METHOD AND APPARATUS FOR SHIPPING METAL

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This invention relates to the loading and shipping or transporting of material, such as sheet, strip or bar metal on railway cars or other carriers.

The present application is a continuation of my co-pending application, Serial No. 313,846, filed October 20, 1928, now Patent No. 1,745,057, issued January 28, 1930, and more particularly as to Figures 5 and 6 of said co-pending case.

An object of the invention is to provide a method and apparatus for loading or packing the metal, such as sheet, strip or bar steel, on the floor of a freight car or carrier for transportation in relatively heavy units and in such manner as to prevent or resist such relative shifting movement of the constituent parts of the packs or bundles as would result in damage to the freight car, damage to the material, and render difficult and expensive the removal or unloading of the metal at destination.

A further object of the invention is to provide a new and efficient method, as well as an apparatus for carrying out the method, for shipping sheet, strip or bar metal in packs whereas resistance to the relative sliding or shifting movement of the parts of the pack during transit is obtained through the medium of friction material causing a binding or frictional action on the parts within the pack, or within the cross sectional area thereof.

In accordance with the present invention, the sheet, strip or bar metal, which is shipped in large quantities from steel or rolling mills to automobile manufacturers and others is transported on the floor of a freight car or carrier in heavy packs or bundles, such as packs weighing from five to ten tons, and the constituent parts of the pack, in part or in whole, are held together by the application of friction interorly of the pack or within the cross sectional area thereof. This may be done by interposing relatively softer friction material between the adjacent layers or edges of the sheets, strips or bars, such as relatively soft wood strips. The metal parts of the pack are maintained, preferably by substantial pressure, against this friction material. This pressure may be obtained through the weight of the metal, through the medium of the binding or bracing elements, or both.

In the case of sheet or strip metal, where the edges of the sheets are usually relatively smooth, especially where the sheets or strips are sheared at the mill, wood strips may be advantageously employed and a sufficient amount of pressure of the edges of the metal against this material can be made to result in embedding the edges therein and in resisting relative shifting movement of the sheets or strips during transit.

Moreover, the invention enables a pack to be made up of several smaller units or stacks, and at the same time transported effectually by resisting relative shifting of the units within the bundle or pack as a whole. For instance, a bundle may be made up of metal sheets of several different widths, or simply of narrow sheets or strips arranged in individual piles according to width within the bundle as a whole. These sheets are preferably arranged with their inner edges abutting or in opposed relation, with friction material interposed therebetween, so that frictional resistance can thus be applied to the sheet or strip edges interiorly of the bundle, or within the cross sectional area thereof.

Furthermore, the invention provides for the shipment of unit packs made up of a plurality of piles or sections superimposed one upon the other, and in which any pile or section can be made up of stacks of sheets narrower than the width of the pack as a whole. In this instance the invention provides for the maintaining of the sections or layers together through preferably a common medium for frictional resistance while also maintaining the individual stacks of any section together through frictional resistance within the cross sectional area of the bundle as a whole.

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 charac-
ters designate corresponding parts in the several figures.

Figures 1 and 2 are transverse vertical sections showing successive steps in the loading of a pack of strip or bar metal on the car floor.

Figure 3 is a side elevational view of the pack shown in Figure 2, arranged with the edge surfaces horizontal and extending lengthwise of the car.

Figure 4 is a view similar to Figure 3, showing a slightly modified form of guiding means.

Figure 5 is a fragmentary perspective showing the support for the pack somewhat more clearly.

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 practiced 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 as considered in view of the prior art and the requirements thereof.

The handling of sheet, strip and bar metal, such as steel, and the shipment of this material in freight cars or carriers have in the past been accomplished at great expense, not only to the steel mills and consumers, such as automobile companies, but also to the railroads. Not only has the labor expense in loading or unloading the cars been very great, but account of manual handling of the metal, but the time required to load and unload the cars has resulted in tying up cars on the railroad sidings, causing congestion and frequently impeding production. One of the serious disadvantages to previous methods employed in transporting this metal has been on account of the enormous damage to freight cars as well as damage to the material due to the shifting of the metal in transit, particularly in the case of sheet steel.

