

Dec. 23, 1952

G. F. STEWART ET AL

2,622,540

METHOD AND APPARATUS FOR HANDLING RAILROAD TIES

Filed Sept. 6, 1951

3 Sheets-Sheet 1

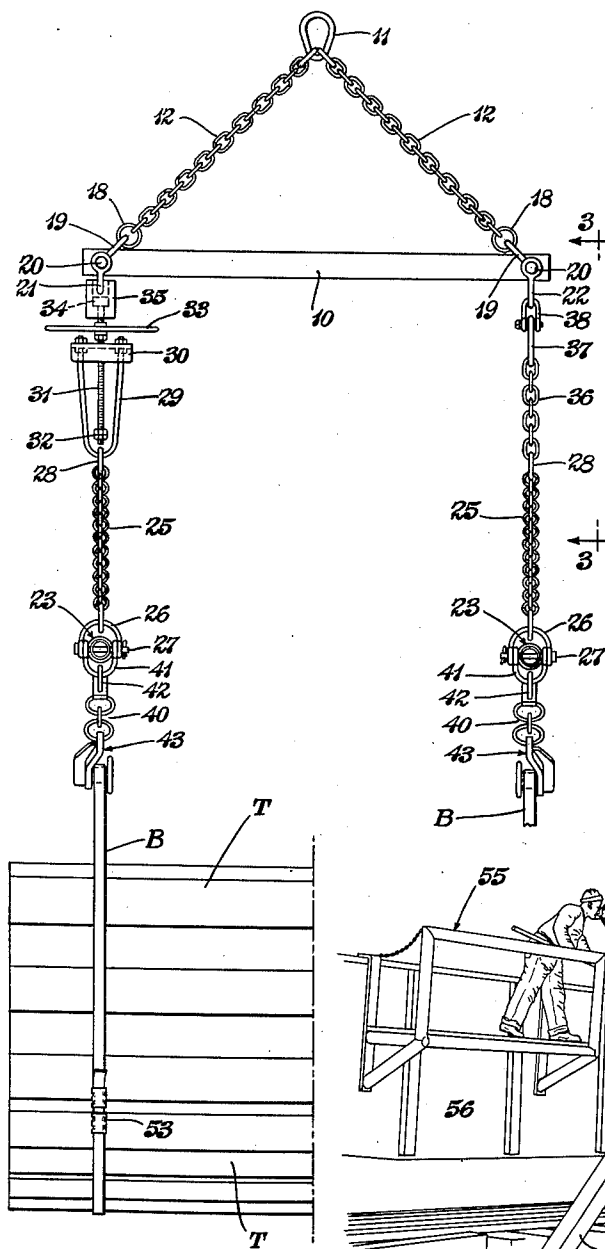


Fig. 2

