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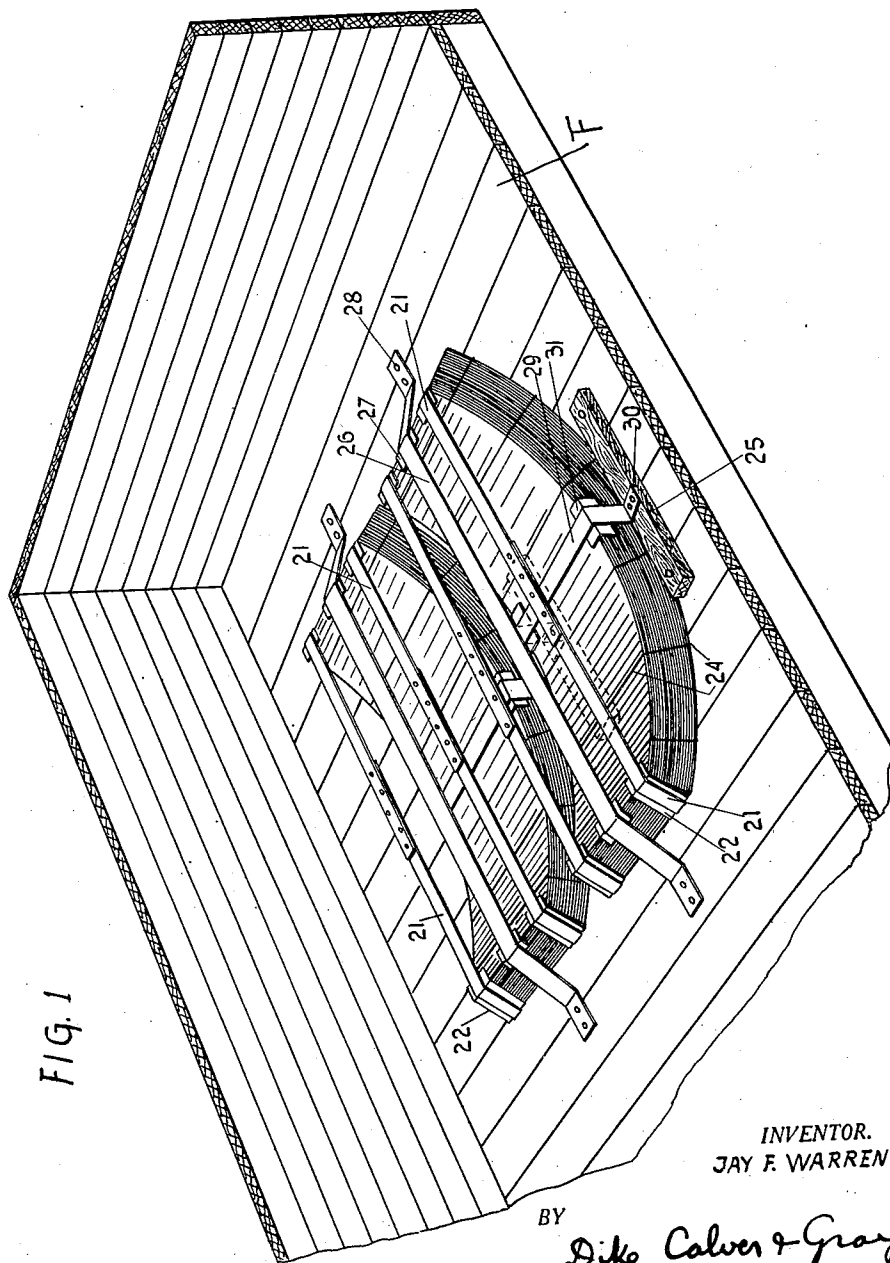
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2,028,366

