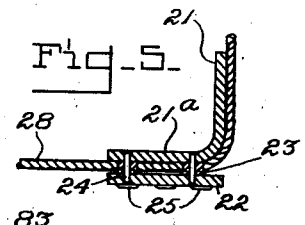
Aug. 12, 1930. R. T. ROMINE 1,772,731

SHEET METAL LOADING FOR FREIGHT CARS

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Fig. 5.



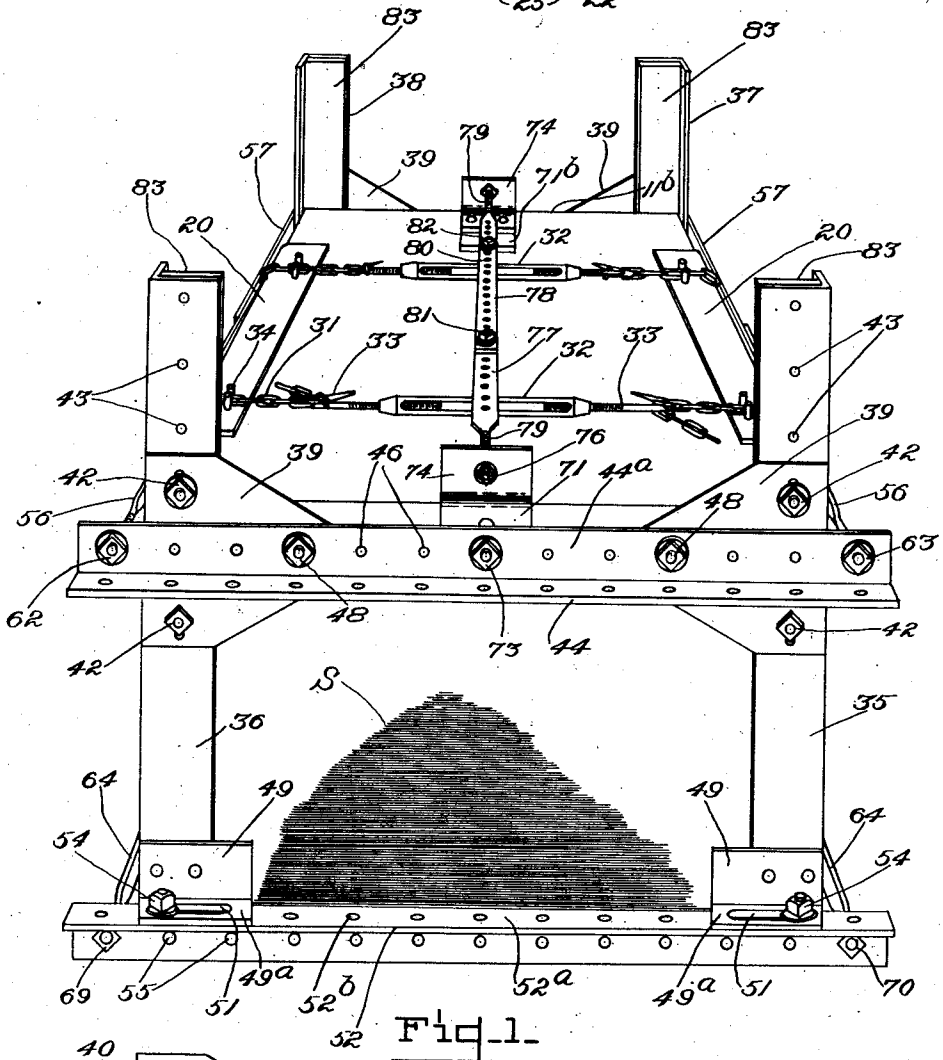
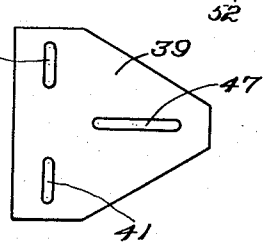


Fig. 1.

Fig. 4.



