suitable formation and may be formed of cast metal, rolled steel, or any other satisfactory material now used for this purpose.

As here illustrated, the side stakes are preferably of angle formation consisting of an inner flange 24 and an outwardly extending flange 25, the latter of which terminates in a reinforcing bead 26. In the form shown in Figure 2, the lower part of the side stake is deformed so that the inner flange 24 is deflected outwardly as at 27 to terminate in a vertically disposed end portion 28 lying in a plane outwardly from the plane of the flange 24. Whereas this may be formed in any suitable manner, when made of rolled stock, it may be first formed as a straight angle bar and then bent outwardly to provide the portions 27 and 28 above referred to and then subsequently cut off as at 29, to continue in a vertical line at the outer edge of the stake.

As evident from a comparison of Figures 6, 7, and 8 certain of the side stakes may be made of increased depth for increasing the strength thereof according to the load supporting requirements at the particular location where the particular side stake is to be installed.

In the form of the invention illustrated in Figures 1 to 8 inclusive, the supporting and protect-

ing shield is formed as best illustrated in Figures 2 and 4, that is to say, as a single integral piece having side flanges 30, 31, and a bottom flange 32, all lying in the outer plane adjacent the plane of the vertical flange of the lower chord 21. Further, it has inclined marginal portions 33 and 34 which terminate in a top vertical flange 35 occupying an inward plane adjacent the vertical flange of the top chord 20.

The central portion of this shield plate comprises an inner plate 36 as shown in Figures 4 and 6 and an inclined plate 37 which merges with the lower vertical flange 32 and is connected with the marginal portions 30, 33, and 31 and 24 by inclined wall portions 38 and 39 respectively. The lower vertical flange 32 of the shield may be secured to the lower chord 21 by means of rivets 23 or any other suitable means and likewise may be secured throughout its length to the flanges 24 and 27 of the side stake. The upper flange 35 may also be secured by rivets to the inside of the vertical flange of the upper chord 20, so as to provide suitable protection therefor. It is obvious however, that the upper flange 35 of the side stake and the vertical flange of the upper chord, or for that matter the shield and side stake could be first assembled independently and then mounted as a unit between the upper and lower chords. These details are not critical to this invention and therefore it is contemplated that all of such modified constructions as may be adopted according to good practice are included as a part of this invention.

After the upper and lower chords, side stakes and shields are assembled as above provided, the side sheets proper as shown in Figure 2, are next attached between adjacent shields. In this form the side sheets comprise a main central panel 40 having an upper flange 41 and an inclined connecting panel 42. As above described, this side sheet is formed by two bends on lines 43 and 44 respectively, both of which are in the same direction. It is thus apparent that this sheet is capable of being constructed by a simple, inexpensive, and efficient bending or pressing operation which is free from the danger of distortion or damage above referred to. If desired, the side sheet may be provided at its top and bottom with holes 45 so that it may be attached to the upper and lower chords respectively by suitable rivets or bolts 23 as illustrated in Figure 1.

In the form illustrated the side sheets are of a width which permits them to snugly fit in the space between adjacent shield plates with their edges positioned in abutting relationship with the edges of the shields. This construction permits the abutting edges to be welded which provides a very satisfactory and efficient construction, all as shown in Figures 1, and 6 to 8, inclusive.

It is to be understood that any suitable means of securing the edges of the side sheets and the shields may be employed and that welding is here illustrated merely as one satisfactory method. In the form of the invention illustrated in Figures 9, 10, and 11, the main features are the same, except that it will be noted that the vertical flange of the lower chord 121 lies in the same plane as the vertical flange of the upper chord 120. This permits the use of a side stake 122 which is a perfectly straight angle bar having an inward flange 124 and an outwardly extending flange 125 terminating in a reinforcing bead 126. In consequence the supporting and reinforcing shield

is likewise modified so that it has side flanges 130 and 131 and inwardly inclined flanges 133 and 134, both at the top and bottom.

The bottom flanges merge with the lower vertical flange 132 whereas the top inclined flanges merge with the upper vertical flange. The inward wall 136 lies in the plane of the upper and lower vertical flanges 135 and 132 respectively and is joined to the outwardly spaced side flanges 130—131 by means of inclined walls 138 and 139.

It will be seen that in this form the bottom vertical flange is mounted in between the side stake 132 and lower chord 121 and the upwardly extending flange 135 is mounted on the inside of the vertical flange of the upper chord 120. As shown in Figure 9, the side sheet comprises a main panel 140 and upper flange 141 and a connecting flange 142. At the bottom there is also an inwardly spaced flange 143 connected to the main panel by an inclined panel 144. As shown in Figure 10, the upper and lower flanges 141 and 143, respectively, lie in substantially the same plane and accordingly the side sheets are adapted to be placed in edge contact with the side flanges of the supporting and protecting shields and welded or otherwise secured thereto in the manner described in connection with the first modification.

It is apparent that this invention provides a new and improved construction having wall parts constructed differently from those of cars heretofore employed and that this novel arrangement makes for an improved and simplified wall construction. It is further apparent that the wall parts of this invention lend themselves to manufacturing and assembling operations which eliminate the difficulties and waste heretofore encountered.