Freight cars are subjected to shocks, blows and collisions, frequently resulting in impacts at as much as twenty miles per hour. Where the sheet, strip or bar metal is loaded on the car floor in accordance with previous practice, violent displacement of the bars of sheets or steel strips, frequently resulted when the car received a shock or blow, and the bars were often driven against the ends or the side walls of the car with great force. This resulted in considerable damage to the cars, as well as to the metal, even in ramming holes through the end walls of the car. The tendency of sheet, strip and bar metal to shift is, of course, aided by the fact that the surfaces are usually provided with an oily, rust preventative coating, causing the metal to slide very readily.

In the drawings, the invention is illustrated as applied to the loading and shipping of metal sheets or strip metal, although it will be understood that the latter are simply illustrative of material for which the invention is intended, and that the same is also applicable to bars as shown in my co-pending application above mentioned.

Referring to Figures 1 and 2, the metal sheets or strip metal are arranged in layers or groups. The pack of Figure 1 comprises a bottom layer, the individual sheets or strips of which are disposed on edge, and a top layer or group D', the sheets of which are arranged similarly to the sheets of the lower group or layer. The two layers or sub-units which make up the entire pack or larger unit may be bound as shown in Figure 1, at the mill prior to loading in the car, or if desired, the pack may be bound in the car. However, it is preferable to form the pack at the mill so that the same may be taken directly as a unit into the car, thereby saving a great amount of labor and expense in the loading operation. The two groups or sub-units are separated by means of transversely extending strips 10 of relatively softer material, such as wood, in engagement with the surfaces which are to be horizontally disposed and extend lengthwise of the car. Other material adapted to frictionally engage the edges of the sheets could, of course, be used.

As will be observed, the strips 10 are spaced apart and are disposed between the juxtaposed inner edges of the sheets constituting the two groups or layers. The pack made up of these groups or sub-units may be bound by an encircling medium, which in the present instance, comprises several longitudinally spaced band or strip steel binders 11. Interposed between these binders and the pack are wood bars or strips 12, preferably disposed at all four sides of the pack, and particularly along the top horizontal surfaces. Of course, if the pack consists of only one layer, then the softer material along the top horizontal edges functions as does the intervening or internal strips 10. The band binders or strips 11 are of suitable gauge steel several inches in width, and the ends 11' are drawn together and clamped as through the medium of an encircling collar 13. The bands may be nailed to the wood strips 12, as illustrated in Figure 3, and as will be observed, the pack is preferably formed with the packs at right angles to one another so as to be rectangular in cross section, as shown in Figure 1.

After being thus formed, the pack may be positioned as a unit on the freight car floor for transportation. It may be carried into
the car by means of a power driven industrial truck, and it will be understood that the term "freight car" is used throughout the specification and claims is intended to cover any transporting medium, the term being used in a broad sense.

The pack is preferably supported on the car floor through means interposed between the same and the floor, such as bars or riding members 14 extending longitudinally of the car and spaced apart a sufficient distance to provide a stable support. These bars are spaced apart transversely by a plurality of members 15 of relatively softer material than metal which are disposed edgewise with the lower straight edge 12, notched to receive the longitudinal strips 11, as shown clearly in Figure 5. The transverse bars 15 and the longitudinals 14 may be nailed together.

As will be observed, the pack supporting surfaces of the members 15 are curved or arched to provide an inclined surface which will tend to distort the pack from the rectangular form shown in Figure 1 to the form shown in Figure 2. As will be understood, when the pack is lowered in the car on the supporting members 15, the lower edges of the sheets will rest upon the arched surfaces of the members 15 with the binder at one side thereof as shown in Figure 3. This will result in bowing the stack, whether the same consists of only one unit or of a plurality of sub-units, as shown in Figure 1. The several units or groups will conform to the curvature or inclination of the supporting surfaces of the members 15, thereby increasing the cross sectional area of the entire pack, increasing the distance around the pack, and tightening the band binders or strips 13 under considerable tension. Moreover, it will be observed that the distortion tends to increase the frictional engagement between the horizontal surfaces, which in the present instance are the sheet edges, and the internal members 10, as well as between the top surfaces or edges and the bars disposed between said outer edges and the bands 13. The bars 10 being spaced apart will conform to the pack distortion as illustrated in Figures 1, 2 and 4, and the edges of the sheets will cut into the wood sufficiently to provide considerable frictional resistance against shifting of the sheets relatively to one another during transit.