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SHEET METAL LOADING FOR FREIGHT CARS

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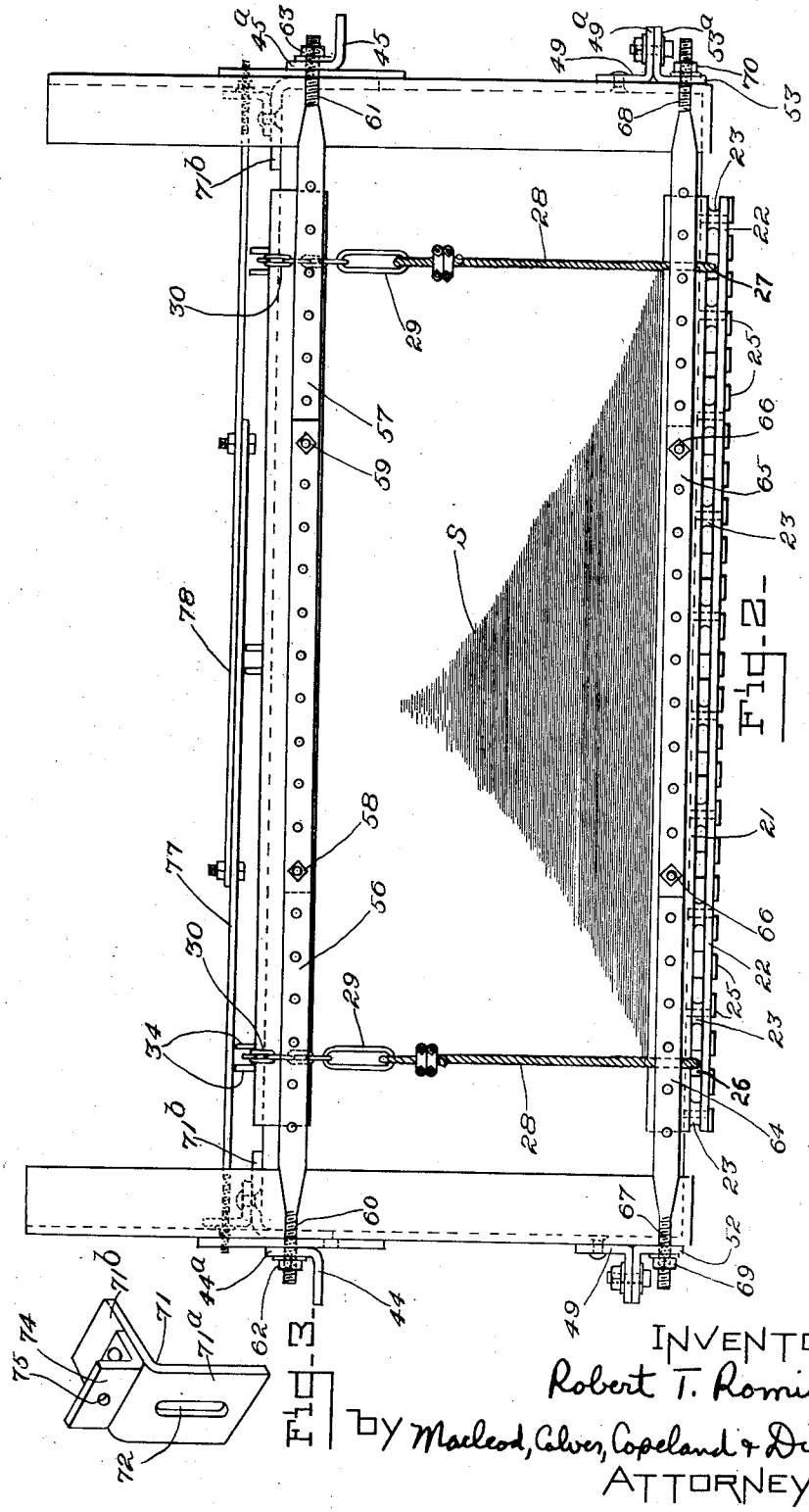


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE

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SHEET-METAL LOADING FOR FREIGHT CARS

Application filed June 23, 1926. Serial No. 118,062.

This invention relates to an apparatus for loading and packing metal in freight cars for shipment, the invention being particularly, although not exclusively, adapted for the purpose of packing stacks or piles of finished metal sheets, strip steel or the like in unitary bundles on the car floor.

An object of this invention is to provide an improved binding or loading apparatus capable of sustaining and resisting more fully any whipping or weaving action of the metal sheets caused by vibrations of the freight car and the shocks and collisions to which the cars are subjected in transit.