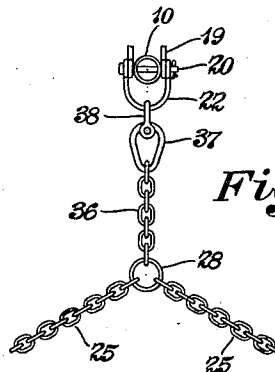


Fig. 3

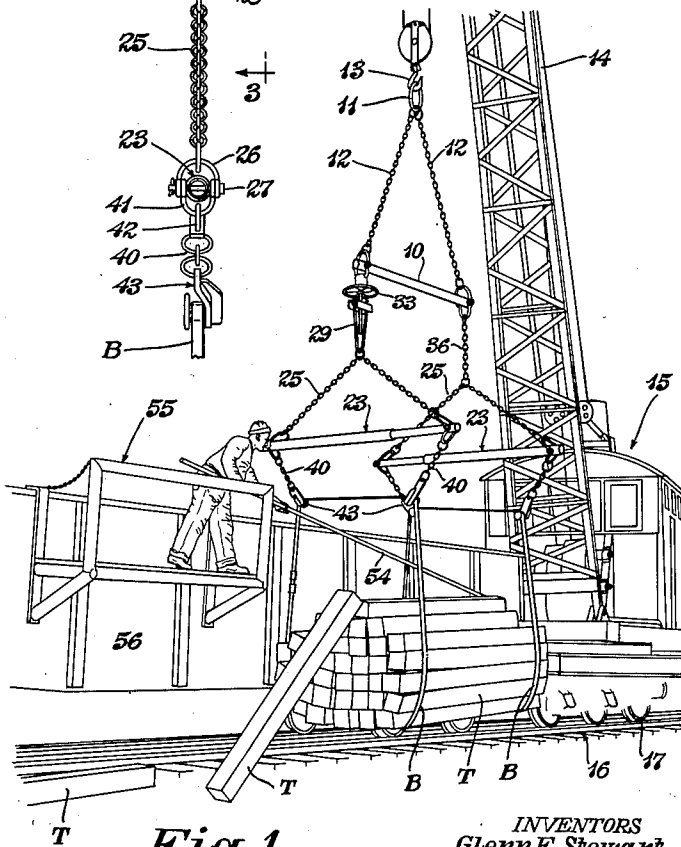


Fig. 1

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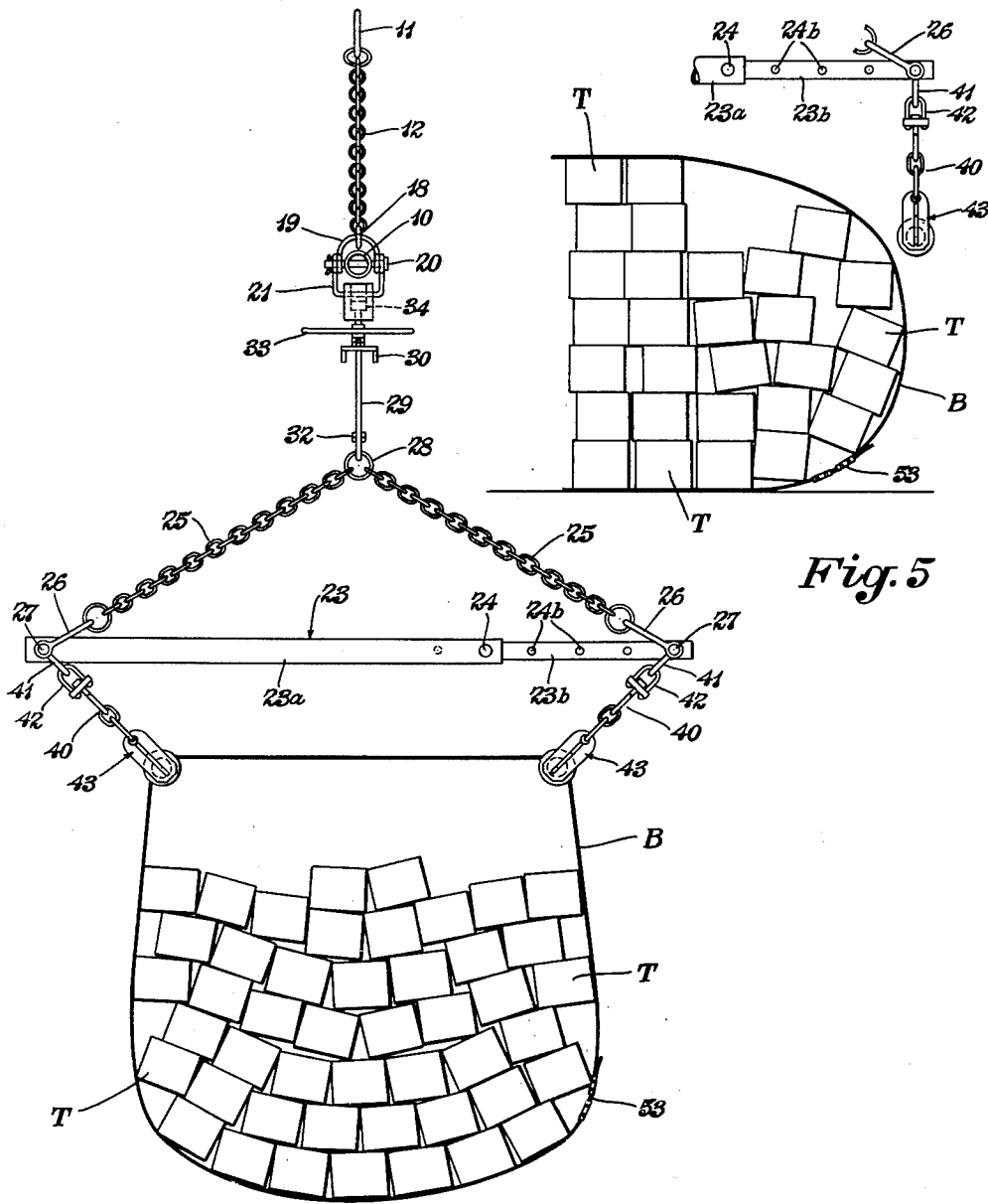