METHOD OF LOADING AND SHIPPING SHEET METAL

Filed May 25, 1931

2 Sheets-Sheet 1



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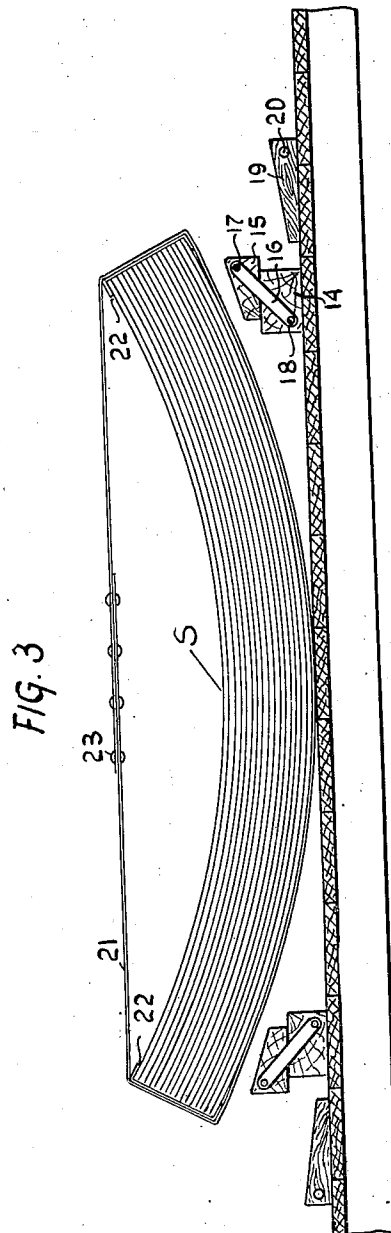
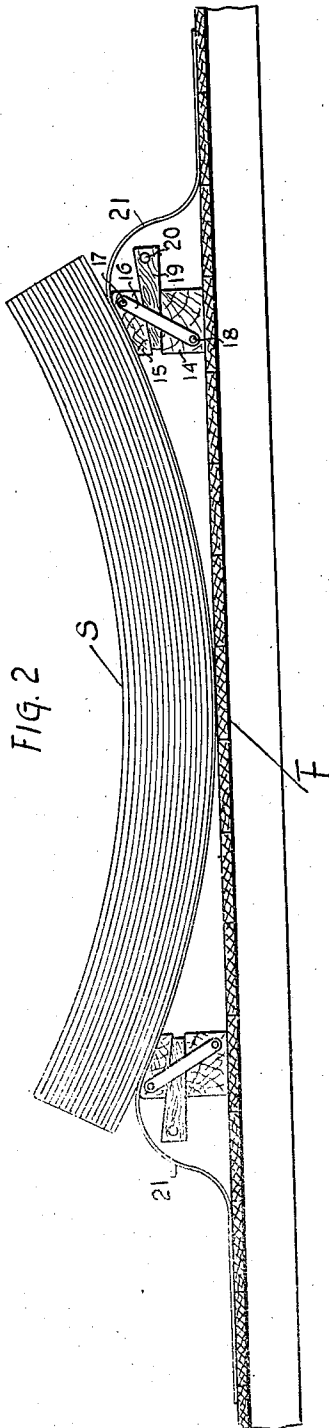
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UNITED STATES PATENT OFFICE

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METHOD OF LOADING AND SHIPPING
SHEET METALJay Fred Warren, Detroit, Mich., assignor to The
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21 Claims. (Cl. 105—369)

This invention relates to the preparation and handling of sheet metal, particularly sheet steel, for the purpose of shipping the same in freight cars or carriers from rolling mills to consumers, an object of the invention being to provide a new and more efficient method of loading and transporting metal or steel sheets.

lifting of one end of the pack and the depressing of the other end. Thus according to the invention, the force transmitted to the stack by the car impact will be expended in the movement of the pack confined to the zone of the pack, while the curvature of the sheets and their angle of incline will resist relative shifting thereof.

Other objects of the invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification.

In the drawings:

Fig. 1 is a perspective view illustrating packs of sheet steel loaded on a carrier floor in accordance with the invention.

Fig. 2 is a side elevation showing a step in carrying out the method.

Fig. 3 is a similar view illustrating a further step in the method.

In the drawings there is shown, for the purposes of illustration, one plan for practicing the invention, although it is understood that other embodiments are fully within the scope of the invention. Moreover, it is understood that the terminology employed herein is simply for the purpose of description and not of limitation.