A further object of this invention is to provide an apparatus capable of binding sheet steel or other metal in large piles or stacks, such as in bundles approximating five to ten tons, in which the weight of the apparatus is reduced but at the same time greater strength and flexibility is obtained, as a result of which improvement a stack of sheet steel, for instance, may be held intact without relative shifting of the sheets and irrespective of any shifting movement of the bundle as a whole on the car floor due to unusual shocks or jolts.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification, wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a perspective view illustrating an apparatus embodying my present invention and utilized for the purpose of packing a stack of metal sheets on the floor of a freight car.

Fig. 2 is a side view of the apparatus with a stack of metal sheets held in position thereby.

Fig. 3 is a detail view showing one of the angle clamping plates.

Fig. 4 is a detail view of the gusset plate.

Fig. 5 is a cross section of one of the bottom gripping and clamping plates.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practised or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention beyond the terms of the several claims hereto appended or the requirements of the prior art.

The present improved apparatus is illustrated in connection with the shipment of sheet metal, such as sheet steel, and in practice I prefer to load the freight car by conveying directly into the car the packs of metal without separately handling the individual sheets within the car. The packs or stacks are placed on the car floor at each end of the car, side by side, and preferably spaced apart with the sheets running lengthwise of the car. Each stack of sheets is bound and braced together as a unit to prevent the sheets shifting and breaking loose in which event considerable damage is done to the sheets as well as to the cars. One of the most serious problems in the shipping of sheet steel resides in the fact that when the sheets shift upon each other and strike an obstruction, the edges or corners of the sheets become bent or crimped rendering them defective. Where the surfaces of the sheets are oiled and therefore slippery, as in the present practice of shipping sheet steel, great difficulties are met in attempting to hold a heavy stack of sheets intact so that the individual sheets will not slide and in order that the whipping action of the sheets will not result in causing the edges of the sheets to become crimped.

In shipping sheet metal in accordance with my method it is of great importance that the weight of the apparatus for packing the sheets in stacks in the car be reduced to a minimum. The binder apparatus is preferably constructed to permit it to be returned from the consumer or manufacturer to the steel mill for use over and over again, and the freight cost therefore of shipping the bracing is an important commercial factor. It is, therefore, important that the bracing apparatus be

as light as possible and yet of sufficient strength to sustain the maximum impacts or shocks to which the freight cars are subjected.

In the drawings the present improved binder apparatus is illustrated in connection with the packing of metal sheets, such as sheet steel, in a freight car. A pair of upper metal angle plates or bars 20 are positioned at the upper longitudinal corners of the bundle or pile of sheets S. At the lower longitudinal corners of the bundle are positioned a pair of angle plates or members 21 which in like manner embrace opposite corners of the bundle or stack of sheets. These angle members 20 and 21 are preferably somewhat shorter than the shortest sheets to be shipped so that they may be used in connection with bundles or stacks of different lengths. It will be seen that the weight of the bundle is carried by the lower horizontal flanges 21ª (see Fig. 5) of the lower angle members 21, and in the present instance these members are provided with bottom gripping surfaces adapted to frictionally engage the floor of the car and resist the tendency of the bundle to become displaced during transit. A metal friction gripping plate 22 is carried by the flange or plate 21ª of each angle member 21, this gripping plate being spaced therefrom by means of suitable metal spacers 23. The bottom of the gripping plates 22 which engage the floor of the car are provided with suitable spaced projections 25 having flat bottom surfaces providing a gripping surface, which will act to retard movement of the pack on the car floor but will not clinch the pack to the car floor against movement under more severe shocks. It will be noted that the plate 21ª is spaced from the gripping plate 22, thereby permitting the tying cables 28 to pass therebetween. As shown in Fig. 2, the wood spacers 26 where used in addition to the metal spacers 23 are provided with transverse guide holes 27 through which extend the steel cables 28.