Fig. 5

Fig. 4

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3 Sheets-Sheet 3

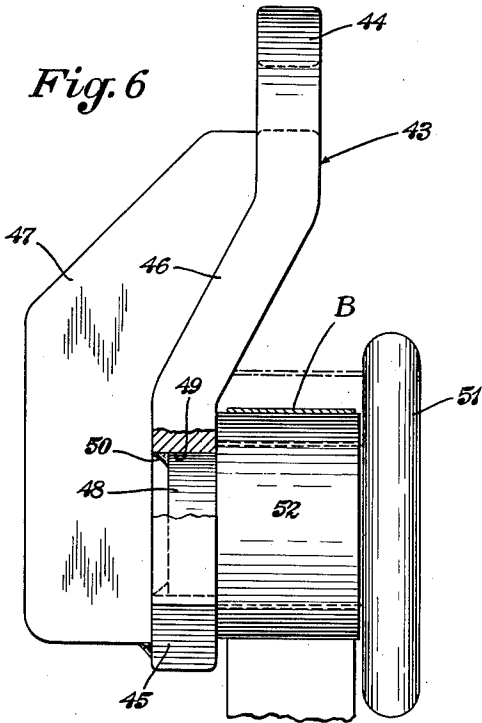


Fig. 6

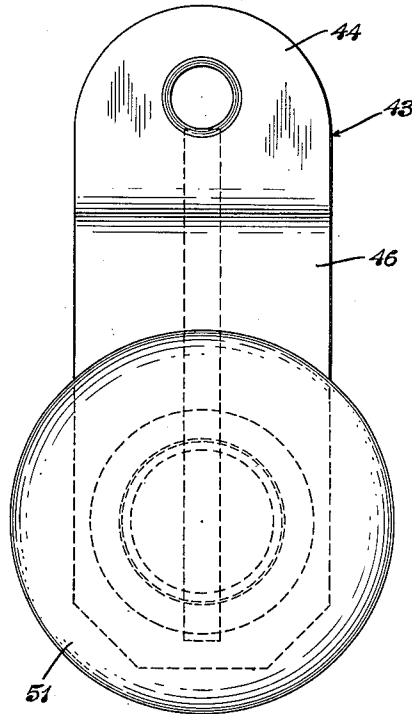


Fig. 7

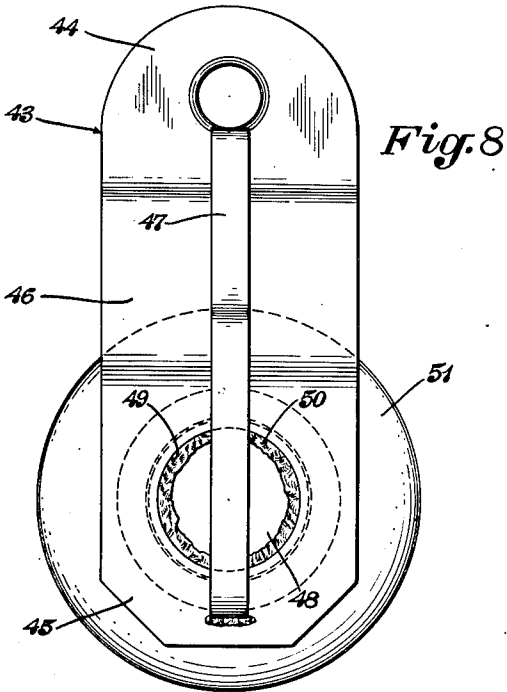


Fig. 8

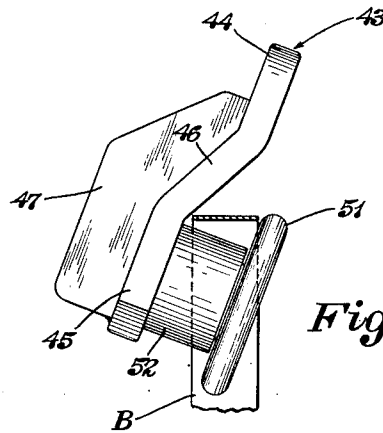


Fig. 9

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2,622,540

METHOD AND APPARATUS FOR HANDLING RAILROAD TIES

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Application September 6, 1951, Serial No. 245,398

15 Claims. (Cl. 104-5)

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The invention relates generally to the handling of railroad ties and more particularly to a novel method of, and apparatus for, distributing ties along a railroad right-of-way to replace the ties already in place supporting the rails.