The packs during shipment are held in position on the car floor against lateral shifting movement with respect to each other and to the side walls, and are also guided in their movement longitudinally of the car by means of longitudinal guide members 20 which are nailed or secured to the car floor. These guides have the important functions,

(1) Of guiding the packs in a predetermined path longitudinally of the car during the restricted floating movement of the packs back and forth on or relatively to the car floor as a result of shocks and blows to which the car is subjected in transit; and

(2) Of maintaining the packs in predetermined spaced relation with respect to the side walls of the car, thereby preventing damage to the car walls while retaining suitable aisle spaces at opposite sides of the packs to permit removal of the packs as units at destination, such as by means of a portable crane or stack lifter as illustrated, for instance, in my above mentioned Patent No. 1,650,560. This stack lifter has an arched frame, the legs of which are movable into position in the aisle spaces, when either loading or unloading the packs, to straddle opposite sides of each pack, lifting mechanism being provided for lifting or lowering the pack with respect to the car floor. These guides, therefore, not only retain these aisle spaces, but in performing this function also prevent contact of the packs with the side walls of the car causing damage thereto during transit. Relative movement between the pack and supporting pallet may be prevented in any suitable manner. In the present instance relative sliding movement is prevented by means of the encircling bands which are disposed immediately adjacent the end cross members 15. Tilting movement may be prevented in any manner desired, for instance, by suitably tying or binding the pack to the supporting pallet.

Referring to Figure 4, it may be found desirable to provide above the wooden guide strips 20 a supplemental guide 21 in the form of an angle bar which may extend the full or greater length of the pack and has one flange projecting upwardly a sufficient distance to engage the pallet above or support above the longitudinal members 14.

It will be understood, of course, that although the sheets are shown as arranged on edge, the invention is not limited to this precise form, since they may also be disposed flatwise as described in my co-pending application, Serial No. 492,845, filed January 23, 1930.

It being understood, therefore, that the invention is not to be limited to the details which are above described, what I claim is:

1. The hereindescribed method of shipping sheet, bar or strip metal, in relatively heavy unit packs on a freight car floor which consists in applying friction to the pack by binding the same as a unit with the upper or lower horizontal surface in engagement with relatively softer material, such as wood, and distorting the pack transversely of the binder against said material to increase the frictional engagement.

2. The hereindescribed method of shipping sheet, bar or strip metal, in relatively heavy unit packs on a freight car floor which consists in applying friction to the pack by
binding the same as a unit with the constituent parts having their edges in engagement with relatively softer material, such as wood, and distorting the pack transversely of the binder against said material to increase the frictional engagement.

3. The hereindescribed method of shipping sheet, bar or strip metal in relatively heavy unit packs on a freight car floor which consists in applying friction internally to the pack by binding the same as a unit with the constituent parts between the layers or groups thereof having their horizontal surfaces in engagement with relatively softer material, such as wood, and distorting the pack transversely of the binder against said material to increase the frictional engagement.

4. The hereindescribed method of shipping sheet, bar or strip metal in relatively heavy unit packs on a freight car floor which consists in applying friction internally to the pack by binding the same as a unit with the constituent parts between the layers or groups thereof in engagement with relatively softer material, such as wood, and distorting the pack transversely of the binder to increase the frictional engagement.

5. The hereindescribed method of shipping sheet, bar or strip metal, in relatively heavy unit packs on a freight car floor which consists in applying friction to the pack by binding the same as a unit with the constituent parts having their horizontal surfaces extending lengthwise of the car and in engagement with relatively softer material, such as wood, and distorting the pack transversely to increase the frictional engagement by supporting the same upon a member having an inclined surface.

6. The hereindescribed method of shipping sheet, bar or strip metal, in relatively heavy unit packs on a freight car floor which consists in applying friction to the pack by binding the same as a unit with the constituent parts having their edges in engagement with relatively softer material, such as wood, and distorting the pack transversely to increase the frictional engagement by supporting the same upon a member having an inclined surface.

7. The hereindescribed method of shipping sheet, bar or strip metal in relatively heavy unit packs on a freight car floor which consists in applying friction internally to the pack by binding the same as a unit with the constituent parts between the layers or groups thereof having their horizontal surfaces extending lengthwise of the car and in frictional engagement with relatively softer material than the metal, and distorting the pack transversely to increase the frictional engagement by supporting the same upon a member having an inclined surface.