In the present instance the bundle or stack of metal is tied or bound together by means of two sets of flexible cables each preferably comprising a length of steel cable terminating at opposite ends in chains which are adjustably connected together by means of turnbuckles. Each of these sets of binding devices is identical in construction and comprises a length of steel cable 28 which extends beneath the bundle, between the plates 21ª and 22 at opposite bottom corners of the bundle, and upwardly a substantial distance at opposite sides of the bundle. Each steel cable 28 terminates in a relatively large eye link 29 at each side of the bundle and preferably adjacent the top thereof. Connected to these links 29 are chains 30 and 31 at opposite sides and these chains at the top of the bundle are connected together by means of a turnbuckle 32. Each turnbuckle 32 terminates at opposite ends in grab hooks 33 adapted to releasably seize and hold the body of the chains 30 and 31 at adjusted positions. It will thus be seen from the foregoing construction that the angle plates 20 and 21 embracing the four longitudinal corners of the bundle are interposed between the flexible tying cables and the bundle and by tightening these cables by means of the turnbuckle, it will be apparent that the sheets will be securely clamped together at the horizontal corners thereof. An approximate adjustment of each cable is obtained by adjusting the chains 30 and 31 as tightly as possible in the bight of the grab hooks, and thereafter a tight or fine adjustment is obtained by turning the turnbuckles 32.

From the foregoing it will be seen that the steel cables 28 are guided and positioned by means of the guide holes 27 between the angle members 21 and gripping plates 22 and that the weight of the bundle is not carried by these cables. The chains 30 and 31 at the top of the bundle are guided and positioned by means of projecting pairs of guide studs or pins 34 secured to the top flanges of the angle plates 20.

At the four vertical end corners of the bundle or pile of sheets are placed angle members or standards 35, 36, 37 and 38. As in the case of the horizontal angle members 20 and 21 these upright members or posts comprise steel angles and form buttresses for clamping together the end corners of the bundle.

Adjustably connected to the outer face of each standard 35, 36, 37 and 38 is a steel gusset plate 39 (see Figs. 1 and 4). Each of these plates is provided with spaced vertically alined slots 40 and 41 for the reception of a pair of adjusting bolts and nuts 42, the bolts adapted to extend through any of a series of vertically alined holes 43 in the end flange of each standard. From this construction it will be seen that the several gusset plates 39 may be accordingly adjusted in different vertical positions on the posts 35—38. The adjacent pair of standards 35 and 36 at one end of the bundle or stack is adjusted and clamped in position against the stack by means of upper and lower parallel transverse angle bars 44 and 52, and in like manner the opposite adjacent pair of standards 37 and 38 are adjusted and clamped with respect to the stack by means of a corresponding pair of transverse upper and lower bars 45 and 53. The vertical flanges 44ª and 45ª of the opposite upper set of clamping bars 44 and 45 are positioned against the outer faces of the gusset plates 39. The brace bars 44 and 45 are identical in construction and the vertical flange of each bar is provided with a horizontal series of holes 46 spaced a predetermined distance apart. The gusset plates 39 are provided with horizontal slots 47, and

the plates 39 and hence the angle standards are adjusted toward and from each other relatively to the stack by means of bolts and nuts 48 passing through any of the holes 46 and adjustable in the slots 47 in the gusset plates. By virtue of this construction the adjacent pairs of angle posts 35, 36 and 37, 38 may be tightly clamped transversely against the stack of sheets.

Each of the angle posts or standards at its lower end is provided with an angle bracket 49 riveted thereto, the horizontal flanges 49^a of these brackets extending outwardly from the posts and provided with elongated slots 51. The lower transverse adjusting and clamping bars 52 and 53 at opposite ends of the stack, are placed with the depending vertical flanges thereof abutting against the lower ends of the standards with the horizontal flanges 52^a and 53^a extending outwardly and abutting against the bottom of the flanges 49^a of angle brackets 49. The horizontal flanges 52^a and 53^a of these bars are provided with a series of spaced holes 52^b, whereby the standards together with angle brackets 49 may be adjusted transversely with respect to these bars by means of adjusting bolts and nuts 54 which pass through any of the holes 52^b and through the slots 51.

The bars 44 and 45 project at opposite ends beyond the standards and the corresponding ends thereof are adjustably connected together. This is accomplished at each side of the stack by sets of adjusting devices which are identical in construction each set comprising a pair of flat steel bars or straps 56 and 57 provided with spaced holes. The bars 56 and 57 are adapted to be overlapped in the proper adjusted positions and are connected together by means of two sets of bolts and nuts 58 and 59. The bar 56 terminates in a threaded end 60 and in like manner the bar 57 at the opposite end of the stack terminates in a threaded end 61. The threaded ends 60 and 61 are adapted to extend freely through certain of the holes 46, depending upon the width of the sheets, in the transverse bars 44 and 45, and are tightened by means of nuts 62 and 63.