For many years the ordinary method of distributing ties along a railroad track has been to transport the ties in gondola cars and have a crew of six or eight men on the cars throw the ties off at the side of the track in a sort of hit or miss fashion. Another crew of men follow on the ground and arrange or align the ties substantially opposite the points where they are to be used.

In some cases the ties have been bound in bundles with tensioned metal bands and loaded into gondola cars, from which the bundles are unloaded by a crane and deposited along the right-of-way to be distributed further at a later date. In order to handle these bundles with conventional chain or cable slings it is necessary to block up or raise the bundles both in the cars and on the ground so that the slings can be passed around the bundle. Moreover, binding the ties into bundles requires tensioning the bands around the bundles with hand tools while the ties are in a storage yard or on a tram car, and where these bundles are piled in a storage yard it is necessary to space them apart sufficiently to allow passing the crane slings around the bundles for later removing the same from storage.

Prior attempts have been made to handle bundles of ties bound with tensioned metal bands by engaging the hooks of the crane lift directly with the bands. Such attempts have not been successful for several reasons. The tensioned bands are very difficult to hook onto and the hooks do not or cannot slide easily to the lift point or fulcrum of the band, with the result that the hooks tend to tear the band and to "roll" the bundle when the hooks catch and fail to slide during the start of the lifting operation.

In any case where bound bundles of ties are placed along a railroad right-of-way, it is necessary to cut the bands and then distribute the ties singly by hand, which is very costly due to the amount of manual labor involved.

It is a general object of the present invention to provide a novel and improved method and apparatus for handling and distributing ties along a railroad right-of-way in such manner as to overcome the foregoing difficulties and disadvantages, and greatly reduce the amount of manual labor required.

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More specifically, it is an object of the present invention to provide a novel method and apparatus for handling and distributing ties, which eliminates the necessity of tensioning metal bands around bundles of ties, which eliminates the necessity for blocking or spacing bundles of ties in storage or in transport, and which eliminates the need for passing slings around the bundles prior to lifting and transporting them.

Another object is to provide a novel and improved method of handling and distributing ties using presealed metal bands fitting loosely around the bundles and using the bands as slings for handling the bundles.

Another object is to provide a novel lifting apparatus for engaging the loosely fitting presealed metal bands to handle a bundle of ties engirdled by said bands.

A further object is to provide an improved method of distributing ties singly along a right-of-way, using a crane for supporting and moving the bundle as the ties are pulled one at a time from the bundle.

Another object is to provide a novel lifting apparatus for engaging metal bands loosely engirdling a bundle of ties in such a manner that the top ties in the bundle are free to move while the bundle is suspended.

A still further object is to provide a novel lifting apparatus employing novel roller hooks which are adapted to be engaged under sealed metal band loops loosely fitting around a bundle of ties for lifting the ties straight upwardly without tearing the bands or rolling the bundle, said hooks having means preventing their disengagement from the bands during the lifting operation.

These and other objects are accomplished by the parts, methods, apparatus, combinations and arrangements comprising the present invention, preferred embodiments of which are shown by way of example in the accompanying drawings and described in the specification, the nature of the invention being set forth in the following general statement, and the scope of the invention being defined in the appended claims.

In general terms, the invention comprises pre-sealing metal bands into loops for engirdling a predetermined number of ties in a bundle with a substantial amount of slack in the bands and placing the bands around the ends of the bundle, then employing a lifting apparatus which has two roller hooks engaging each band and spreader bars for spreading the hooks to exert a laterally outward pull on the top of each band so that the ties at the top of the bundle are free

to be moved longitudinally thereof, the lifting apparatus being used to transport bundles of ties to a gondola car, and subsequently to lift the bundle from the car and suspend it along the right-of-way close to the ground with the ties extending longitudinally of the track, so that the ties can be pulled from the top of the bundle one at a time as the bundle is moved along the right-of-way.

Figure 1 is a perspective view of the novel lifting apparatus of the present invention suspending a bundle of ties along a railroad track, and the ties being distributed singly along one side of the track;

Fig. 2 is an enlarged side elevation of the lifting apparatus suspending a bundle of ties shown fragmentarily;

Fig. 3 is a fragmentary and elevational view of the lifting apparatus, as on line 3—3, Fig. 2;

Fig. 4 is an elevation of the opposite end of the lifting apparatus and bundle;

Fig. 5 is a fragmentary end elevation of a bundle of ties engirdled by a loose band and resting on a flat surface preparatory to attaching the lifting apparatus (shown fragmentarily) to the band;

Fig. 6 is an enlarged side elevation of the novel roller hook, partly in section, showing the hook in position supporting a metal band loop;

Fig. 7 is a front elevation of the hook;

Fig. 8 is a rear elevation thereof; and

Fig. 9 is an elevation similar to Fig. 6 on a reduced scale, showing the manner of engaging the hook under a band loop.