8. The hereindescribed method of shipping sheet, bar or strip metal in relatively heavy unit packs on a freight car floor which consists in applying friction internally to the pack by binding the same as a unit with the constituent parts between the layers or groups thereof having their edges in frictional engagement with relatively softer material than the metal, and distorting the pack transversely to increase the frictional engagement by supporting the same upon a member having an inclined surface.

9. The hereindescribed method of shipping sheet metal in relatively heavy unit packs on a freight car floor which consists in applying friction to the edges of the sheets by binding the same as a unit with the opposed edges of parallel layers or sub-units of sheets, in engagement with relatively softer material and distorting the pack against said material.

10. The hereindescribed method of shipping sheet metal in relatively heavy unit packs on a freight car floor which consists in applying friction internally to the edges of the sheets by binding the same as a unit with the sheet edges in engagement with relatively softer material and distorting the pack against said material.

11. The hereindescribed method of shipping sheet metal in relatively heavy unit packs on a freight car floor which consists in applying friction to the sheet edges by binding the same as a unit with the opposed edges of parallel layers or sub-units of sheets in engagement with relatively softer material and distorting the pack against said material by supporting the pack on an inclined surface.

12. The hereindescribed method of shipping sheet or strip metal which comprises transporting on the floor of a carrier a bound pack made up of sub-units separated by relatively softer material, such as wood, engaging the edges of the sheets or strips, and maintaining said material in frictional engagement with the edges to resist relative shifting of the parts during transit by distorting the pack transversely.

13. The hereindescribed method of shipping sheet or strip metal which comprises transporting on the floor of a carrier a bound pack made up of sub-units separated by relatively softer material, such as wood, engaging the edges of the sheets or strips, and maintaining said material in frictional engagement with the edges to resist relative shifting of the parts during transit, and distorting the
pack by supporting the same on a medium adapted to shift the sheets relatively to one another against said material.

15. The method of shipping sheet or strip metal which comprises binding in a unitary pack a plurality of sub-units, the sub-units having the edges of the individual sheets or strips juxtaposed and spaced by a relatively softer material, such as wood, binding the pack with an encircling medium, supporting the pack with the sheets on edge and distorting the pack against said material to increase the frictional engagement between said spacer and to tighten the binder.

16. The method of shipping sheet or strip metal which comprises binding in a unitary pack a plurality of sub-units, the sub-units having the edges of the individual sheets or strips juxtaposed and spaced by a relatively softer material, such as wood, binding the pack with an encircling medium and supporting the pack with the sheets on edge and distorting the pack against said material by resting the same on a member having an inclined supporting surface.

17. The hereindescribed method of shipping sheet, bar or strip metal, in relatively heavy unit packs on a freight car floor which consists in applying friction to the pack by binding the same as a unit with the constituent parts in engagement with relatively softer material such as wood, distorting the pack transversely of the binder against said material to increase the frictional engagement, and permitting the pack to float as a unit on the car floor during shipment.

18. The hereindescribed method of shipping sheet metal in relatively heavy unit packs on a freight car floor which consists in applying friction to the edges of the sheets by binding the same as a unit with the opposed edges of parallel layers or sub-units of sheets in engagement with relatively softer material and distorting the pack against said material to increase the friction and tighten the binding, and permitting the pack to float as a unit on the car floor during shipment.

19. The hereindescribed method of shipping sheet or strip metal which comprises transporting on the floor of a carrier a bound pack made up of sub-units separated by relatively softer material, such as wood, engaging the edges of the sheets or strips, and maintaining said material in frictional engagement with the edges to resist relative shifting of the parts during transit by distorting the pack transversely, and permitting the pack to float as a unit on the car floor during shipment.

20. An apparatus for shipping sheet, strip or bar metal on the floor of a freight car in a pack comprising a supporting means adapted to be interposed between the bound pack and the floor, said supporting means consisting of longitudinal members connected by a trans-verse member having an arched upper surface adapted to engage the pack and to distort the same upwardly, and binder means for the pack including a member of relatively softer material adapted to be disposed above a portion of the pack to receive the thrust of the upward distortion and set up a frictional engagement with the pack.

In testimony whereof I have hereunto set my hand.

ROBERT T. ROMINE.