The bars 52 and 53 are in like manner connected together by means of a set of adjusting devices at each side of the stack, each set being identical and comprising flat steel bars 64 and 65 each having a spaced set of holes for the reception of adjusting nuts and bolts 66 by means of which the bars may be overlapped and secured together in the proper relation. The bar 64 has a threaded end 67 extending through certain of the holes 55 in the bar 52 and adjusted by means of a nut 69. In like manner the bar 65 has a threaded end 68 extending through any of a series of holes in the bar 53 and tightened by means of a nut 70.

The stack of sheets are clamped midway of the pairs of standards 35, 36 and 37, 38 by means of angle members or devices. Each of these devices comprises an angle plate 71 having a vertical flange 71^a provided with a vertical slot 72 permitting the plate to be adjusted vertically with relation to the bar 44 or 45 by means of adjusting bolts and nuts 73. The horizontal flange 71^b of each angle plate extends over the top of the stack of sheets, and riveted to the upper face of this flange is an angle bracket 74, the vertical flange of which is provided with a hole 75. The brackets 74 secured to the opposite angle plates 71 at opposite ends of the bundle are adjustably connected together by means of overlapping flat steel bars or straps 77 and 78, each having a threaded end 79 extending freely through the hole 75 in bracket 74 and tightened by means of a nut 76. The bars 77 and 78 are each provided with a series of holes 80 and are adjusted in overlapping position by means of bolts and nuts 81 and 82. An approximate adjustment of the bars 77 and 78 is obtained by means of the adjusting bolts 81 and 82, and thereafter the plates 71 are drawn together by tightening the nuts 73, thus clamping the flanges 71^b tightly against the top of the stack of sheets. It will be seen that this construction not only provides an additional means for securing the bars 44 and 45 together intermediate the ends thereof, but also provides a means for holding the end edges of the sheets against upward movement resulting from the whipping action of the sheets.

In the preferred form shown in Fig. 1 each of the upright standards or posts 35, 36, 37 and 38 is provided on the inner face thereof with a vertical strip of cushioning material 83 which is preferably of wood or other relatively softer material. This construction is of considerable importance in enabling any relative movement of the sheets to be absorbed and cushioned without resulting in causing the end edges of the sheets to become crimped or bent. The provision of the wood cushioning members 83 in contact with the end edges of the sheets also provides a means for preventing the sheets from curling up at the ends which is often the case when a severe blow causes the sheets when in contact with a metal surface to slide up the face thereof and become bent or crimped.

It is important to note that the sets of bracing and tying bars 56, 57 and 64, 65 at each longitudinal side of the stack are parallel. I have discovered that by tying the angle posts together at opposite sides by means of parallel tying devices, greater strength is obtained for resisting the tendency of the angle posts to buckle. At the same time a degree of flexibility is obtained by this construction which enables the posts

to yield slightly with the stack of sheets when the car receives a severe blow. I have discovered that the parallelogram construction, in providing greater strength and a degree of flexibility, enables angle posts of lighter weight to be used and at the same time which will hold the stack intact without buckling. This is assisted by means of the parallel bars 44, 45, 52 and 53 which span the adjacent standards, and by means of the gusset plates 39, which construction stiffens the angle posts at the points where they are under greatest strain.

It will be seen that the foregoing apparatus not only provides a stronger and at the same time more flexible construction having a minimum weight, but at the same time a structure which may be very easily assembled. To unload the car, it is merely necessary to remove the nuts 62, 63, 69, 70, and 76 to remove the parallel adjusting bars at the longitudinal sides and top of the bundle, and thereupon the angle posts or standards may be removed from the stack in pairs without removing the bars 44 and 52 or 45 and 53. Thereafter a lifting apparatus may be wheeled into position to straddle the stack, and the four depending hooks of the hoisting mechanism may be connected to the eye links 29. The bundle may then be lifted bodily from the floor of the car to permit the platform of a load elevating truck to be inserted beneath the bundle and receive the same. The truck is then propelled out of the car with the bundle and delivered at any desired point.