Similar numerals refer to similar parts throughout the drawings.

Railroad ties are normally given a wood preserving treatment in a closed treating chamber, and for this purpose a substantially cylindrical bundle of ties is carried on a tram car and track into the treating cylinder. The bundles of ties may contain a predetermined number which varies from 36 to 53 ties, according to the practice on different railroads or varying conditions of installation. After the preserving treatment, the trams of ties are wheeled out of the treating cylinder, and the bundles are loaded by crane into a gondola car or stacked in a storage yard for subsequent use. Prior to this invention, the conventional manner of handling the bundles of ties was to pass the usual chain or cable slings around each bundle and lift it by engaging the ends of the slings with the lifting hook of the crane.

According to the present invention, a large number of metal bands, two for each bundle of ties, are made up in advance into closed loops of predetermined circumference. These bands may be made in a shop or convenient place equipped with the necessary coil holding and cutting apparatus and sealing tools. The lengths of the bands are calculated according to the predetermined number of ties being used per bundle, and the ends of the bands are sealed together so as to provide closed loops which will engirdle the bundle with a substantial amount of slack. Preferably, a type of seal is used which crimps the edges of the band rather than one which cuts the edges and tends to weaken the band.

Referring to Fig. 4, the length of the closed band loop B should be such that when it is drawn taut upwardly about a bundle of ties by pulling laterally outward at two points above the sides of the bundle, the distance from the top ties in the bundle to the top stretch of the band is about 18". Preferably, a so-called "heavy duty" size, 2" wide

by .065" thick, metal band is used to increase the factor of safety in lifting the bundles of ties by engaging the lifting apparatus directly with the bands.

When the tram loads of ties are wheeled out of the treating cylinders, two of the made-up bands are placed in position around the ends of the bundle as it rests on a tram car and the usual retaining rods are disengaged from the car. The novel lifting apparatus of the present invention is then lowered by crane and the roller hooks thereof are engaged with the bands to lift the bundle and place it either in a storage yard or in a gondola car for being transported along the right-of-way.

The improved lifting apparatus of the present invention preferably includes a longitudinal spreader bar 10 which may be tubular as shown, and which is hung from the crane hook ring 11 by two strands of flexible connectors which may be lengths of chain as shown at 12. As indicated in Fig. 1, the ring 11 is supported on a usual crane hook 13 suspended in a usual manner from the boom 14 of the crane indicated generally at 15 which is rollably mounted on a railroad track 16 by wheels 17.

As shown in Figs. 1 to 4, the strands 12 are connected to the ends of the longitudinal spreader bar 10 by rings 18 attached to clevises 19 which are pivoted on pins 20 extending through the ends of the bar. The pivot pins 20 also pivotally support clevises 21 and 22 depending below the bar, and the clevises 21 and 22 carry laterally extending spreader bars indicated generally at 23 for suspending and pulling laterally outward on the metal bands B engirdling a bundle of ties T.

Each lateral spreader bar 23 is preferably adjustable as to length and consists of two tubular bars 23a and 23b (Fig. 4), the bar 23b being telescoped within the bar 23a. A pin 24 extends through holes in the inner end of bar 23a and through a selected pair of holes 24b located at intervals along the length of bar 23b, so that the length of the spreader bar 23 is adjustable. The spreader bars 23 are supported by two strands or lengths of flexible connectors which may be chains 25, the chains being attached at their lower ends to clevises 25 swiveled on pivot pins 27 on the outer ends of the bars 23a and 23b. The chains 25 are connected at their upper ends to rings 28 and the rings are hung from and supported directly below the clevises 21 and 22 mounted on the ends of the longitudinal spreader bar 10.

The front clevis 21 is connected to the ring 28 located immediately below by a vertically adjustable link construction which includes a yoke 29 secured in the ring 28 and having its upper ends bolted to a channel member 30. A vertical adjusting screw 31 having stop nuts 32 on its lower end is screwed through the web of the channel 30 and has an adjusting hand wheel 33 secured on its upper end portion. The upper end of the screw above the wheel 33 has a head 34 thereon which is journaled on a shoulder in a coupling sleeve 35 carried on the clevis 21.