In practice the metal or steel sheets may be trucked or otherwise transported in suitable stacks into the freight car for loading on the floor F of the car or other carrier as the case may be. The flat sheets may then be stacked in such manner as to form an arched pack with the individual sheets bent or bowed preferably under tension induced simply by the weight of sheets, as when they are suspended between two points. For example, this may be accomplished in a relatively simple manner by providing pairs of expansion wood blocks 14 and 15 of suitable combined depth to give the desired suspending height for the pack. The blocks of each pair may be linked and retained together by diagonal links 16 pivoted at their upper and lower ends at points 17 and 18 respectively. As shown in Fig. 2 the pairs of expansion blocks are first placed on the car floor in properly spaced relation, the wedges 19 having been inserted between the blocks and driven into place. It will be noted that the top faces of the upper blocks 15 are preferably tapered inwardly to provide uniform bearing faces for the pack.

Thereupon the metal sheets S may be stacked across the supporting blocks so as to span the same in the manner illustrated in Fig. 2, and by virtue of their weight the sheets will sag or bow due to their inherent flexibility and the center of the pack will rest on the car floor. The pack

It is the customary practice, for instance in the production of sheet steel for shipment, to cut the metal after the rolling process into sheets of sizes required by the consumer for the purpose of producing stampings. Sheet steel of this character is extensively used in the automobile industry for producing body panels, fenders, hoods, etc. In practice the sheets have been arranged and loaded in packs or stacks suitably bound or braced on the freight car floor and transported to destination. Each pack or stack of sheets, weighing frequently as much as five to ten tons, has been supported either directly or through the medium of wood members on the car floor with the individual sheets piled flatwise and held in the stacks by means of binding elements, such as steel bands. Moreover, according to conventional practice, the stacks have either been braced or anchored as a whole to the car floor against longitudinal movement or freely supported to permit the stack or pack to shift as a whole longitudinally of the car as a result of shocks or jolts to which the car is subjected in transit.

Where flexible steel bands alone are used to bind the pack, the shifting of the pack to take up the shocks has been considered necessary in order to minimize the relative sliding of the sheets (which are usually oiled), shearing of the band binders and scattering of the sheets over the car floor. Nevertheless, this system, although reducing the amount of dunnage by eliminating a substantial amount of the wood bracing formerly employed, has far from solved the problems of pack shipment nor eliminated to any substantial extent the tendency of the sheets to break loose in the car when the latter is subjected to severe shocks.

An object of the present invention is to overcome these disadvantages, and in accordance therewith a method is provided in which the metal sheets are arranged in a pack held in bowed condition, without however permanently deforming the sheets, and supported on the car floor in such a manner as to permit the stack to rock or lift when the car is subjected to shocks, as a result of which substantially no movement of the pack on the car floor will occur. Moreover, maximum resistance to the sliding of the sheets will be obtained due to the curvature of the pack and the

may be bound by means of flexible steel bands, one or more of which may be used as required. Two binders 21 for each pack are shown in the present instance. These bands are first laid across the supporting blocks before the sheets are stacked thereon, and after a pile of the desired number of sheets has been formed, the bands 21 are brought around the ends of the pack, the ends overlapped and riveted at 23, or otherwise fastened together. Metal protecting shoes 22 are preferably interposed between the ends of the pack and the band binders to protect the sheets and prevent danger of shearing the bands.

After the foregoing has taken place, the wedges 19 can be readily driven out by the workman simply by striking the projecting pins 20 carried by the wedge blocks. This will release the expanding blocks as illustrated in Fig. 3 and free the ends of the pack from these supports. The removal of these supports will result in the pack recoiling or straightening out to a degree effective to draw the band binders 21 taut and place considerable tension thereon due to the tension of the sheets S. Preferably the sheets are bowed to an extent only sufficient to temporarily deform them and without exceeding the elastic limit of the metal. Hence when the bands are cut the sheets will spring back to their normal flat condition, although it is apparent that any permanent deformation may be removed at destination by passing the sheets through flattening rolls.