From the foregoing it will be seen that the pack of metal sheets, or the like, is supported above the car floor through the medium of the rigid supporting members comprising parts 21ª, 22, 23 and 26, which act to hold the sheets of the pack substantially flat in horizontal planes and prevent bowing or bending of the pack in the center, so that the end portions of the sheets extend horizontally against the wood members 83. It will be noted that these members 83, of softer material than the metal sheets, are positively drawn under pressure against the end edges of the metal sheets which extend transversely of the car. Owing to the fact that in practice slight variations in the length of the sheets occur, the vertical face of the pack at its end will be irregular or ragged. Sufficient pressure may be applied to cause the end edges of the slightly longer sheets to be embedded in the softer material 83. This may take up the slight variations in length of sheets, and also result in binding the vertical face of the pack against the material 83, preventing crimping or curling action of the slightly shorter sheets resulting from longitudinal vibration thereof within the pack.

What I claim is:

1. An apparatus of the class described, comprising two pairs of standards for engaging opposite sides of a stack of metal adjacent the corners thereof, a bar spanning each pair of standards, and three sets of adjusting means for connecting said bars to clamp the standards against the stack, one of said sets extending over the top of the stack.

2. An apparatus of the class described, comprising two pairs of buttresses for engaging opposite sides of a stack of metal, an angle bar spanning each pair of buttresses, and means for adjustably connecting the corresponding ends of said bars.

3. An apparatus of the class described, comprising two pairs of buttresses for engaging opposite sides of a stack of metal, cushioning means interposed between said buttresses and the stack, a bar spanning each pair of buttresses, and a rigid brace member for adjustably connecting the corresponding ends of said bars.

4. An apparatus of the class described, comprising two pairs of buttresses at opposite sides of a stack of metal, a pair of parallel bars spanning each pair of buttresses, and a pair of parallel members for adjustably connecting the corresponding ends of said bars.

5. An apparatus of the class described, comprising two pairs of angle members for embracing the vertical corners of the stack of metal, means for adjusting said members transversely of the stack, and parallel devices for adjusting said members longitudinally of the stack.

6. An apparatus of the class described, comprising two pairs of angle members for embracing the vertical corners of a stack of metal, and rigid parallel relatively adjustable members for adjusting said angle members lengthwise of the stack.

7. An apparatus of the class described, comprising two pairs of buttresses for engaging opposite sides of a stack of metal, and four pairs of parallel devices, a pair at each side of the stack, adjustably connected together for clamping said buttresses against the stack.

8. An apparatus of the class described, comprising two pairs of buttresses for engaging opposite sides of a stack of metal, four pairs of parallel devices, a pair at each side of the stack, adjustably connected together for clamping said buttresses against the stack, and cushioning means of relatively softer material interposed between said buttresses and the stack.

9. An apparatus of the class described, comprising two pairs of buttresses for engaging opposite sides of a stack of metal, four pairs of parallel devices, a pair at each side of the stack and each pair at the ends thereof adjustably connected to the ends of adjacent

pairs, for clamping said buttresses against the stack.

10. In an apparatus of the class described, the combination of means for clamping together a pack of metal sheets in a car, angle members embracing opposite corners of the pack intermediate the vertical corners thereof, and means extending lengthwise of the car and over the top of the stack for connecting said angle members together.

11. In an apparatus of the class described, the combination of means for clamping together a pack of metal sheets in a car and including standards having means for embracing the vertical corners of the stack, angle members embracing opposite corners of the stack intermediate the vertical corners thereof, and means extending lengthwise of the car and over the top of the stack for connecting said angle members together.

12. In an apparatus of the class described, the combination of means for clamping together a pack of metal sheets in a car and including standards having means for embracing the vertical corners of the stack, angle members embracing opposite corners of the stack intermediate the vertical corners thereof, means extending lengthwise of the car and over the top of the stack for connecting said angle members together, and means for adjustably connecting said angle members and standards.

13. In an apparatus of the class described, the combination of standards having means for embracing the four vertical corners of a stack of metal, a transverse bar spanning each adjacent pair of standards, a gusset plate interposed between each standard and each bar, means for adjustably connecting each gusset plate with its standard, means for adjustably connecting each bar with a pair of said gusset plates, and means for adjustably connecting said bars together.

14. In an apparatus of the class described, the combination of metal standards at each of two opposite ends of a stack of metal, a transverse bar extending across the adjacent standards, a metal member interposed between each bar and standard, means for vertically adjusting each member relative to its standard, means for adjusting each bar horizontally relative to a pair of said members, and means for adjusting said bars toward and from each other.