Thus, in order to adjust the vertical distance between the clevis 21 and the ring 28 immediately below the same, the hand wheel 33 is turned to rotate the screw 31 up or down in the channel 30 carried by the yoke 29, the head 34 of the screw rotating on its journal in the sleeve coupling 35.

The rear clevis 22 is connected with the ring 28 immediately below by a flexible strand or length of chain 36 having a ring 37 at its upper end and a detachable connector yoke 38 connect-

ing the ring 37 to the clevis 22. Accordingly, by adjusting the hand wheel 33 at the front end of the longitudinal spreader bar 10, the distance between the clevis 21 and the ring 28 can be made equal to or greater or less than the distance from the clevis 22 to the ring 28 below the same. In this way, the bundle of ties suspended by the lifting apparatus can be carried horizontal, or can be tilted up or down at one end, as required.

The pivot pins 27 on the ends of the lateral spreader bars 23 pivotally support connectors 40 which are adapted to engage under the metal bands B encircling the ends of a bundle of ties for suspending the bundle. Each pin 27 pivotally mounts a clevis 41 connected to a yoke 42 which is connected by chain links or the like to novel roller hooks indicated generally at 43.

Referring to Figs. 6 to 9 inclusive, the novel roller hooks 43 include hanger arms having vertically disposed upper and lower portions 44 and 45 respectively, connected by an intermediate inclined portion 46. On the outer side of the arm 43, a reinforcing rib 47 is preferably attached, as by welding. A roller supporting pin 48 is secured in an aperture 49 in the lower portion 45 of the arm 43, as by welding indicated at 50, and the other end of the pin is provided with a circumferential rim flange 51 projecting radially from the pin.

A roller 52 is journaled on the pin 48 between the rim flange 51 and the lower portion 45 of the hanger arm, there being a working clearance between the roller and the arm and rim flange. The axial length of the roller 52 is slightly greater than the width of the band B being used, the normal width of the band being 2". As indicated in Fig. 6 in dot-dash lines, when the roller hook 43 supports a band B on the roller 52 under load, the band cannot jump off the roller, because of the relatively narrow width between the rim flange and the inclined portion 46 of the hanger arm. In other words, when the roller hooks support the bands under load, the bands are locked against accidental displacement from the hooks.

In order to engage the roller hooks under the closed band loops B, it is merely necessary to tilt the hooks at an angle to the band as shown in Fig. 9 in order to pass the rims 51 of the hooks under the band and allow the band to pass between inclined portion 46 of the hanger arms and the adjacent edge of the rim flange 51. Referring to Fig. 5, when a bundle of ties T is encircled by loosely fitting bands B which have their ends sealed together by crimped joints indicated at 53, and the bundle is resting on the ground or the bottom of a railroad car or any flat support, the lifting apparatus is lowered by the crane so that each pair of hooks 43 suspended by the lateral spreader bars 23 is adjacent to slack portions of the bands. The joints 53 are preferably located at the sides or bottom of the bundle to be a substantial distance from the roller hooks.

The operator then tilts the hooks 43 one at a time and engages them under the slack portions of the bands, whereupon the lifting apparatus is raised by the crane, and during the initial lifting operation, the roller hooks 43 roll upwardly to fulcrum or load-lifting points on the band as indicated in Fig. 4. The radii of the hook rollers 52 should be not less than 1½" in order that the portion of the band engaging the rollers is not bent so sharply as to weaken the band.

It is essential that the lengths of the lateral spreader bars be substantially greater than the

width of the bundle when lifted, so the hooks 43 pull laterally outward on the upper portion of the band as they raise the bundle. The result is that the side portions of the bands are held apart with a taut upper horizontal portion between them, so that the ties on the top of the bundle are not bound but are free to be moved.

Thus, when the bundle is suspended along a railroad track as shown in Fig. 1, with the ties extending longitudinally of the track, a single workman using a pike pole 54 can pull the top ties one at a time from off the bundle. If the workman is positioned on a catwalk or platform indicated generally at 55 which may be attached to the side of a gondola car 56 carrying bundles of the ties encircled by the bands B, the crane 15 may move slowly along the track pulling the gondola car 56 and suspending the bundle of ties alongside of the car where they are pulled one at a time by the workman and distributed at intervals lengthwise along the railroad right-of-way.