After binding the pack of sheets the blocks 14, 15 and 19 are either removed or left in the car for unloading the sheets at destination. In transporting the packs they may be arranged side by side in pairs at opposite ends of the car, as illustrated in Fig. 1. I prefer to anchor the packs in respect to their longitudinal position on the car floor, although this may be omitted in practice in order to effect additional economies in dunnage material used. The packs may, of course, be shipped without removing the blocks 14 and 15 from beneath the ends of the pack, in the manner indicated in Figs. 2 and 3. In such case the blocks are desirably nailed to the car floor but preferably released from the pack sufficiently, as by withdrawing the wedges 19 part way or entirely, so as to place the bands 21 under tension or tighten them sufficiently to provide a more efficient binding action to hold the sheets intact in the unit.

In the example shown in Fig. 1 the pack is bound transversely by means of wire binding elements 24 which may be easily and cheaply applied. A flexible steel band 26 is stretched over the top of the pack and thence to the car floor beyond opposite ends of the pack and is nailed at its ends 28 to the floor. Protecting metal angles 27 are shown interposed between this bracing binder and the corners of the pack. Moreover, the pack may be additionally held in certain position with respect to the car floor by means of a transverse band 29 stretched crosswise over protecting corner angles 31 of sheet steel and nailed at their ends 30 to wood strips 25. The latter are nailed to the floor at opposite sides of the pack to prevent it from shifting or cocking sidewise during transit.

The present invention thus provides a method whereby the pack of sheets may be maintained in fixed position with relation to the car while preventing the danger of the sheets breaking loose from the pack when the car suffers a shock or collision in transit. This has heretofore never been possible in the transportation of metal

sheets, particularly sheet steel of the character having the surfaces thereof oiled for protective purposes. Where the sheets are shipped as illustrated in Fig. 1 for example, with the pack arched or bowed and bound together to hold the sheets under the tension induced by sustaining the weight of the pack normally at its center of curvature, the force of any shocks will be expended by the rocking of the bundle. That is, when the car is suddenly stopped by colliding with a forward car, the inertia of the pack will be entirely dissipated by translating this force into a force expended in rocking the pack. This force will lift an end of the pack, correspondingly depressing the opposite end, and the force expended in this effort will increase disproportionately on account of shifting the center of gravity of the pack away from its central point of support on the car floor. Hence the pack will substantially maintain its longitudinal position on the car and all inertia forces will be compensated by the rocking action of the pack. Moreover, due to the curvature of the sheets the tendency of the sheets to slide relatively to one another will be reduced to a minimum, which is not possible where the sheets are arranged flatwise in accordance with conventional practice.

The present invention also contemplates loading the arched pack in the reverse position to that shown in the drawings hereof. This may be accomplished by stacking the sheets over a central support in bowed condition and permitting the ends of the pack to rest on the car floor. The pack may then be bound to maintain it in arched condition with the sheets held under tension. With the support then removed the pack will be sustained at its ends with the body of the pack arched or bowed upwardly away from the car floor. This method is more specifically comprehended in another application of mine forming a continuation hereof and therefore a more detailed description herein is not deemed necessary.

I claim:

1. The herein-described method of transporting metal sheets, such as sheet steel, on a carrier, which comprises mounting on the carrier floor a pack of sheets in bowed condition with the opposite ends of the pack free to rock upwardly and downwardly, and binding the sheets of the pack together.

2. The method of shipping metal sheets, such as sheet steel, which comprises maintaining on a carrier floor a pack of sheets with the sheets held in temporarily deformed condition to provide an arcuate pack, and sustaining the pack normally, solely at its center of curvature on the car floor for movement confined substantially to the zone of the pack.

3. The herein-described method of loading and transporting metal sheets, such as sheet steel, which comprises arranging and maintaining the sheets of a pack together with the sheets bent or bowed into concentric arcs, and mounting the pack on a car floor substantially at the transverse center of the pack to permit the ends of the pack to move upwardly and downwardly as a result of shocks to which the car is subjected in transit.

4. The herein-described method of loading metal sheets, such as sheet steel, on a carrier floor for transportation, which comprises forming an arc-shaped pack with the sheets thereof temporarily deformed within their elastic limits, and sustaining the pack against longitudinal movement on the car floor by permitting up and down move-

ment of the ends of the pack to absorb shocks in transit.

5. The hereindescribed method of transporting metal sheets, such as sheet steel, which comprises maintaining the sheets of a pack in bowed condition to resist relative sliding thereof in transit, and sustaining the pack on a carrier floor to rock freely thereby resisting longitudinal movement of the pack resulting from shocks in transit.