I claim:

1. A car wall construction of the character described comprising a plurality of side stakes, upper and lower chords connected respectively to the top and bottom ends of said side stakes, a shield plate for each of said side stakes connected throughout their central portions to the inside of said side stakes and at their upper and lower ends to said upper and lower chords respectively, said shield plates having their side edges extending laterally beyond said side stakes and deflected outwardly to provide side edges lying substantially in the plane of the outer edge of said side stakes adapted for attachment to side sheets positioned intermediate said shield plates.

2. A car wall construction of the type providing protection for the side stakes and increased car capacity comprising a plurality of side stakes, upper and lower chord members connected to the top and bottom ends respectively of said side stakes, an integrally formed shield plate for each of said side stakes connected to said side stakes and extending to each side thereof, the extending side edges of said shield plates being deflected outwardly to provide edges for connection to intermediate side sheets located throughout the major portion of their height substantially in the maximum outer plane of said side stakes, and said shield plates further having top and bottom edges connected respectively to said upper and lower chords.

3. A car wall construction of the type providing protection for the side stakes and increased car capacity comprising a plurality of side stakes, upper and lower chord members connected to the top and bottom ends respectively of said side

stakes, an integrally formed shield plate for each of said side stakes connected to the inside surface of said side stakes and extending to each side thereof, the extending side edges of said shield plates being deflected outwardly to provide edges for connection to intermediate side sheets located throughout the major portion of their height substantially in the maximum outer plane of said side stakes and said shield plates further having top and bottom edges connected respectively to said upper and lower chords.

4. A car wall construction of the type providing protection for the side stakes and increased car capacity comprising a plurality of side stakes, upper and lower chord members connected to the top and bottom ends respectively of said side stakes, an integrally formed shield plate for each of said side stakes connected to said side stakes and extending to each side thereof, the extending side edges of said shield plates being deflected outwardly to provide edges for connection to intermediate side sheets located throughout the major portion of their height substantially in the maximum outer plane of said side stakes, and intermediate side sheets connected to the edges of said shield plates and having their top and bottom edges secured to the upper and lower chords respectively.

5. A car wall construction of the type providing protection for the side stakes and increased car capacity comprising a plurality of side stakes, upper and lower chord members connected respectively to the top and bottom ends of said side stakes and a side sheet assembly for closing the spaces between said side stakes and chords and lying throughout the space between said side stakes substantially in the plane of the outer edges of said side stakes and at the location of said side stakes in an inner plane so as to provide portions for connection to the inside of said side stakes, said inner portions being provided with outwardly extending connecting portions terminating in said outer plane and formed with said inner portions as separate integral plates secured to said side stakes and having said extending portions secured to the intermediate portions of said side wall assembly.

6. A car wall construction of the type providing protection for the side stakes and increased car capacity comprising side stakes and upper and lower chords connected thereto, a side sheet assembly lying throughout the space between said side stakes substantially in the plane of the outer edges of said side stakes, and being deflected inwardly for connection to the inside of said side stakes, said deflected portions of said side sheet assembly being formed as independent integral plates connected throughout their central regions to said side stakes and having extended edges for connection to the portion of said side sheet assembly lying between said stakes.

7. A car wall construction of the character described comprising upper and lower chord members having vertical flanges disposed respectively in inner and outer vertical planes, side stakes connecting said flanges, and a shield plate associated with each of said side stakes having upper and lower ends connected respectively to the vertical flanges of said upper and lower

chords, said plates being connected throughout their central portions to the inside surface of said side stakes and having projecting side edges extending outwardly and lying substantially in said outer plane, and intermediate side sheets connected at the top and bottom to said flanges respectively, and at their edges to the edges of said shield plates.

8. A car wall construction of the character described comprising an upper chord and a lower chord having a vertical flange in an inner plane and said lower chord having a vertical flange in an outer plane, a shield plate associated with said side stake, having its upper end lying in said inner plane and its lower end lying in said outer plane and having its central portion connected to the inside of said side stake, said shield plate extending laterally and outwardly from each side of said side stake to provide side edges lying substantially in said outer plane and providing means for connecting with intermediate side sheets.

9. A car wall construction of the character described comprising upper and lower chords and side stakes connected thereto, said chords having vertical flanges lying substantially in the plane of the inner surface of said side stakes, shield plates associated with each of said side stakes having their top and bottom ends connected to said flanges respectively, and having their intermediate portions connected to the inside surface of said side stakes, the side edges of said shield plates extending laterally and outwardly to provide, throughout the major portion of their height, side edges lying substantially in the plane of the outer edge of said side stakes, and intermediate side sheets connected to said side edges of said shield plates.

10. For use in a car wall construction of the character described, a shield plate adapted to be associated with a side stake having a central and top portion lying in an inner plane and a U-shaped marginal portion forming the sides and bottoms thereof lying in an outer plane and inclined connecting walls adjoining the said portions to form an integral unitary plate.

11. For use in a car wall construction of the character described, a shield plate comprising a T-shaped portion lying in an inner plane and a U-shaped portion lying in an outer plane and wall portions connecting said first named portions, all in a manner to form a unitary integral plate.

12. For use in a car wall construction of the character described, a shield plate comprising central, top and bottom portions lying in an inner plane and centrally located side edge portions lying in an outer plane and walls connecting said first named portions in a manner to form a unitary integral plate.

13. A car wall construction comprising stakes, upper and lower chords to which the stakes are attached, side sheets between the stakes and an integral substantially U-shaped shield embracing the inner face of the stakes and having its legs extending toward the side sheets to which sheets said legs are attached.

HARRY S. HART.