In handling and distributing ties according to the present invention, the bundles of ties loosely encircled by the bands B are loaded crosswise into the gondola cars by engaging the bands B with the novel lifting apparatus. When the bundles are disposed in the cars and the roller hooks 43 disengaged therefrom, the bundles of ties will spread out laterally to substantially fill the loose bands as in Fig. 5, and this spreading causes a lowering of the tops of the bundles, thus insuring that the tops of the ties will be below the sides of the gondola cars in accordance with railroad regulations. The adjusting wheel 33 is used to raise or lower the front end of the bundle in accordance with the frictional resistance between the ties which may vary considerably according to different weather conditions. For example, if the ties are coated with ice they will slip more readily and require less tilting of the bundle.

If desired, the workman pulling the ties for distributing them singly along the track may walk along the right-of-way behind the suspended bundle, but the catwalk position is preferred because it is much less hazardous.

By using the novel method of single tie distribution employing the novel spreader lifting apparatus including the roller hooks, the bands are preformed and sealed into loops in a convenient location provided with the necessary equipment, so that the bundles of ties do not need to be strapped and tensioned in the field or yard. The bundles encircled by the loose bands may be stored flat on the ground and on top of each other or loaded into a gondola car without any necessity of blocking up the bundles to enable passing crane slings around the same. The slack in the bands makes it easy to insert the roller hooks under the slack portions, and the roller hooks immediately roll to the fulcrum points when the bundle is lifted, without tending to roll the bundle, and without tearing or weakening the bands where they are engaged by the hooks, as is the case with rigid hooks normally used for lifting.

The novel method and apparatus of the present invention enables handling and distributing ties singly along a railroad right-of-way without the necessity of tensioning the metal bands around the bundles and laterally cutting the bands; eliminates the necessity of blocking and spacing the bundles in storage or in transport; and eliminates the need for passing the usual crane slings around the bundles for lifting and transporting them. Moreover, the present in-

vention provides for greatly reducing the amount of manual labor required in handling and distributing the ties along the railroad, due to the fact that one man can attach the lifting apparatus to the bundles in the car and then pull the ties one at a time from the top of the bundle as it is suspended alongside of the car.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention, the construction, the operation and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful methods and constructions, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

We claim:

1. The method of distributing ties alongside a railroad track which includes engirdling a bundle of ties with metal bands having their ends sealed together to form loops loosely engirdling said bundle, engaging and spreading apart the top portions of said loops to lift the bundle with the top ties thereof free, suspending and moving said bundle along said track with the ties in the bundle extending longitudinally of said track, and pulling single ties longitudinally from the top of the bundle as the bundle moves along the track.

2. The method of distributing ties alongside a railroad track which includes forming metal band loops for engirdling a predetermined number of ties in a bundle with a substantial amount of slack in the bands, placing said bands over the ends of said bundle, engaging and spreading apart the top portions of said loops to lift the bundle with the top ties thereof free, suspending and moving said bundle along said track with the ties in the bundle extending longitudinally of said track, and manually pulling single ties longitudinally from the top of the bundle as the bundle moves along the track.

3. The method of distributing ties alongside a railroad track which includes engirdling a bundle of ties with metal bands having their ends sealed together to form loops having sufficient slack to be spread apart at the top for suspending the bundle with the top ties thereof free to move longitudinally, spreading and lifting the top portions of said loops to suspend the bundle, moving said suspended bundle along the track with the ties in the bundle extending longitudinally of said track, and pulling single ties longitudinally from the bundle at intervals as the bundle is moved along the track.

4. The method of distributing ties alongside a railroad track which includes forming metal band loops for engirdling a predetermined number of ties in a bundle with sufficient slack to allow the bands to be spread apart at the top while suspending the bundle with the top ties free to move longitudinally, placing said bands over the ends of said bundle, spreading and lifting the top portions of said loops to suspend the

bundle, moving said suspended bundle along the track with the ties in the bundle extending longitudinally of said track, and manually pulling single ties longitudinally from the bundle at intervals as the bundle is moved along the track.

5. In combination, a bundle of railroad ties having longitudinally spaced laterally extending metal band loops loosely engirdling said bundle, lifting apparatus including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, spreader bars holding the lower ends of each pair of supports apart laterally at least over the outer edges of said bundle, and flexible supports hung from the ends of said spreader bars and having means on their lower ends for spreading and supporting said metal band loops at opposite sides of said bundle.