6. The method of preparing and loading metal sheets, such as sheet steel, on a carrier for shipment, which comprises stacking the sheets and partially suspending them between supports arranged beneath opposite ends of the pack, binding the pack, and maintaining the pack on the car floor with the ends of the pack free of support.

7. The herein described method of transporting metal sheets, such as steel sheets, which comprises causing the pack of sheets on the carrier floor to assume a bowed condition, and maintaining the pack in said condition with the opposite ends free to move upwardly and downwardly, without permanently deforming the sheets.

8. The method of loading flat metal sheets, such as sheet steel, on a carrier floor for transportation, which comprises forming an arched pack with the sheets thereof in bowed condition, and maintaining the pack in arched condition substantially independently of any support on the car floor.

9. The method of loading flat metal sheets, such as sheet steel, on a carrier floor for transportation, which comprises forming an arched pack with the sheets thereof in bowed condition, binding the pack to maintain the sheets together in bowed condition, and sustaining the pack on the car floor at the center of curvature of the pack to permit rocking action thereof.

10. The method of preparing and loading flat metal sheets, such as sheet steel, on a carrier floor for transportation, which comprises forming an arched pack with the sheets thereof supported in bowed position, binding the pack by means of flexible metal elements when so supported, and relieving the pack of said support to tighten said elements under tension and hold the pack in bowed condition.

11. The method of loading flat metal sheets, such as sheet steel, on a carrier floor for transportation, which comprises forming an arched pack with the sheets thereof bowed on the car floor, and maintaining the pack for shiftable movement as a unit with the pack held in arched condition independently of any support on the car floor.

12. The method of loading flat metal sheets, such as sheet steel, on a carrier floor for transportation, which comprises forming an arched pack and binding the pack to hold the pack bowed under its own weight, and maintaining the pack on the car floor against substantial longitudinal displacement while permitting predetermined movement of the pack to absorb shocks or blows in transit.

13. A unit package for shipment on a carrier

floor, comprising a stack of flat metal sheets bound together as a unit in arched position with the sheets of the stack held under tension by the binding means, said unit package adapted to maintain its shape independent of any supporting means.

14. The art of loading metal sheets, such as flat steel sheets, on a carrier floor, in which the sheets of a stack are bent into arched shape and bound together to maintain the individual sheets under tension in bowed condition, the shape of said pack being maintained solely by said binding means.

15. The art of loading metal sheets, such as flat steel sheets, on a carrier floor, in which the sheets of a stack are bent into arched shape and bound together to maintain the individual sheets under tension not exceeding the elastic limit thereof, as a movable unit, the shape of said pack being maintained solely by said binding means.

16. The art of loading metal sheets, such as flat steel sheets, on a carrier floor, in which the sheets of a stack are bound together in arched condition with the individual sheets thereby held under tension, the shape of the pack maintained solely by said binding, and sustaining the stack on the car floor for predetermined bodily movement confined substantially to the zone of the stack.

17. In the method of loading flat metal sheets, such as sheet steel, on a carrier floor for transportation, the steps which comprise supporting the ends of the pack above the car floor to maintain the sheets of the pack in bowed condition and binding the pack together so as to maintain the individual sheets under tension as a bowed unit independent of any supporting means.

18. The combination of a pack of metal sheets and a movable planar support, said pack being held in a bowed condition and resting on said support on its curved surface alone, whereby jolts to said movable support will rock said pack.

19. A pack of metal sheets held under tension in a bowed condition and adapted to be placed on a movable surface with the curved face of said pack against said surface, so that sudden movement of said surface will rock said pack.

20. The combination of a movable planar support and a pack of sheets, said pack of sheets being held in a bowed condition and resting on said support on the bowed portion of said pack alone, so that said pack will rock when said support is suddenly moved.

21. The herein described method of loading metal sheets on a carrier floor for transportation, which comprises stacking the sheets to provide an arcuate pack, binding the same to maintain the arcuate configuration and sustaining the pack on the carrier floor for transportation with the ends of the pack spaced from the floor to permit rocking of the pack when the car is subjected to shocks in transit.

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