15. In combination with a pile of metal sheets disposed on a car floor, said pile presenting edges of the sheets in a vertical face extending transversely of the car which is relatively ragged due to slight disalignment of the edges, apparatus for binding the pile during transit comprising cushioning material relatively softer than the sheets engaging the said vertical ragged face of the pile, means overlying said material and reinforcing and backing the material, the combined means and material having sufficient rigidity to resist bending under embedding pressure, and adjustable devices at two opposite vertical faces of the pile extending longitudinally of the car for pressing said means and material toward said ragged face to embed the edges of the sheets in said material substantially throughout said ragged face.

16. In combination with a pile of metal sheets disposed on a car floor, said pile presenting edges of the sheets in a vertical face extending transversely of the car and which is relatively ragged due to slight disalignment of the edges, apparatus for binding the pile during transit comprising cushioning material relatively softer than the sheets engaging the vertical ragged face of the pile, means overlying said material and reinforcing and backing the material, the combined means and material having sufficient rigidity to resist bending under embedding pressure, and adjustable devices at two opposite faces of the pile for pressing said means and material toward said ragged transversely extending face to embed the edges of the sheets in said material substantially throughout said ragged face.

17. In combination with a pile of metal sheets disposed on a car floor, said pile presenting edges of the sheets in two vertical faces extending transversely of the car and which are relatively ragged due to slight disalignment of the sheet edges, apparatus for binding the pile during transit comprising cushioning material relatively softer than the sheets engaging the ragged vertical faces of the pile, means overlying the material at each face and reinforcing and backing the material, the combined means and material having sufficient rigidity to resist bending under embedding pressure, and adjustable devices at two opposite faces of the pile for pressing said means and material toward said ragged faces to embed edges of the sheets in said material substantially throughout each of said ragged faces.

18. In combination with a pile of metal sheets disposed on a car floor, said pile presenting edges of the sheets in two vertical faces extending transversely of the car and which are relatively ragged due to slight disalignment of the sheet edges, apparatus for binding the pile during transit comprising cushioning material relatively softer than the sheets engaging the ragged vertical faces of the pile, means overlying the material at each face and reinforcing and backing the material, the combined means and material having sufficient rigidity to resist bending under embedding pressure, and adjustable devices at two opposite faces of the pile for pressing said means and material toward said ragged faces to embed edges of the sheets in said material substantially throughout each

of said ragged faces, said devices connecting said means to one another.

19. In combination with a pile of metal sheets disposed on a car floor, said pile presenting the edges of the sheets in two vertical faces extending transversely of the car, each face being relatively ragged due to slight disalignment of the sheet edges, apparatus for binding the pile during transit comprising cushioning material relatively softer than the sheets engaging both vertical ragged faces of the pile, rigid members overlying said material to reinforce and back the material, said members having sufficient rigidity to resist bending under pressure exerted thereon to embed the sheet edges into the material, and adjustable devices at two opposite faces of the pile for pressing said members and material toward said faces to embed edges of the sheets in said material substantially throughout said ragged vertical faces.

20. In combination with a pile of metal sheets disposed on a car floor, said pile presenting the edges of the sheets in two vertical faces extending transversely of the car, each face being relatively ragged due to slight disalignment of the sheet edges, apparatus for binding the pile during transit comprising cushioning material relatively softer than the sheets engaging both vertical ragged faces of the pile, rigid members overlying said material to reinforce and back the material, said members having sufficient rigidity to resist bending under pressure exerted thereon to embed the sheet edges into the material, and adjustable devices at two opposite sides of the pile for pressing said members and material toward said faces to embed edges of the sheets in said material substantially throughout said ragged vertical faces.

21. In combination with a pile of metal sheets disposed on a car floor, said pile presenting the edges of the sheets in two vertical faces extending transversely of the car, each face being relatively ragged due to slight disalignment of the sheet edges, apparatus for binding the pile during transit comprising cushioning material relatively softer than the sheets engaging both vertical ragged faces of the pile, rigid members overlying said material to reinforce and back the material, said members having sufficient rigidity to resist bending under pressure exerted thereon to embed the sheet edges into the material, and adjustable devices at two opposite sides of the pile for pressing said means and material toward said faces to embed edges of the sheets in said material substantially throughout said ragged vertical faces, said devices connecting said members to one another whereby to simultaneously draw the same toward one another when adjusted.

In testimony whereof I affix my signature.

ROBERT T. ROMINE.