6. Apparatus for lifting a bundle of railroad ties having longitudinally spaced laterally extending metal band loops loosely engirdling said bundle, including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, means for adjusting the height of one of said pairs of flexible supports, spreader bars holding the lower ends of each pair of supports apart laterally at least over the outer edges of said bundle, and flexible supports hung from the ends of said spreader bars and having means on their lower ends for spreading and supporting said metal band loops at opposite sides of said bundle.

7. Apparatus for lifting a bundle of railroad ties having longitudinally spaced laterally extending metal band loops loosely engirdling said bundle, including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, laterally extending spreader bars adjustable in length holding the lower ends of each pair of supports apart laterally beyond the outer edges of said bundle, and flexible supports hung from the ends of said spreader bars and having means in their lower ends for engaging and supporting said metal band loops at opposite sides of said bundle.

8. Apparatus for lifting a bundle of railroad ties having longitudinally spaced laterally extending metal band loops loosely engirdling said bundle, including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, means for adjusting the height of one of said pairs of flexible supports, laterally extending spreader bars adjustable in length holding the lower ends of each pair of supports apart laterally beyond the outer edges of said bundle, and flexible supports hung from the ends of said spreader bars and having means on their lower ends for engaging and supporting said metal band loops at opposite sides of said bundle.

9. In combination, a bundle of railroad ties having longitudinally spaced laterally extending metal band loops loosely engirdling said bundle, lifting apparatus including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, spreader bars holding the lower ends of each pair of supports apart laterally at least over the outer edges of said bundle, flexible supports hung from the ends of said spreader bars, and roller

hooks on the ends of the last-said flexible supports for spreading and rollably supporting said metal band loops at opposite sides of the bundle.

10. Apparatus for lifting a bundle of railroad ties having longitudinally spaced metal band loops loosely engirdling said bundle transversely, including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, means for adjusting the height of one of said pairs of flexible supports, spreader bars holding the lower ends of each pair of supports apart laterally at least over the outer edges of said bundle, flexible supports hung from the ends of said spreader bars, and roller hooks on the ends of the last-said flexible supports for spreading and rollably supporting said metal band loops at opposite sides of the bundle.

11. Apparatus for lifting a bundle of railroad ties having longitudinally spaced metal band loops loosely engirdling said bundle transversely, including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, laterally extending spreader bars adjustable in length holding the lower ends of each pair of supports apart laterally beyond the outer edges of said bundle, flexible supports hung from the ends of said spreader bars, and roller hooks on the ends of the last-said flexible supports for rollably engaging and supporting said metal band loops at opposite sides of the bundle.

12. Apparatus for lifting a bundle of railroad ties having longitudinally spaced metal band loops loosely engirdling said bundle transversely, including a bar extending longitudinally over the bundle, means for suspending the ends of said bar from a crane hook, a pair of flexible supports hung on each end of said bar, means for adjusting the height of one of said pairs of flexible supports, laterally extending spreader bars adjustable in length holding the lower ends of each pair of supports apart laterally beyond the outer edges of said bundle, flexible supports hung from the ends of said spreader bars, and roller hooks on the ends of the last-said flexible supports for roll-

ably engaging and supporting said metal band loops at opposite sides of the bundle.

13. A roller hook for rollably engaging a metal band loop around a bundle to lift the bundle, including a pin, a cylindrical roller journaled on the pin and having an axial length slightly greater than the width of the band, a continuous circumferential flange secured to one end of the pin, and a supporting arm secured to the other end, said arm extending angularly to a point over the center of the roller, and the distance between the angular extension of the arm and the circumferential flange measured parallel to the roller axis being less than the width of said band.

14. A roller hook for insertion under a closed metal band loop to rollably engage the band, including a cylindrical roller, a pin journaling said roller and having a continuous rim flange at one end projecting radially beyond the roller, a hanger arm attached to the other end of the pin and extending angularly over the roller midway of its ends, and the distance between said hanger arm and rim flange measured parallel to the roller axis being less than the width of the band while permitting entry of the band in a relatively inclined position.

15. A roller hook for insertion under a closed metal band loop to rollably engage the band, including a cylindrical roller, a pin journaling said roller and having a continuous rim flange at one end projecting radially beyond the roller, a hanger arm secured to the other end of the pin and having an inclined portion extending over the roller midway of its ends, means at the outer end of said inclined portion for attaching a flexible support, and the distance between said inclined portion and said rim flange being such as to require tilting of the roller relative to the band in order to pass the band between said inclined portion and rim flange.

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No references cited.